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Military Tech-Writer's Graphics Guide (Draft)

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Preface

It is the Army's fundamental purpose to win wars through land force dominance. To that affect, the Army uses a variety of media to present doctrine and training information to prepare Soldiers to perform the functions they need. This pamphlet presents artists of printed doctrine media and technical writers with understanding and guidance of how to visually communicate technical procedures and the intangible abstracts of doctrine to Soldiers. The standards in this pamphlet are derived from the traditional aesthetic styles used during the era of ink and paint, before the advent of computers and desktop publishing. Though the methodology and media of doctrine publications have evolved technologically, the visual characteristics of effective text book illustration as an end product have not changed.

This pamphlet provides three functions for military artists and technical writers. It introduces the principles of how visual communications works in the human mind, and the history of art that has been most effective for communicating military concepts. This pamphlet establishes a defined set of style rules to craft consistent visual approach that the majority of Soldiers can rapidly interpret, intuitively. Furthermore, it provides detailed work steps for the use of the most common digital development and editing graphics software programs. The ultimate objective is to provide non-artists and artists with guidance on how to produce a consistent look-and-feel for illustrations in Army manuals when developing basic black-and-white images.

This pamphlet provides definitive standards for division chiefs within the various centers of excellences, the editors and quality reviewers within the Combined Arms Doctrine Directorate, and the publishing printers within the Army Publications Directorate.

Mr. Charles W. Bissett (CTR)

Doctrine Writer & Visual Developer

Note. Unless otherwise stated, whenever the masculine gender is used, both men and women are included.

Introduction

"The single biggest problem in communication is the illusion that it has taken place."

George Bernard Shaw

This manual provides instruction on the mechanics of preparing illustrations for incorporation into Army doctrine publications. It is intended for use by publication authors-writers, visual information specialists, and graphic artists. This guidance pertains to doctrine documents intended for publication as electronic manuals and printable materials. The written text of a military document is not a primary subject of this manual except in as far as it is the mission of the graphic artist or visual information specialist (referred to as, artist) is to create tables or figure graphics that support the text in a doctrine document. This guidance provides doctrine authors with standards on the graphic styles and correct image development process for figures used in doctrine publications developed for the Army Publishing Directorate. At a minimum, all doctrine production team members should become familiar with the illustration styles and the image insertion procedures.

Previous military manuals on this subject were based on the production of graphics based on ink and paint. These analog image production techniques have disappeared, and the doctrine literature which supported those techniques became obsolete and were discontinued. A void has developed in the definition of appropriate military doctrine graphic styles, even as digital media has proliferated.

This guide first of all seeks to establish visual syntax standards for application to doctrine documents. This takes military symbology a step beyond defining the meanings of icons or glyphs, such as found in Army Doctrine Reference Publications (ADRP) 1-02, *"Terms and Military Symbols,"* into the formalized structured visual language of visual literacy. Visual literacy is the ability to encode (create a visual language) & decode (understand a visual language). Even as a language has grammar rules to ease its comprehension, military graphics profits from standardizing its visual vocabulary with rules governing its use; syntax. Even with the development of computer graphic software, a proficient Photoshop™ or PowerPoint™ user can still lack the visual literacy which a trained graphic artist has developed. This manual compiles the U.S. Army's visual dialect into a single reference, to providing uniform standards for use in all of the Army's informative media.

The guide is divided into two major areas. Readers should read the whole of chapters one and two which set forth the underlying principles and standards of military graphics. The remainder of the guide is a reference for step-by-step procedures for desktop publishing techniques.

This guide addresses graphic design as the creative process for producing illustrations, and desktop publication mechanical processes for making digital image files. It attempts to close the syntax gap by codifying visual standards that doctrine developers and training developers can both use. It provides artists with the procedures and constraints for using Microsoft™ and Adobe™ based graphics software to produce doctrine illustrations. This is a form of desktop publishing that has previously not been well defined by the military. Although, there are other more robust graphics programs in the industry, they are not addressed in this guide. The focus here is on using office programs that are typically found on government or military office computers to perform desktop publication.

Word-processing programs such as Microsoft (MS) Word™ are a growing software for desktop publication. 21st Century word-processing software does so much more than the original software of the 1970s and 1980s. Today, it is first of all the target where art developed in other programs is deposited, and secondly presents text in a way that best conveys the intended message. Development of tables is mentioned in this document. The guidance on tables is focused on visual formatting of a table to maximize the readers absorption of the key data presented. Here, the same principles of graphic art and informative illustration are used to style tables.

The latter portion of this manual moves from the topic of aesthetic style to the technical background and procedures for producing an illustration as a figure or table. A lot of technical information is brought up in the ensuing discussion in a generalized way, or that is glossed over. These technical issues have a real impact on how the final product is achieved even though the average user might not be aware of how it works. These technical issues such as software programming principles behind file formats, are not the central objective of this manual. However, this technology is addressed because it has buried obstacles such as file size management or table formatting that can blindside and frustrate a novice artist. Professional artists and technical writers are encouraged to follow up with independent research in this arena.

This version of Graphic Art Standards for Doctrine Developers is the initial release. This pamphlet has eight chapters:

Chapter 1 – Military Graphic Arts: Reviews historical military graphic art presentation standards. It defines and explains the use of minimalism art style as the preferred aesthetic style. It finishes with planning standards for art work that the document writing lead can use.

Chapter 2 – Graphic Types for Doctrine: This chapter opens with and explanation of the organizational framework for military graphics. There is a focus on how graphics are connected to the text in a document. It then defines the five most common illustrations used in a military document.

Chapter 3 – Illustrative Process: Specific standards and art style rules are set forth for the construction of illustrative (or informative) images. This chapter presents the "how to" techniques for accomplishing the requirements of ADRP 1-02; Army Tactics, Techniques, and Procedures (ATTP) 5-0.1, *Commander and Staff Officer Guide (rescinded)*; Department of the Army Pamphlet (DA Pam) 25-40, *Army Publishing Program Procedures*; and TRADOC Regulation (TR) 25-36, *The TRADOC Doctrine Publication Program*.

Chapter 4 – Construction of Illustrations: Using "Task" procedures, writers are shown how to work with setting the default characteristics of graphics software and word-processors to produce images that are informative and illustrative. Here, the different types of file formats are defined and the various basic methods for manipulating vector and raster files is explained in step-by-step procedures.

Chapter 5 – Job Ordering Graphics Support: Although obtaining external support has pretty much disappeared from the Army, where it does exist, this chapter discusses how such support can be sought.

Chapter 6 – Inserting and Laying-Out Graphics: This chapter explains the details of inserting an image file into a text based document. Configuration of properties for images is expanded in step-by-step procedures. Procedures for creating, inserting and configuring a table are delineated. It concludes with procedures for correctly creating a portable document format (PDF) document that is configured for print media publication.

Chapter 7 – Managing Digital Images in a PDF: The roles and functions of the various document developers are outlined and explained for the use of Adobe Acrobat™. Procedures for manipulating PDFs are presented. Special attention is focused on maintaining resolution, and ensuring that a document is ready for publication.

Chapter 8 – Archiving Graphics: This chapter establishes a standardized procedure for storage and retrieval of graphic images used in a document. Such standardization helps future writers and artists to retrieve illustrations for future use.

Chapter 1

Military Graphics

Graphic Artist

2-31. ….Thinking visually is a skill that not all members of the team can do well. It is important for team leaders to seek out members in the team that are good visual thinkers and graphic artists. These visual thinkers capture team thought and develop clear visual models for presentation to others outside the group.

ATP 5-0.1, *Army Design Methodology*, July 2015

The human brain is structured to process visual stimulation very differently from text, spoken language, and sound. Functional Magnetic Resonance Imaging (fMRI) scans quantitatively verify that there is a dual coding system through which visuals and text/auditory input are processed. These are separate channels that simultaneously augmenting each other. Soldiers who are provided with a well-designed combination of visuals and text in a media, capture more information than Soldiers who predominately learn by text, or by visual processing, alone. This physiological fact of cognitive brain structure (Mayer and Moreno [1998]) underpins the need for graphic arts in doctrinal manuals.

Even though the technology for graphic artistry has changed from paint-&-pen to that focused on desktop publication, there are certain fundamentals of the finished product that persist. This chapter is focused on how to make today's graphics, regardless of development medium, relevant to the military reader.

ARTISTIC HERITAGE OF MILITARY GRAPHICS

1-1. Military doctrine technical illustration (simply referred to as, illustration) has a very long and rich heritage. An illustration is an emblematic representation of a thought or idea. More than any other use of military graphics, individual doctrine illustrations end up holding long term presence in the Army. The classic graphic illustrations in figure 1-1 are from before the 1960s, and are still actively used in current doctrine. For example, the drawn image of the M-88 Hercules front spade and winch assembly dates back to the late 1950s; the other image is older. The durability of military graphics is found in the effectiveness of their practical utility.

1-2. The use of non-professional artists working with PowerPoint™ results in widely varied graphic styles. Such inconsistencies create an amateur appearance that reflects poorly on the quality of the whole doctrine product. Without trained artists, doctrine authors have turned to obsolete images, their own PowerPoint™ skills, or are forced to forgo having an otherwise useful illustration. Such poor quality (figure 1-2) reflects badly on the quality of Army training and professional skills.

1-3. Doctrine publications are primarily text dominated, and only uses illustrations to visually improve upon the text. Army doctrine graphics must be essential, functional, and self-explanatory. Authors should create or select a graphic when a picture expresses or clarifies a point or a complex construct more effectively than words. Doctrine publications do not add graphics merely for visual interest. Text is preferred because it is highly definitive for conveying the fine details of the disciplines and processes being described by doctrine.

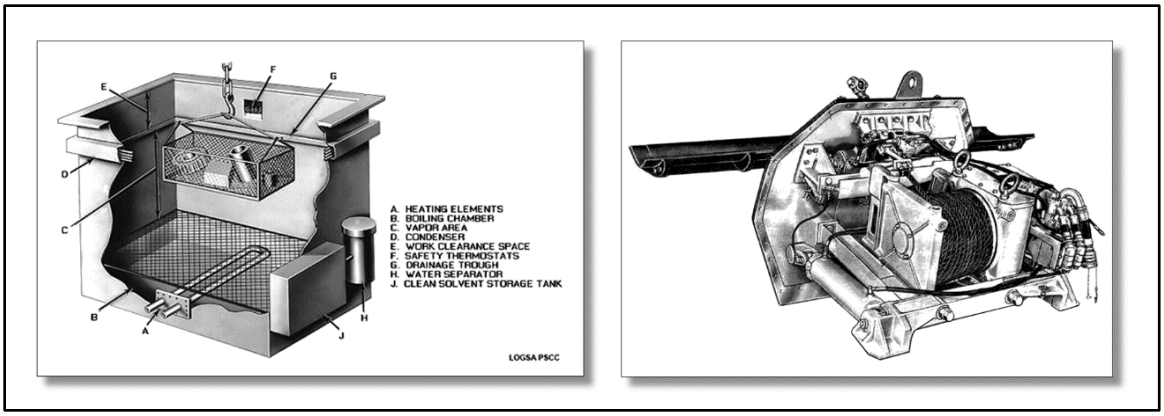


Figure 1 1. Historic graphics from before the 1960s, still found in current doctrine literature

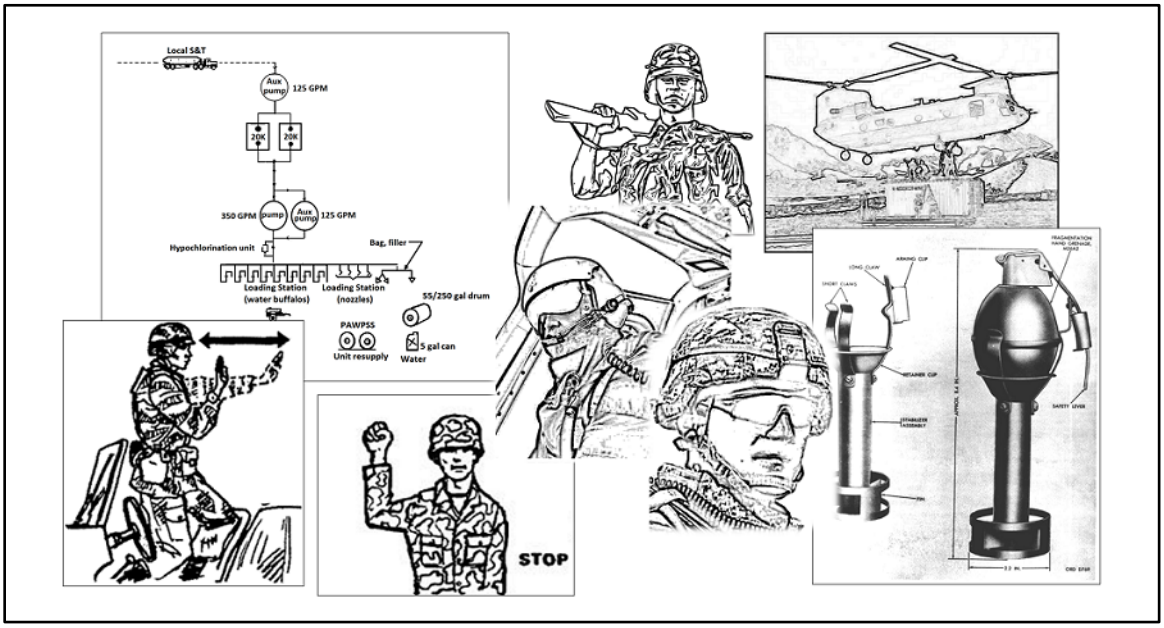


Figure 1-2. Poor quality or obsolete images found in doctrine publications

1-4. So, with the emphasis on keeping graphics to a minimum, why have any graphics? Good graphic illustrations have a profound impact on the readers' ability to perceive or absorb the content of technical work. Humans are the only animals born with language centers in their brains. Yet, those centers make up only about 3% of the central nervous system. However, visual perception involves almost 40% of the brain. Furthermore, visual perception is first processed through the subconscious, or old centers of the brain; whereas, the language centers are only in the cortical areas of the brain.

1-5. Humans are visual creatures. Hence, a well-developed illustration intuitively reaches a larger portion of the reader's mind than text, alone. In general, authors use graphical representations of doctrine constructs when a picture is worth a thousand words; whereas a poor image is like a thousand mumbles. Combined with clear, well written text, a quality graphic makes it easier for the average Soldier to understand.

THE VALUE OF VISUALIZATION

1-6. The use of graphic arts is justified, not by its popularity alone, but by scientific research into how the brain functions. The average person knows about 16,000 to 20,000 base words in their native language (English has more than 250,000 distinct words). To really understand how doctrine is communicated, a good

graphic artist understands how the brain absorbs and processes information. Learning styles have been studied extensively for over a century, and toward the end of the 20th Century there was an explosion of understanding about how the brain works (neuroscience) and develops (cognitive science). Visual thinking, which leads to visual learning, is a proven method of organizing ideas graphically, for which the right side of the brain is more receptive. Research by child development theorist Linda Kreger Silverman suggests that about 30% of the population strongly uses visual/spatial thinking, another 45% uses both visual/spatial thinking and thinking in the form of words, Whereas 25% of the population thinks almost exclusively in words.

1-7. Human beings process visual information faster and more efficiently than text. This makes sense when one realizes that speech and language brain centers are a recent evolutionary development. "…research does exist examining the processing of visual stimuli for print advertisements (i.e., pictures vs. text). Generally, these studies have found that pictures are more easily recalled than accompanying text or text containing the same basic information as the pictures…." (Jensen and Rottmeyer, 1986)

1-8. For the Army to convey the knowledge of doctrine, the media used; whether its text in a book, or internet distance learning; is best absorbed by the Soldier when the media engages the whole brain through as many senses as posable. This is anecdotally demonstrated by the Army's historical emphasis on conveying mission orders by the use of ROC-drills (rehearsal of concept drill); which engage visual, audio, and tactile scenes. The diversification of visual-spatial learning styles is based on quantifiable brain research discoveries made just before the 21st Century into the lateralization of brain functions between left and right hemispheres. The left hemisphere is sequential, analytical, and time-oriented. The right hemisphere perceives the whole, synthesizes, and apprehends movement in space. When paired with linguistic -- or text-based -- literacy, visual literacy can multiply a persons' ability to recall and think about what they have learned. What research has discovered is that:

- Images and diagrams tap into the spatial and relational capabilities of the brain to create meaning.
- The mind establishes relationships between the elements of a topic based more on color, shape, and spacing presented visually, than from text alone.
- Visual illustrations that are edited correctly can clarify content by removing unnecessary words that can be misleading or unnecessary.
- Information delivered with visual learning techniques decreases reliance on text and lecture, and increase the understanding of relationships between ideas.

1-9. A visual illustration is a method of communication that uses pictures, graphics, and other images to express ideas. For visual communication to be effective, the receiver must be able to construct meaning from seeing the visual image. To create a well-crafted illustration, a visually literate artist is needed who can transform thoughts, ideas, and information into all types of pictures, graphics, or other images that help communicate the associated information. Not all artists are visually literate. Artists with visual literacy can:

- Clarify thoughts: People can see how ideas are connected and realize how information can be grouped and organized. With a visualized illustration, new concepts are more thoroughly and more easily understood.
- Organize and analyze information: Trained graphic artists use diagrams and plots to display large amounts of information in ways that are easy to understand and help reveal relationships and patterns.
- Integrate new knowledge: According to research, people better remember information when it's represented and learned both visually and verbally.
- Think critically: For doctrine, linked verbal and visual information helps people make connections, understand relationships and recall related details.

1-10. It must be emphasized, not all artists or printers have a talent for visual literacy (figure 1-3). Even though the contemporary generation of Soldiers is more orientated toward visuals, the lack of funds for art training in most secondary schools has left even those with an artistic aptitude visually illiterate. They can read the graphic, but don't have the skill to create it for themselves.

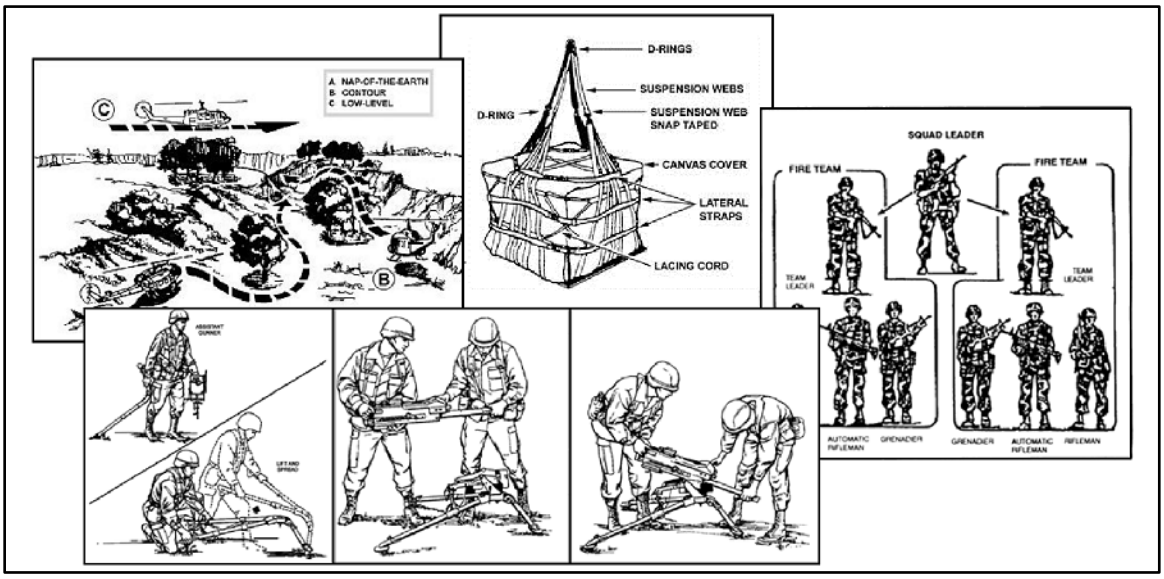


Figure 1-3. Good "illustration" by a visually literate artist is informative

1-11. If we accept that visual literacy includes the group of skills which enable an individual "to understand and use visuals for intentionally communicating with others" (Ausburn & Ausburn, 1978: 291), then the visually literate will need visual grammar rules and a style guide to expedite the communication flow. Visual literacy is a discipline derived from: visual arts, art history, aesthetics, linguistics, philosophy, general psychology, perceptual psychology, sociology, cultural anthropology, journalism, instructional design, semiotics, communications studies, educational technology, and more. Even as someone who can type words correctly needs specialized training and experience in technical writing to be a good doctrine developer, the same is true for artists to be graphic artists. A good illustration consists of a subject, and the process of an action. This makes such graphics a grammatically complete sentences of subject and predicate.

1-12. One of the least recognized, but critical characteristics of visual literacy in military graphic arts is the visual conventions or culturally specific visual idioms used by the military community for ascribing meaning to images. This would in spoken language equate to a dialect. Military ground forces (Army and Maines) have created a heritage of formal symbols and informal symbolisms that reflect the type of tactical and operational thinking needed for the way that they function. Consequently, military culture has its own visual linguistic dialect; which this manual attempts to explain (with text). However, keep in mind that the brain "reads" a picture in a different way from how it reads words, and making rules for visual language in the same way as those which apply to words, grammar and spelling will never work.

1-13. Doctrine can't be developed by words or text alone, to the exclusive use of only words. Doing that would ignore the majority of the brain's functional capacity. Educational research demonstrates that mixing text with images increases the ability of a communicator (writer or artist) to more effectively convey information, than using a single mod of expression. However, for visuals to work, the artist must be visually literate. Even as writers spend what equates to, two whole years of their lives learning to write before even graduating high school, artists need to be trained in visual literacy. This means that a publication artist must have training in graphic arts. Furthermore, the artist must be literate in the idioms of the military culture to communicate with a military audience.

AESTHETIC STYLE

1-14. So, when technique is put together with style, what works? What doesn't…? Good doctrine illustrations quickly tell the viewer, "how" using a visual sentence. In this regard, military doctrine art favors the minimalism art style (figure 1-3 on page 1-3, and figure 1-4 are examples of detail in abstraction). The term "minimalist" often colloquially refers to anything that is spare or stripped to its essentials. As an art form, minimalism sets out to expose the essence, essentials or identity of a subject through the elimination of all

non-essential forms, features or elements in the picture. The military takes the liberty of adding informative text. The application of the minimalist principles to military art are discussed throughout this manual.

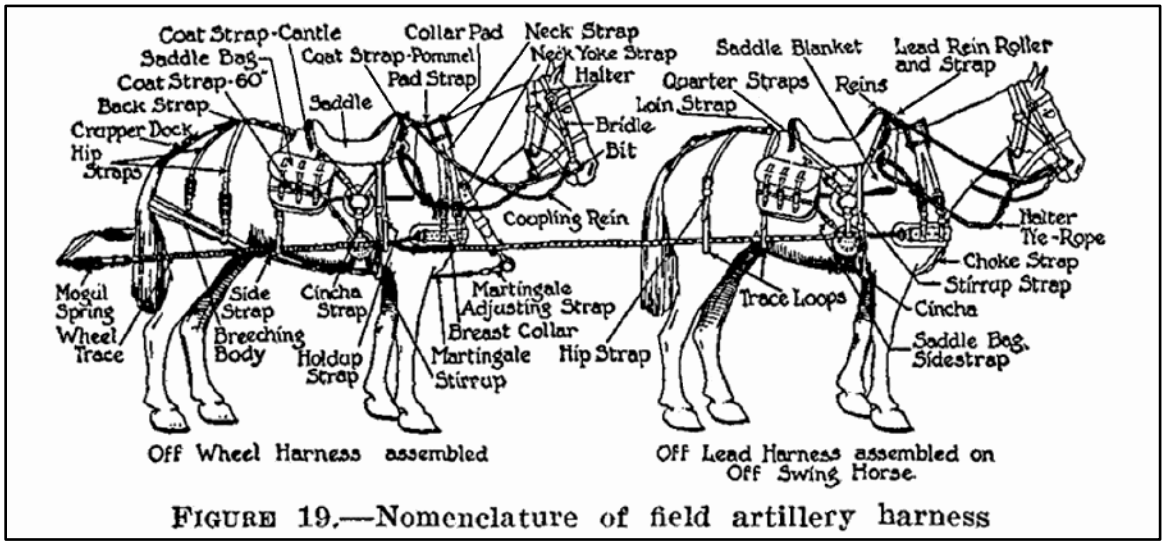


Figure 1-4. The harnessing system from a 1931 field artillery manual

1-15. Artistic minimalism is a form of early 20th Century American abstract art. In other styles of abstract art, it is the shapes that are alluded to instead of being rendered. The minimalist style takes a picture and extracts nonessential elements, leaving only that which supports the message. Those elements may be presented in great detail; like that of a parts diagram (figure 1-4). Or, image elements may be presented in the generalized fashion like clipart. The resulting image is an abstraction of what would otherwise be seen in a photograph. It is the direct focus on the message of this artistic style (such as in figures 1-3 and 1-4) along with its utilitarian simplicity that makes the minimalist style of art ideal for informative doctrine.

1-16. Other relevant aesthetic styles to a lesser extent are photographic, photorealistic rendering (figure 1-1), realism, mechanical drawing (such as blueprints), along with cartooning (figure 1-5) and clipart. Each of these art forms (except cartooning) is used to represent the subject truthfully without stylization, embellishment, or romanticism. Cartooning allows for emotive accenting, anthropomorphizing or caricaturizing elements of an illustration.

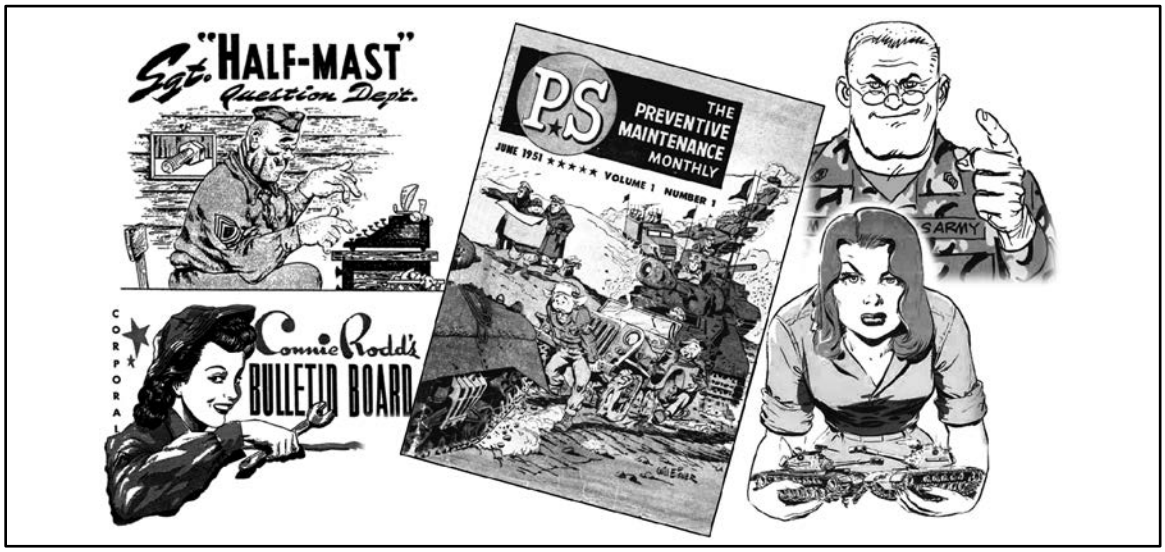


Figure 1-5. Will Eisner's enduring contribution to military graphics

1-17. Cartooning, in the comic book sense, is almost never used in doctrine. Yet when used, cartoons help elicit a desired emotional perspective that the author wants the reader to hold toward the subject (as different from pointless visual entertainment or eye catching attractiveness). The US Army Material Command's technical bulletin (TB) 43-PS series (called PS Magazine because it is a postscript to the standard technical manuals [TM]), "The Preventive Maintenance Monthly" has had great success using cartooning to convey critical maintenance information, beginning in June 1951 (figure 1-5). It actually originated during World War II with the instructional publication, the "Army Motors" magazine. Its value is evident in its success and longevity across generations.

1-18. Supporting the message of the written text is the essential aesthetic characteristic of military doctrine's visual style. This means that the artist must avoid all artsy embellishments. Although the military informative style may seem emotionally dry or dreary, nothing can be farther from the truth. Good military art leaves the viewer feeling edified or enlightened without the use of subjective emotional hooks. Knowledge itself is the foundation of military art; with knowledge comes confidence; and, confidence is the emotional inspiration which the military artist seeks to induce. Yet, time is a premium commodity for the military reader. Good military graphics allows the reader to visually grab-and-go with the information.

1-19. Never use propaganda or decorative drawings (figure 1-6). For all their glamour and glitz, they don't tell the reader what he or she needs to know in order to achieve functional success. They are of little value and a very costly resource to develop and incorporate into informative publications.

1-20. Even worse are the ugly pseudo drawings and degraded images, such as those found in the center of figure 1-2. They are hard on the eyes. They require a lot of neural effort for the reader to optically interoperate. The result is that if the image was part of the message, that part of the message will be hard to perceive, or becomes lost and misunderstood. Ultimately, the author will end up having to write into the text of the manual that part of the message which the image bungled trying to convey, anyway.

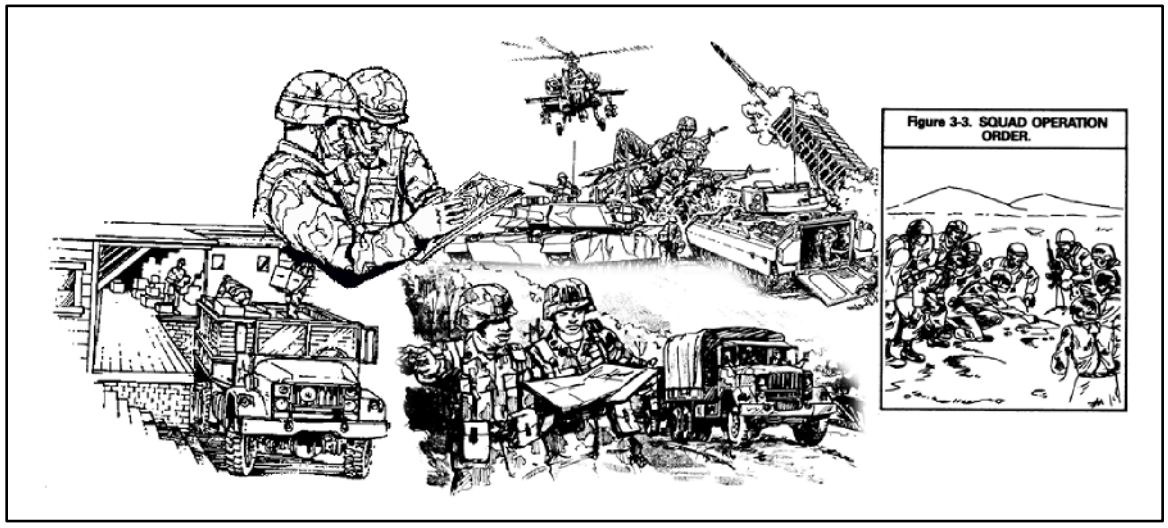


Figure 1-6. Pointless emotive "images" failing to depict objective or functional information

NOTE: An illustration is an image that tells a story, and successfully informative. Not all images (figure 1-5) are illustrations.

MILITARY SYMBOLOGY

1-21. Military symbology is a contemporary form of a logographic writing system using a combination of glyphics (picture writing) mixed with phonetic characters (text shortened into abbreviations and acronyms). Together, the military refers to glyphs and phonemes as icons (figure 1-7). These icons are intended to provide the reader looking at them with an intuitively overview of a situation, that can be quickly absorbed. Military symbols serve three functions:

- Show where a unit or element is located, or moving next.
- Show the relationships of units or elements acting in concert with each other.
- Show the status, readiness, or capabilities of a unit.

1-22. Up through the end of the 20th Century, the depictions of military symbols was flexible and intuitive. However, with the constraints of computerization, the depiction of military symbols had to be stabilized. Therefore, artists cannot use abbreviations and acronyms where standardized symbols already exist.

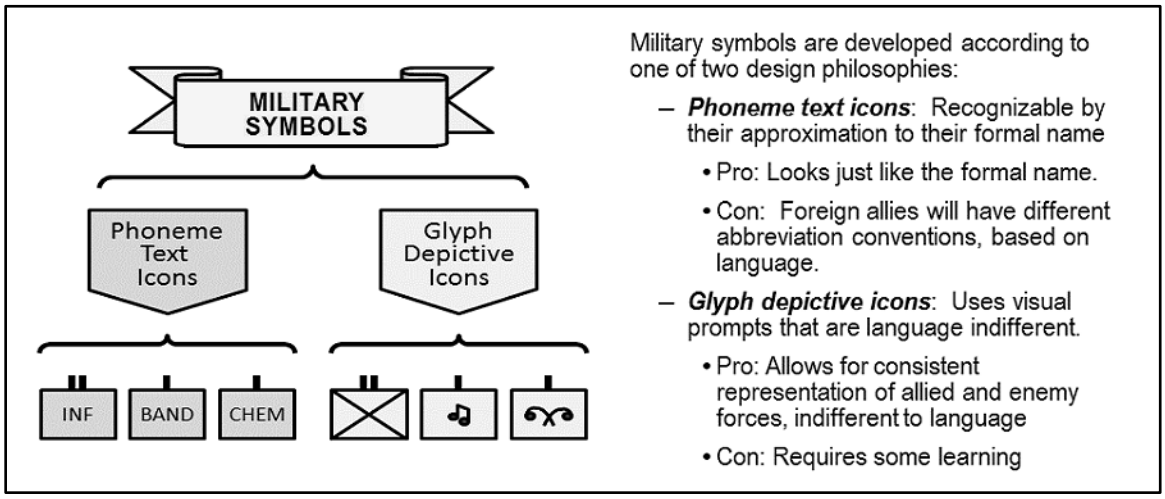


Figure 1-7. Characteristics of a Military Symbol

1-23. Artists must make every reasonable effort to use icons that are authorized within ADRP 1-02. This is especially true for icon elements within the border frame of the unit symbol device. A unit symbol device is limited to three icons: one main subject and two modifiers within the border; along with the echelon marker. Any more detailed optional information is added to the outside of the border of the unit symbol. Phoneme text is still a symbol.

1-24. The use of approved icons in a doctrine publication shows the readers what they can expect to see on digital display monitors. If explanatory text is needed, it should be placed on the right or under the unit symbol device. See chapter 2, sub-section on "Command Organization and Staff Relationships," and chapter 3, section on "Organizational Charts." These chapters present style standards for the use of military symbology in doctrine publications.

NOTE: ADRP 1-02 is not necessarily applicable to all images, such as subject overviews or item depictions of equipment.

WARNING! Although, artists need to communicate the message above following the rules, this is not an excuse for taking shot cuts, or for lacking technical artistic skill in desktop publishing.

PLANNING GOOD GRAPHICS

1-25. The process of developing illustrations for doctrine publications begins with the author. As the author starts organizing the material and identifying the images to be used, this is the time to make initial notes on where any other illustrations would be useful.

1-26. The doctrine author has three options for generating illustrations:

- Make the illustration, himself.
- Put in a formal request for support from a training support activity on the installation.
- Use the services of a dedicated artist from within the doctrine department.

1-27. The use of a good illustration can take a variety of abstract elements and put them into context or a clear relationship with each other. The most common use of military graphic art is to show relationship,

motion, progression, and connection. Illustrations should be relevant to the text. What does this mean? There are five circumstances in which an illustration should be used to clarify text:

- Introduce an object, unit, or equipment that is the central subject of the text.
- Depict relationships in which three or more elements or entities are involved.
- Show processes that have multiple, optional, or parallel pathways.
- Illuminate an action or item in action which is abstract, or objective but not visible or is visually concealed during the operation or process.
- Call attention to detail which could be easily overlooked.

1-28. There are three production aspects affecting graphic images used in doctrine:

- The illustrative message of the text; developed by the author.
- The graphic appearance of figures; overseen by the artist (such as a chief visual design editor, visual information specialist, or graphic artist).
- The technical mechanics of publication; overseen by the editor and branch manager.

1-29. The goal of a doctrine division's artist is to:

- Work as a part of the production team with branch managers, authors and subject matter specialist to produce informative illustrations that are of real value to Soldiers.
- Focus graphics on an audience of first time practitioners (usually junior officers and NCOs) who have had only a very limited exposure to the material being presented.
- Verify that the images reflect the current doctrine, and are consistent with the text of the publication into which the image will be associated.
- Ensure wherever possible that all images produced for a series of doctrine publications have a consistent style. (Not just within the individual publication, but across the spectrum of related publications.)
- Limit images to those which have utility or informative illustrative value. This means the avoidance of primarily emotive (artsy) or persuasive marketing (eye candy) images.
- Create images that meet the graphic industry's standards of professional artistic discipline.
- Produce master images that are of a high resolution for the final publication, while holding down the digital bandwidth. The goal is to have 8 point text be legible on the published canvas of an image.

TECHNICAL PARAMETERS

1-30. Contemporary military graphics is digital in nature, and must be transmittable through e-mail and the internet. People producing graphics need to understand the basics of how information is stored on a computer hard drive, virtual memory, temporary files, and in random access memory (RAM). Graphic artists need to have a basic understanding of how to balance maximizing image resolution while minimizing file size and bandwidth.

1-31. Computer users are responsible for knowing how to setup and configure the programs that are the tools of their trade. Help desk technicians have training which is focused on network administration, computer operating systems and computer hardware. Wordsmiths; such as clerks, managers, secretaries, writers, journalists, publishers, technical writers, and the like; are responsible for knowing how to work and fix word-processing program issues; those being the Microsoft Office Suite™ programs, and Adobe Acrobat™. Graphic artists performing desktop publishing need to be proficient in both word-processing programs, and graphics programs.

1-32. The exact performance capabilities of computers and internet access systems is going to vary depending on equipment configuration and the internet service provider's bandwidth capacity. The use of special internet services (such as, AMRDEC Safe Site™) to compress and route excessively bulky files should not be necessary to transmit doctrine documents. Document authors are responsible for a manual's file size and bandwidth requirements. Editors and artists are only available to provide technical assistance for file size management.

- Tables and images are the major cause of excessive file size. The final electronic file version of a document, in both MS Word™ and PDF formats, is not to exceed 20 megabytes. The ideal size is less than 10 megabytes. (Exceptions to this require approval of, and coordination with Army Publications Directorate.)

WARNING! The default resolution settings for PowerPoint™, Office Word™, and Adobe™ Acrobat™ are of insufficient quality for fine feature printed publications. To attain good print resolution of small text incorporated into images, it is necessary to manually reconfigure the default stings.

- There are two primary resolutions (measured in pixels per linier inch [ppi]) that are preferred for doctrine manuals: 300ppi, or 150ppi.

  NOTE: Microsoft Office ™ programs usually have default setting of 96ppi, which is only intended for display on a computer monitor, and not good for printing from a photocopier.

  - 300ppi is used for images with fine detail or small text under 10 point font.
  - 150ppi is used for robust images and text that equals or exceeds 10 point font.

NOTE: Font size for images is based on the apparent size of text after being installed into a document, not the program's font setting at the time of image creation. Determination of font size is made by visual comparison to word-processor text from the document.

NOTE: Instructions in this manual are focused on creating, installing and presenting images at 300ppi. Artists may need to make calculations, to adjust image size and pixels per inch when creating images of 150ppi, or lower. For calculating image size, see chapter 5, How to Calculate Resolution.

- The specific mechanical procedure for setting a high resolution in PowerPoint™ that conforms to Army publication standards is addressed in the section "Change Page Setup Properties" of chapter 4.
- To keep Microsoft Word™ from scaling an image back to low resolution, see the section titled "Configuring Image Resolution in Office Word™" in chapter 6.
- To preserve the resolution quality of images stored in a PDF, see the section titled "Digital Image Resolution Management" in chapter 7.
- The office tasked with developing a manual is responsible for the final conformity of a document's technical parameters meeting Army Publications Directorate standards before its final transmission. Designing images that conform to the resolution quality and publication constraints is administratively the responsibility of the manual's author/writer, and technically the job of the artist.

Chapter 2

Graphic Types for Doctrine

> I am an artist not because of what I may or may not produce, but because of the way in which I see. As I look at the world around me, I am always aware of patterns, of contrasts, of line and mass. I make art in my mind, as I perceive certain things visually and translate them…Right now, I am content with my internal life as an artist, and am at peace with my view that what an artist is lies inside, not in what is produced outside.
>
> Kathy Courchene, a counselor of the gifted in Atlanta, Georgia, in a letter to Linda Kreger Silverman, Ph.D.

Informative publications are dominated by text because words are better at providing distinct and well defined meaning. Even in informative manuals where graphics do take up a greater portion of the publication, the graphics are still there to support the text. The value of, and need for, a well-developed graphic cannot be ignored. A functional graphic serves a purpose such as aiding retention, summarizing, or clarifying relationships. On the other hand, the use of graphics in military doctrine publications should be approached judiciously with restraint, focused on the flow of discussion. Too many graphics can become confusing, disrupting the train of thought. This chapter looks at the visual standards for military graphics as a finished product, indifferent to the medium or software used to make them. It is focused on how to develop various graphic images, and incorporate them into the message of a publication.

HOW KNOWLEDGE IS VISUALLY PRESENTED

2-1. There are two general types of graphics used for a doctrine publication: figures and tables (figure 2-1). Tables are tabular arrays of information where the rows and columns signify relationships or values. The unique capability of a graphic table is that word processor programs such as Acrobat ™ and Word™ can search for and find individual text. Figures are indexed images, such as illustrations, maps, graphic aids (such as flow charts and completed forms), and photographs. All figures are inserted into doctrine publications as a picture (raster) image file. The width of any figure on a page can be as large as six inches to as small as three inches; no more, no less.

2-2. The hierarchy in figure 2-1 depicts the relationship of graphic types that can be used to support common categories of military doctrine writing. At the end of this chapter, is a short discussion on briefing slides. Military artists must not confuse an artistic technique or aesthetic style, with the illustrative or graphic category of an illustration.

2-3. For example, a graphic artist may draft an architectural drawing; that is a graphic category (though not specifically military). Such a drawing may be contoured in two dimensions, contoured in isotonic three dimensional perspective, rendered in three point perspective color, or even photographed. These are each, types of graphic techniques. In this instance, regardless of the artistic technique, all of these images would be categorized as an architectural illustration.

2-4. The category of a graphic illustration pertains to the type of message the image is supposed to convey. For the military, graphic illustrations are very specific in the messages each presents: overview, organization, process, or item. This manual goes back and forth between graphic categories and artistic techniques, and discriminating between the two is a key technical concept for developing military graphics (figures or tables).

Discriminating between message categories and construction techniques is a basic skill for an artist. Authors who do not have artistic support should become acquainted with principles of graphic design for instructional media and for print media.

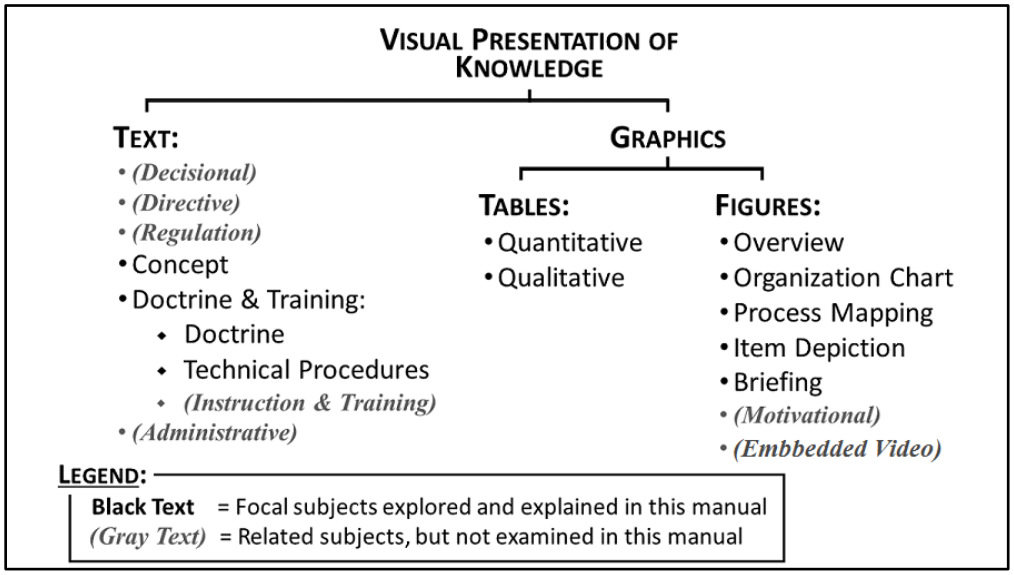


Figure 2-1. Hierarchy of how Army doctrine visually organizes knowledge

FIGURES

2-5. In a publication, a figure is a sequentially numbered image. In doctrine publications, all images are ordered by a figure indexing system. The reason for figures in a publication is to organize how images visually convey the message of the publication; an image management system. It allows the author and reader to connect or cross-reference the message of an image with a specific point in the text of the publication. This keeps the trend of thought in the manual's message flowing, smoothly. Even if it is not practical to locate an image at its point in the trend of thought, figure numbering allows transitioning from text to image and back to text. In electronic publications, such images could be a still picture, or a motion picture; photographic rendering, or a drawn representation; a map, or a sample of a form. A figure indexing system is important for publications focused on text where images are in a supporting role.

2-6. Authors are responsible for determining when a figure needs to be inserted into the text to convey the message. Authors work with artists to determine the best type and style of image to use as a figure. Where the author needs a custom image the artist produces a technical illustration. Once the author has identified the appropriate image to support the publication message, the artist is responsible for configuring the image file properties to meet publication standards.

2-7. In a publication, figures are used as part of a system for managing the relationship between text and the variety of images used to express the message of the final publication:

- Figures are numbered to manage images in the body of a publication.
- A table of figures is placed just after the table of contents.
- The table of figures is created, even if there is only one illustration in the publication.
- Place figure graphics as close as possible following the paragraph in which they are introduced. When a figure is left isolated from its reference in the body text, include in the reference the page number where the figure appears.
- Supplemental tables of contents for graphics are optional in the front matter. The FM-Format2 template for Microsoft Word™ 2007, includes fields to generate these for tables and figures.
- To generate a supplemental table of contents for a category other than figures and tables, contact Army Publications Directorate for assistance.

NOTE: See chapter 6 for technical instructions on the mechanics of inserting and formatting graphics.

TABLES

2-8. Tables are a constant challenge to authors; who usually struggle with configuring the cell and table properties. The author is responsible for creating the initial table and populating the cells with the data. In the final row of a table, the author must insert a legend for all non-standard acronyms and abbreviations that are not otherwise identified in the appendix identifying such. This is next followed by marked foot notes that elaborate upon or make qualification of a data cell. The final insert is any general "Notes:" about the table. This entire final row is made from a single cell.

2-9. The artist supports the final look and fit of a table within the body of text. Considering the large number of books that an artist will encounter, artists are in the best position to develop proficiency in configuring table properties, with a consistent look-and-feel.

2-10. Authors have two choices for types of tables: Quantitative Tables, and Qualitative Tables.

QUANTITATIVE TABLES

2-11. These tables are comprised of numerical relationships. (Examples of such tables would include: wind chill factors, sizes of wood to contain parts of various high weight for creating and shipping, ignition points for petroleum, water production performance statistics, parts list, and similar ordering of numerical relationships.) Such tables may include descriptive text such as item nomenclature, or conditional statements about the circumstances of how or when the datum is applied.

2-12. Formulas alone are not presented as tables; they are depicted as figures.

QUALITATIVE TABLES

2-13. This table segregates specific categories of information into related fields. (Such tables would include: a SWOT [strengths, weaknesses, opportunities, and threats] analysis, unit elements and capabilities relationships, calendar of events, and any similar ordering of abstract relationships.) These tables are a variation of a diagram in tabular format.

2-14. There are occasions when an author will arrange information into a tabular format, and then use odd shapes (triangles and circles) to indicate that the data is then somehow transformed. This presents two problems: First, to get the odd shapes to fit, the image has to be converted into a raster image; which is not searchable by a word processor. Furthermore, the message of "data transformation" is more properly a process chart; which is rightly depicted and correctly classified as a figure.

FORMATTING TABLES

2-15. Tables are a graphic whose appearance and visual expression of the intended message is verified by the artist (aside from the data within). Crafting and configuring a well optimized table is not a skill that soldier-authors usually have time to perfect before transitioning to their next assignment. Therefore, civilian staff (especially the artist and editor) will need to be available to support their soldier colleagues. The artist has the latitude to optimize a table by:

- Table text has different standards from figure text. All tables use the identified text font styles as specified in AR 25-30 for paragraphs.
- Table headers use a field background color shaded grey, not to exceed 15% gray.
- Only table headers can use both bold and italics, within a table.
- Select the font (sans-serif; Calibri, Arial, or Arial Narrow).
- Size the font.
- Define the spacing between the text and the cell's boundaries.

- Ensure that header rows which define the underlying cells in the column repeat at the top of the table if the table breaks across pages.
- Apply gray-fill to off-set header rows which define the subsequent data, from the data field.
- Make sure that the cell boundary lines are of an appropriate thickness. Lines should be a uniform 1 point unbroken thickness, unless special meaning or reasoning is being intentionally ascribed to a line.
- If the author wants thumb-nail images to be inserted into cells, the author must tell the artist. The artist will crop and resize the image for best fit. Then the artist will coach or assist the author on how to install images into a table cell.
- Rules for a table has image:
  - Table cells can only have raster graphics used as images.
  - Vector graphics, and text boxes cannot be embedded in a table (convert them to raster files, first). No vector graphics can be anywhere in a table.
  - Each individual cell having an image, is limited to only one image in that cell, with no other objects or text in that cell.
  - Images in a cell are not to be cropped using the Word™, Format, Crop function.
  - A cell with an image must be text style formatted as, "Normal."
  - The image must be set as text wrapping, "square."
  - The image alignment is, "center."
  - An image in a cell is not to have a border applied to it because the cell is the border.

WARNING! Nonconformity to table image rules will corrupt a document (even if it is not visible in the Word™ version). It will adversely affect making a PDF of the document.

2-16. Table images need to be sized to fit the cell so that the resolution is optimized against the bandwidth limitations. Here, 120ppi to 150ppi based on the size of the cell is best.

WARNING! Excessively large file size of an images in a little table-cell can lock up a table and corrupt a template. See chapter 4, "Resizing an Image with Paint™" for further instructions.

ARTISTIC STANDARDS

2-17. As with all mediums of expression, there are three types of communication: 1.) communication to inform; 2.) communication to persuade; and, 3.) communication to entertain. It is the opinion of many that informative communication is characterized by emotionless objectivity. However, communicators have to understand that neural-psychologically, humans who can't tap into emotional centers of the brain become paralyzed with indecision, having no survival context by which they can prioritize datum. (Seo, 2008) Doctrine artists must therefore be very thoughtful and limited about elements presented in an illustration. Although emotions will always be present, the emphasis has to be pointed toward the objective data. The significance value of any objective information has to begin by conveying how the information to follow will enhance the audience's survival, professional advancement, or general success at a personal level.

2-18. The preferred types and styles of a doctrine images are those best suited to achieve the informative objectives of the text within a publication, in the context of production and presentation technology. The order of precedence is:

- An image supports the text in the publication.
- It conforms to ADRP 1-02.
- It conforms to standards set by the Army Publication Directorate.
- It conforms to all other standards set by the Combined Arms Doctrine Directorate (CADD) of TRADOC.

2-19. To support the informative objectivity of military doctrine, artists must understand how to abstract the illustrations they create. Abstraction can be contrasted against realism. In realism, the artist attempts to

capture as much detail as possible. A photograph is an example of a very high form of realism. However, there is a point in informative graphics where the primary message of the image is diluted by the visual distraction of the non-informative (or nonessential) visual elements. An image with visual distraction or no message is not an illustration. Abstract art can be described as an image where extraneous elements have been removed. The artist uses abstraction to take the audience directly to the heart of the message by the most efficient route (not to be sloppy or lazy).

OBJECTIVES OF AN ILLUSTRATION

2-20. Authors focus the content of each image within a figure by answering one question: What is this picture supposed to demonstrate? A well-developed, Illustration:

- Communicates a single main point visually, just as a paragraph expresses a single main idea using sentences.
- Self-explanatory and can stand alone. Usually, readers can understand its point intuitively without having to study the text.
- Has a clear relationship to the text.
- Does not interrupt the flow of the discussion.
- Free of internal clutter which could distract from the essential message of both the text and the image, itself. A drawn image should avoid having so many lines, boxes, circles, or arrows that an uninitiated reader could not decipher the main point. Where a photograph image has a background, the background clutter should not distract from the central objective of the image or cause the eye to strain. (It is the same as authors avoiding excessive verbosity, circumlocutious phrasing, or polysyllabic alliteration.)

2-21. In order for readers to understand why an image is included, authors introduce every figure in one of the preceding paragraphs. The author's introduction of a figure should include the context for the illustration's relevance to the text.

TECHNICAL IMAGES: ILLUSTRATION VERSES DRAWING

2-22. Technical illustrations that are a very challenging yet pervasive form of figure found in doctrine publications. It is a drawn image of a technical nature that conveys an informative thought or narrative. A "technical illustration" is focused on general comprehension and quick understanding. Therefore, a technical illustration is not concerned with presenting a large volume of precision detail especially if that detail is a tangent or distraction to the message.

2-23. A "technical drawing" is a plan for the construction of a machine (or some such item) focused on precise detail. In a technical drawing, text is presented to elaborate upon the details of the drawn image; which is the opposite of an image's role in a doctrinal document. A technical drawing has more in common with an unaltered photograph, where the artist has not extracted irrelevant visual components.

CONNECTING TEXT TO AN ILLUSTRATION

2-24. The artist's skill at drawing will determine the quality of the visual articulation that the image can provide to support the author's message. The level of detail or granularity abstracted into an illustration should not cross outside of the information in the written text. Too much detail is the visual equivalent of a speaker going off on a tangent. The artist needs to gather from the author a clear understanding of the message the author is conveying. Prior military experience, or industry specific technical experience is a great asset for an artist to have in such situations. However, an inexperienced artist can suffice if he or she is very good at asking the right questions and has good communication skills.

2-25. To check that an illustration supports the text, the author should go through each text box or image component / element, and then locate where within the text body it has been addressed. The author should not assume that readers can understand the fine points of an illustration intuitively without having words in the body of the writing to provide supporting context. An illustration is not a substitute for an explanation, nor should an illustration create questions that are not relevant or topical to the text in the publication body.

2-26. Items depicted or words presented in an illustration that are not clarified in the body text are distracting to a reader, creating lingering questions. The author must ensure that terms used in an illustration are elaborated upon in the text of the publication. This gap commonly occurs when authors use illustrations from briefings, commercial sources, training aids, or some other such place. Such older illustrations are often developed to support a different narrative.

2-27. Another gap occurs when artsy images using various eye-catching colors is placed in an informative publication. Readers looking for informative meaning to be associated with the different colors become confused by meaningless color variations. Here, the author (not the artist) is responsible for connecting the publication text to colors within the illustration. However, the artist has to be sensitive to this consideration.

FONT STYLE IN IMAGES

2-28. For continuity of style and ease of reading, military illustrations are to use letters formed from sans-serif fonts (such as; Calibri, Arial, or Arial Narrow) in a sentence case or title case of mixed upper and lower case letters. Avoid using all upper case letters.

NOTE: The image font style is not the same as the font style used in the body of a document.

2-29. The last generation of graphic artists used a technical or mechanical pen that had a fixed width. This pen was used with a stylus and a letter template ruler to create a very uniform font. It was guaranteed to be readable with granny blue prints. The resulting letters were sans-serif in upper case. It has become the traditional standard for illustrative fonts that was derived from the pen and ink era.

2-30. There is a debate about what is visually the best type of font for illustrations and design drafting. There is no conclusive research with an answer between serif and sans-serif fonts. However, research has shown that mixing upper case with lower case is easier to read than all upper case.

PREFERRED DOCTRINE IMAGE STYLES

2-31. Within the graphic arts industry, the numbers and types of image styles are too many to address in this manual. For doctrine authors, the most significant styles for doctrine figures are those that can be developed by, and stored on office computers. The hierarchy of preferred styles is:

- Rendering (figure 1-1)
- Pseudo-Rendering (figure 3-5, right side, mixing contour with rendering)
- Contour (outline) with Gray-Fill Accent (figure 3-2)
- Contour (outline without gray-fill accent) (figure 3-5, left side)
- Photographs (figure 3-4)
- Silhouette (figure 3-2)
- Pseudo-Contour (which are not to be used) (figure 1-2)

2-32. Any image can be supplemented with labels of text and pointer arrows (figure 1-3).

GRAPHIC CATEGORIES

2-33. A graphic category refers to the role or function of the image within a publication; the type of message it tells. This is very different from the aesthetic style and artistic construction techniques of images. In doctrine publications, there are four preferred categories of figure images:

- Diagram of Principles or System Overview
- Command Organization and Staff Relationships Charts
- Process Flow or Decision Tree Charts
- Item depictions

2-34. At the start of the illustration production process, the first thing to do is identify the subject of the figure. This can be written as a topic sentence, or the caption to the figure. The next step is to identify which of the four preferred figure types will be used for this images; illustrating the author's message. If there is a

need for an image which doesn't seem to fit into one of these types, consult with the artist, or the branch manager administrating the publication's production.

DIAGRAM OF PRINCIPLES OR SYSTEM OVERVIEW

2-35. The Diagram of Principles or System Overview image (figure 2-2) visually portrays the abstract message of the subject and models its conceptual environment.

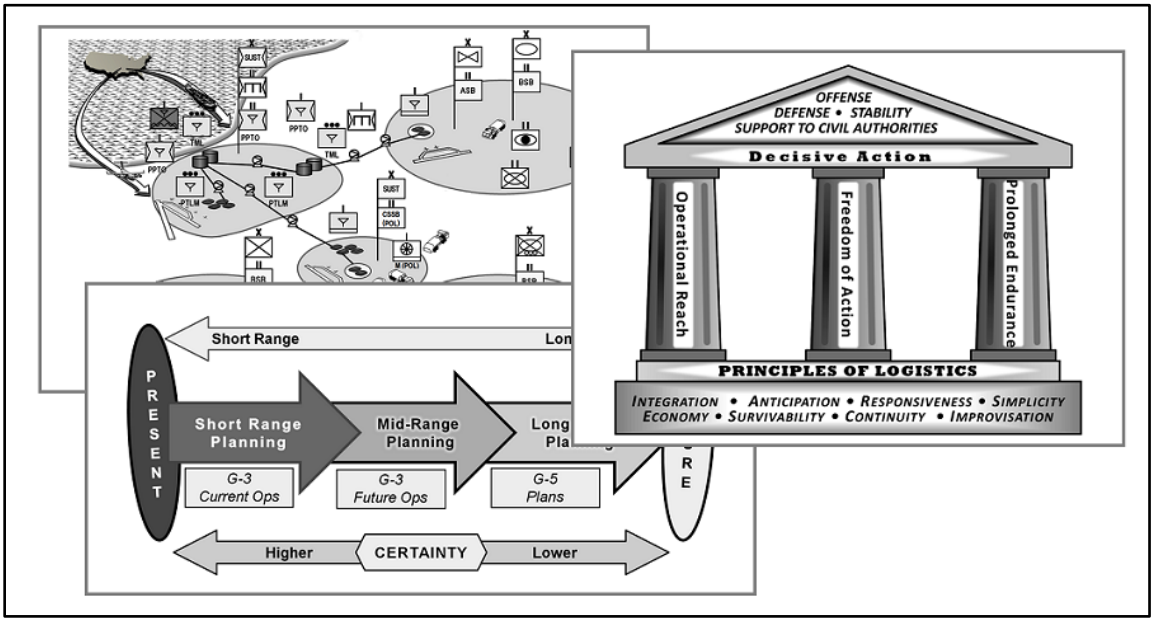


Figure 2-2. Diagrams of Principles or System Overviews

2-36. This type of illustration gets the reader engaged and oriented in the subject being presented (figure 1 of Army Doctrine Publication [ADP] 4-0, Sustainment). It helps the reader to put complex subjects into a relational context. It can portray a functional relationship between intangibles such as a value, principle or related concepts. These images are usually found at the beginning of a discussion about a subject. Such images differ from the following image styles in that they are general and not concerned with conveying hard detail. Though such images should be artistically easy to look at, and often have aesthetic characteristics, they are still primarily focused on being informative.

2-37. To create this type of illustration, the author initially identifies the overarching goal of the whole manual, or the portion of text the image will cover, for the artist. Then the author identifies the major points of the message. In a draft diagram, the author uses boxes or circles to group major points into individual elements. From there, proximity, lines, or arrows can be used to allude to what will be the message of the text.

COMMAND ORGANIZATION AND STAFF RELATIONSHIPS

2-38. The organization chart is one of the most common illustrations found in any military manual. It displays the working relationships of a functional body of people. Any time a manual introduces a new organization, this figure-type is used to depicting one of three messages:

- A parent unit and its internal component elements, with command channels
- The commander's staff organization, with staff coordination channels
- A unit's relationship to external units, with support coordination channels

2-39. Figure 2-3 has an image of each of these three organizational structures. Authors need to identify the topic and focal message for the artist, for each picture. Of particular concern are special function elements or

groupings in an organization. The chart in the lower right has such a grouping which is segregated by a gray field that encircles all the elements with a common role, similar to a Venn diagram.

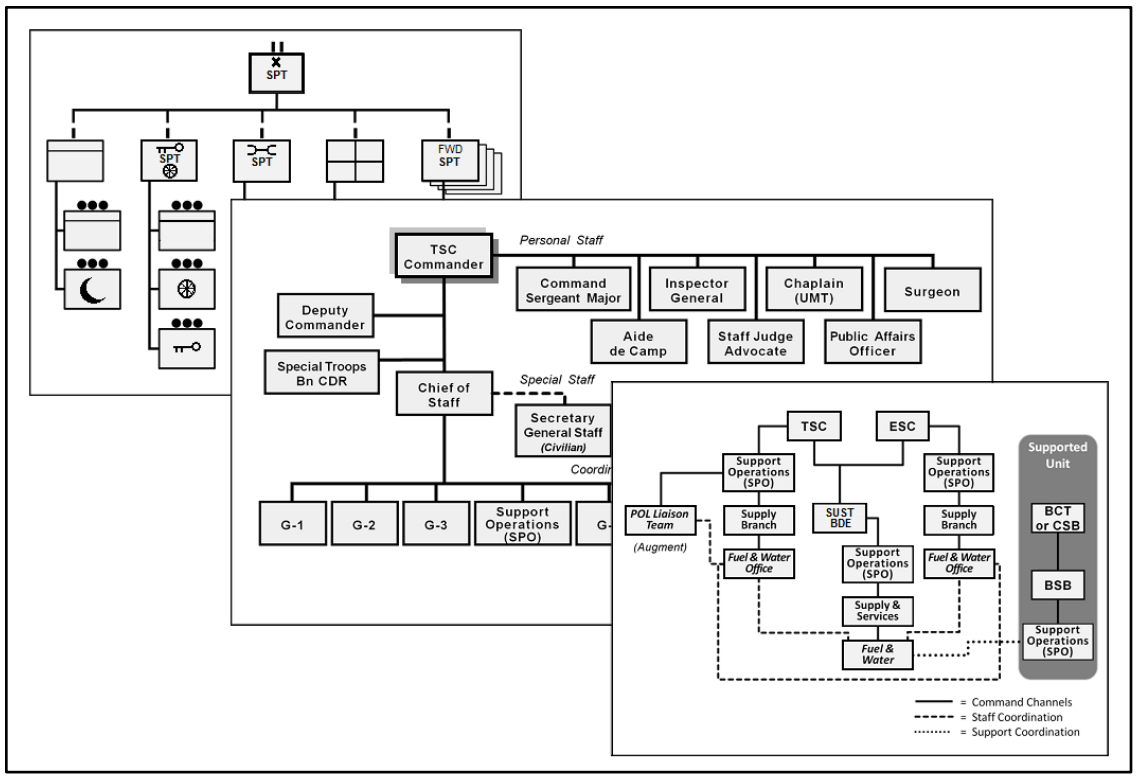


Figure 2-3. Command organization and staff relationships charts

2-40. Amongst organization charts, especially charts of a parent unit and its internal component elements, the artist has to observe strict adherence to ADRP 1-02. The section on Organization Charts in chapter 3 sets forth very specific supplemental rules for the design and styles to be used for such charts. In this situation, the artist must exercise well defined visual literacy. More than the other figure-types, inconsistency of presentation and artistic style will capture the attention of military readers, to become a distraction. Here, the type of line (such as solid, dashed or mixed) and the way the lines are connected to other elements each have very specific meanings. The artist is responsible for knowing exactly which symbology is to be used to represent those relationships.

2-41. The author must be very specific about what type of relationship is to be depicted between the icons. A drawing with hap-hazard lines between elements does not effectively convey the detailed nuances of organizational relationships and command prerogatives or responsibilities which are indicative of ADRP 1-02 graphic standards. Such detailed nuances cannot be ignored because an imprecise depiction can create an incorrect meaning, leaving the reader with a false understanding.

2-42. Command organization and staff relationships charts are a common image in doctrine publications. When making organizational charts of field units, always use the correct operations center map icon and symbology as found in the “Operational Terms and Graphics” manual. When you are writing about how personnel are grouped together to perform a function or accomplish a mission, this is the visual way that this is expressed.

PROCESS CHART

2-43. Processes are the core activity presented in technical manuals, both in writing as well as graphically. Process charts are about resources and work. Process charts have an identifiable start-point and end-point which culminates in a product. At the most detailed level is the “work breakdown structure” which dissects

a process into a complete hierarchy. For the operator at the most basic level is the task, conditions and standards; also known in commercial industry as individual work instructions or work steps (anything lower is an item depiction). At the higher levels is a work schematic (anything higher is an overview). Sometimes, a process can be abstract, such as a decision making process where the product is an intangible course of action or a policy. Other times, it can be as objective as the torque on a bolt or the inner workings of a machine to make a physical commodity. These charts (figure 2 4) show an individual how to structure their actions into a sequence of events the lead up to an end product. They detail transformation by linking resources to sequential or parallel actions.

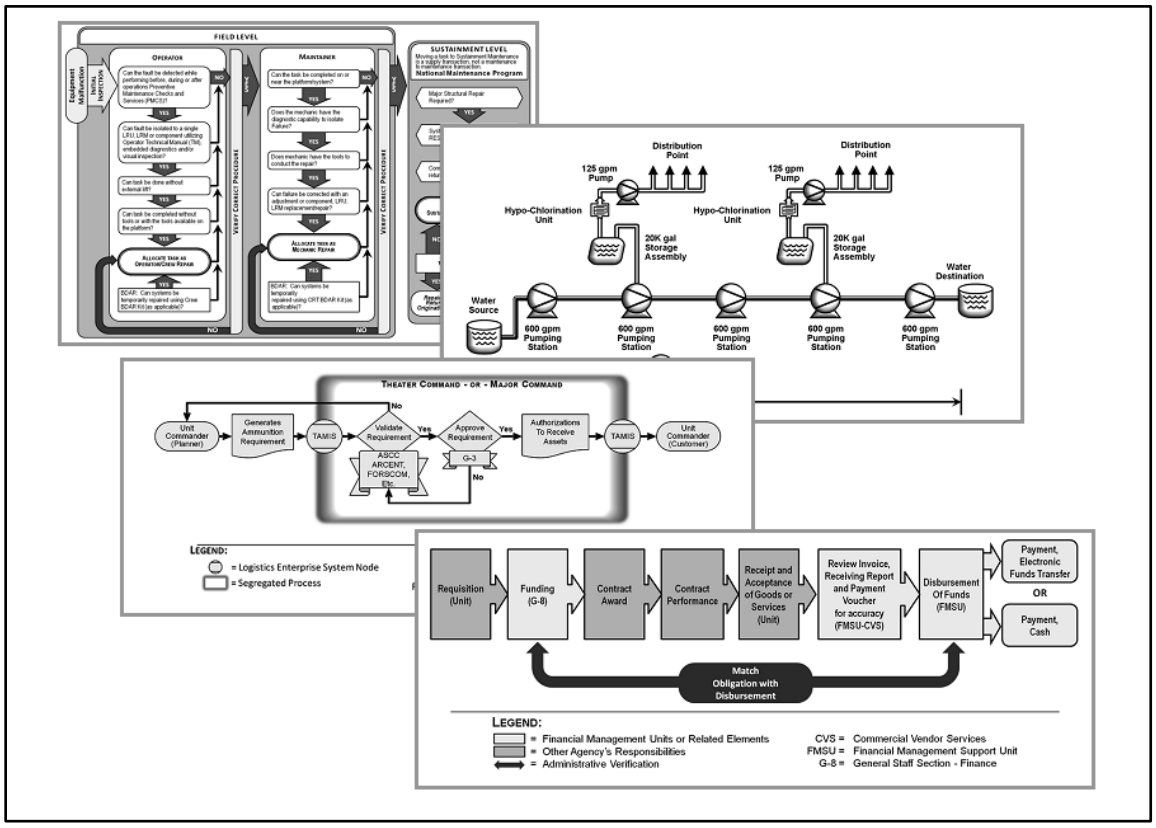


Figure 2-4. Process Flow or Decision Tree Charts

2-44. The level of detail used to describe and depict a process is governed by the type of publication in which the chart is used. Process charts are usually not found in Army Doctrine Publications (ADP) because these publications are focused on the desired end result, to the exclusion of quantifying resources or detailing the steps needed to achieve such results. On the other end of the spectrum, Pamphlets, Technical Manuals and Training Circulars usually have process charts which convey step by step operator instructions at the greatest level of detailed granularity for expressing a process.

2-45. Authors need to know what the desired level of detail is appropriate for the publication. Then the author must sit down with the artist to identify the topic and the major elements, or detailed elements of each step. Authors and artists who develop flow charts should use flow chart symbols that are standard for the industry to which the chart is functionally affiliated. In graphic figures, artists should use standard conventions for expressing data; such as with a computer flow chart for management information systems, or electrical schematics for electrical wiring diagrams.

ITEM DEPICTION

2-46. Item depiction (figure 2-5) shows the reader what "right" looks like. This is particularly true of animate objects. It is very hard to discuss process flow without understanding the component elements. Though many

professionals might be overly familiar with the tools of their trade, so often it is easy to forget that such items are not well known by others. Thus, item depiction is a unique category of illustration.

2-47. Within this category, the artist has two major options for depicting an item: two dimensionally flat, or in some version of three dimensional. Unless the manual writer needs to present precise dimensions, the artist should attempt to develop a three dimensional item depictions. Though a two dimensional image is simpler to construct, it is usually not very efficient at being intuitively perceived, and usually takes up more space on the page (figure 2-6). This actually interrupts the smooth flow of thought for the reader.

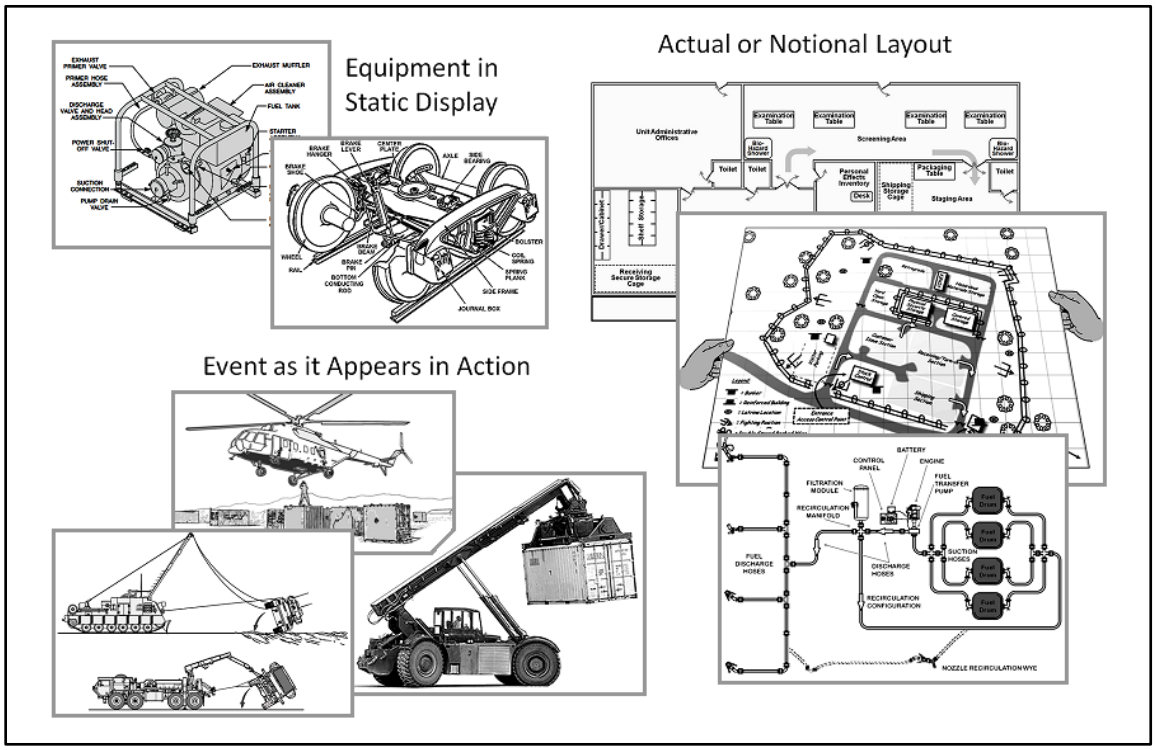


Figure 2-5. Item depictions

BRIEFING SLIDE

2-48. Occasionally, authors will try to inset a briefing slide into a publication. However, there are reasons pertaining to creating serious message problems, as well as technical media issues that differentiate doctrine illustrations from briefing slides. This subject is relevant here only because many doctrine illustrations are derived from them. Sometimes, a doctrine artist will also produce images for briefing slides. Artists need to understand the differences between doctrine images and briefing slides. There are three types of slides that are commonly used in military presentations: concept forum slides, decision slides, and resource status slides.

PRINT GRAPHICS VERSUS BRIEFING SLIDES

2-49. Briefing slides are usually presented by a speaker. Due to how fast briefing slides are typically developed, they frequently lack the single message focus or professional quality of doctrine illustrations. It can be useful for speakers to have one slide with several messages. This provides an overview of the subject and saves the speaker from having to pause during slide changes. The speaker simply steps through each of the various messages depicted on the slide. Then, speakers can adlib about any questions that the audience might have on the slides. However, this is not an option that a doctrine manual's writer has for communicating with readers.

2-50. Briefing slides don't require the visual resolution and detail common to published figures in a manual. Directly copying and pasting a slide into a Word™ document or template results in a vector graphic meta-

file whose invisible programing instructions will conflict with and corrupt the XML (Extensible Markup Language) programming behind Word™ templates. Even if converted to a raster file format, PowerPoint™ slides are usually fabricated in at default resolution (96 dots per inch [dpi]) which is engineered for digital video presentation. Occasionally, they are converted to PDF file for distribution as digital publications. In either case, the poor slide resolution is exaggerated by high resolution photocopy or offset printing processes.

2-51. Visually, cutting corners by using a briefing slide usually results in divergent styles that break the visual continuity for the whole manual. Doctrine artists may find briefing slides useful for generating derivative illustrations, but authors and artists should not try to incorporate an original briefing slide into a doctrine manual.

CREATING BRIEFING SLIDES

2-52. As artists producing a true briefing slide, there are certain best practices:

- The most important part of the development process is to know who the slide will be presented to, and what aesthetic styles the message receiver finds as most comfortable and easy to absorb. Some recipients enjoy an embellishment such as a uniform patterned background; others only want a stark white setting. Some recipients enjoy embellished fonts to accent highlights of the message; others only want a uniform font, throughout. Some recipients enjoy color embellishments; while others only want black and white headers and text. Some recipients are text oriented, while others are visually oriented.
- Identify if a template already exists that the organization uses as a standard format.
- When developing a briefing that responds to an issue or strategic initiative, the slides need to back reference that causative subject. Doing this keeps the presenter and recipient tied back to the context of, or the reason for the briefing. Such slide development will try to capture as much of the whole picture as posable in three; at most four slides.
- Keep the slides simple and direct. Avoid depictions with too much detail, non-topical information, or extraneous eye candy. When a recipient views a picture, they reflexively try to make sense out of what they are looking at. Burdensome visuals become a distraction which side tracks neurological energy from the critical knowledge the audience is trying to absorb for the decision making they need to process. It might be alright to have thumbnail images that are generic examples of the slide topic, even though it is detailed.
- Keep the slides simple and direct. Though a slide may have multiple messages, be careful not to overload a slide. Think of a useful slide as being a five paragraph essay. It would have an introduction by the presenter; illustrate its three major points; and then the presenter concludes the message of the individual slide.
- Keep the slides simple and direct. A briefing slide is not an aesthetic entertaining work of art. Avoid artsy embellishments whose only value is to emotionally hook, impress, or persuade the recipient. Most executives and commanders have to juggle a large number of very heave decisions. For the most part, they want to feel that their decisions were unbiased and dispassionately objective; as satisfies the best interests of their charge. The best service of briefing artists is to be sedate in their visual style.
- A slide presentation should be conjoined (or easily conjoin-able) with a written handout of the slide brief. Although a slide presentation is occasionally used as the document of record or official approval records, written documents are preferred for official records.
- Pay attention to color composition, when color is allowed. An artist usually has the opportunity to work with color in briefing slides. However, poor color choices will become distracting if not jarring to the audience:
  - Pick a supporting color for use throughout the slide presentation to create a sense of continuity. This is a part of the motif.
  - Background colors should be light or pastel, when not white. Background colors should support the text; not upstage or over power the text. Further, dark backgrounds cause an optical illusion of being far away (maybe good for artsyness, but poor for communicating a message).
  - Font colors should be deep or rich, when not black. Font colors need to be strong enough to be visible to viewers in the back of a room (without being florescent).

NOTE: A color harmony guide is recommended for artists.

- The title should be comprised of a font size that is within two to three times the size of the body text. The title text should be spaced so that its distance from emblems on the sides is greater than text is tall.
- Text, especially body text should be sans-serif (lines of even thickness with no flaring lines at the ends). Types of sans-serif are such as Arial, Calibri, Verdana, and the like (not Roman font).
- The use of all upper case font or the use of florescent colors is visually overly aggressive (like having someone shouting at you). The use of uppercase font or florescent colors can be used to signify exclamation or warning; but should only be used sparingly; they are better to avoid.
- When using various colors, do not place warm colors on top of warm colors, or cool colors on top of cool colors; regardless of hue or saturation. No matter how attractive the colors, in a message environment it becomes hard on the eyes to sort through the visual bleed-across to capture the message. (An artist is responsible for knowing cool color from warm).
- Animation is not used in hurried briefing slide presentations. It does not translate into paper copies.
- In briefings, there are three common types of graphic products: Concept Forum slides, Decision slides, and Informative Status slides.

CONCEPT FORUM SLIDES

2-53. Concept developers use concept forum slides to disseminate components of evolving ideas during the process of developing future decisions or future policy. The content of these slides is transient, and their useful life is usually very limited. Such slides are usually made by non-artists who don't adhere to the fine points of the graphic arts discipline. The objective of concept developers is to get the rudiments of an idea out in front of executives and the rest of the community to stimulate thinking and critiques which can improve upon the original idea. In spite of their short life spans and often amateur appearance, these slides are a critical part of the concept development process.

2-54. If a concept moves from being a rudimentary proposal to a formal investigation of new processes, real graphics artistry may be applied. Concept developers at this point will have to provide the in depth rational which is leading to new thinking. At this point, the use of animated rock drills can be considered. (For more information on the principles of animation use, see the sub-section below titled, "Animation.")

DECISION SLIDES

2-55. Decision slides are a group of persuasive slides presented to a commander or executive. Usually, these slides consist of a need for change, the avocation of a new plan for resource use or a process improvement, and a SWOT analysis of the strengths, weaknesses, opportunities, and threats to the proposed change. Such slides might be widely disseminated, but are really targeted at decision makers. Where most doctrine images are presented in conjunction with printed text, decision slides are usually supported by a speaker who can maximize the presentation's impact with extemporized information. Hence, a single decision slide might contain several overlapping messages. For a doctrine image, anything beyond the focal message is clutter or excessive embellishment. Decision slides may be simple or elaborate, but their primary utility is consumed once a decision is made by the person with executive authority.

INFORMATIVE STATUS SLIDES

2-56. A resource status slide can be commonly found in any presentation where a decision has to be made or where process managers are tracking conformity. These slides present the disposition of past, current or projected resources in the recent or near term. It is common to find a resource slide amongst decision slides. Yet, they are likewise common to informative slides as quantitative graphs, tables of assets and trending over the progression of time. What makes these slides unique from doctrine illustrations is that policies set forth in doctrine are indifferent to the recent or near term fluctuations of resources. Doctrine is usually more focused on the long view.

ANIMATION

2-57. PowerPoint™ is a very flexible and powerful tool for developing animations. Animation draws audience attention, but without purpose (just to be artsy) they can be distracting from the message.

2-58. Hence, there are three times when animation should be used that will support the message:

- To show what the eye cannot see.
- To present procedures with multiple actions, or parallel sequence of events.
- To depict a future event, where the underpinnings or context are not familiar to the audience.

2-59. Animations are best presented in situations where time is available to train the audience, such as: long briefings, seminars, or classrooms. They are not useful for printed paper documents. Where paper handouts are to be provided, a fresh set of static (non-animated) illustrations will be needed.

BRIEFING SECURITY CLASSIFICATION

WARNING! All slides in a briefing that possess classified information must be labeled as such, per local command policy.

2-60. Military slides, just the same as any document can contain classified information. If the slide has classified information, precautions must be taken. Seek guidance from the office security officer, G-1/S-1, and G-6/S-6 on command policy.

WARNING! The presence of unauthorized classifies material (Confidential, Secret, or Top Secret) can result in any contaminated data being deleted or the whole computer being data wiped clean. Graphic artists should never try to correct infestation of classified information on a computer. Notify the security manager, followed by contacting the G-6/S-6 technical support.

2-61. Command should never assume that new personnel or contractors (regardless of the person's security clearance level) are trained in "how" to handle classified or sensitive information; as it pertains to computers. Graphic artists should receive the same briefings on computer security standards as other information system operators. It is important that graphic artists can quickly recognize classified material on a computer, and act to contain that information from infecting other computing devises, or from being incorrectly released.

Chapter 3

Graphic Techniques

> "I THINK IN PICTURES. Words are like a second language to me. I translate both spoken and written words into full-color movies, complete sound, which run like a VCR tape in my head. When somebody speaks to me, his words are instantly translated into pictures. Language-based thinkers often find this phenomenon difficult to understand, but in my job as an equipment designer for the livestock industry, visual thinking is a tremendous advantage. Visual thinking has enabled me to build entire system in my imagination."
>
> Temple Grandin
> *"Thinking in Pictures, Expanded Edition: My Life with Autism,"*
> Vintage, 26 January 2010

This chapter is focused on understanding the specific styles used in Army doctrine illustration. In graphic arts, there are many different ways to visually express meaning to an audience. Within a military publication, every graphic is supposed to have a subject that is related to the text and purpose of the document. Every industry has its own conventions for symbols used in plans, and every manufacturer has its own style for presenting its products in its technical manuals. Here, just as in spoken language, there are regional dialects which are understood by some and not by others. Likewise, the same is true for visual dialects where the differences from one artist to the next can have a jarring effect on the audiences' efforts. Variances in style, or poor style, distract a reader's ability to rapidly capture the writer's message.

WORK STEPS IN DIGITAL IMAGE DEVELOPMENT

3-1. The development of illustrations for a doctrine publication merits the highest level of attention to consistency, correctness and professional appearance; in a uniform style. They can be used for any of the Army's standard figure types. While each illustration must be able to communicate its point independently, the collection of illustrations in a book must bear some similarity of design; of the same general style. A striking variation in artistic style or graphical conventions within a book is jarring to the reader.

3-2. Creating images for use as illustrations in a publication involves an artist's development process (figure 3-1). The first step used in the process is the draft image or pre visualization. At this point the manual author, working from the intended message and outline gives the artist a roughed out plan for how the manual will be illustrated. Draft images can be provided on anything as simple as a napkin to as complex as a software engineering schematic. Pre visualization is used when new or customized photographs are needed. The development of such images are recorded in a baseline file and digitally archived with the rest of the publication's development material.

3-3. Once the more abstract message and style of the illustration has been determined, the author and artist must work through the practical limiting factors of building the images. In working with artists (especially non-graphic artists) authors will have to be prepared to discuss or provide detailed instructions on which techniques are to be used for each image.

NOTE: Not all artists are trained in visual communication, or possess visual literacy.

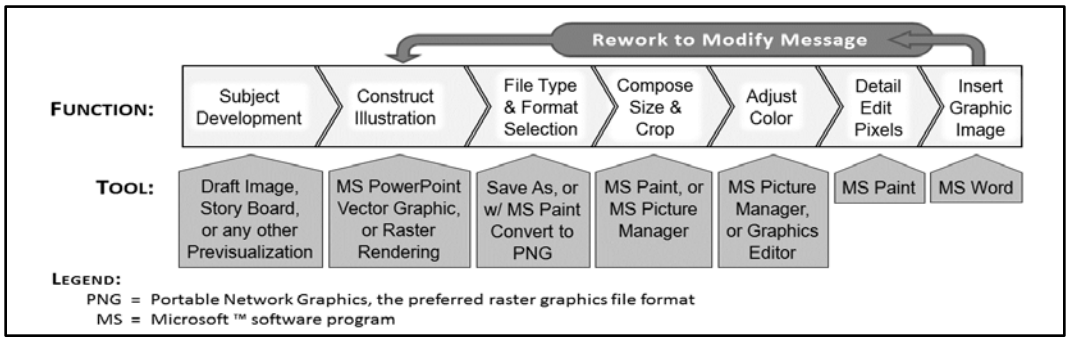


Figure 3-1. Doctrine artist's illustration development process, overview

DIFFERENT GRAPHIC TECHNIQUES

3-4. Using the M-88 Hercules recovery vehicle as a common subject, figure 3-2 depicts it using different graphic techniques. Along with each component image in figure 3-2, is the type of language used to tell an artist what is wanted as an end product. The basic imaging techniques are: photograph, rendering, contour (or line drawing) of various types, and a chart (or diagram as shown in figure 3-3).

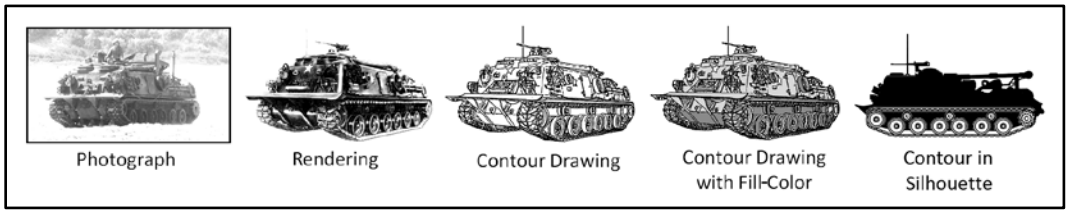


Figure 3-2. Differing image techniques

3-5. The first image technique is a photograph, found on the left of figure 3-2. The photograph is first because even if not used, it is quite often become the foundation for drawn illustrations.

3-6. Closely related to the photograph is a rendering. It is a painting or drawing that is shaded by cross hatching, half tone, or blending. A close examination of this element on figure 3-4 reveals that there are no true lines in a rendering. Renderings are commonly created with stippling, air brush, or programs such as Photoshop™; and skilled artists can even use PowerPoint™ to create simple renderings.

3-7. The opposite technique of a rendering is a contour drawing; done by drawing an image along its visual edges. In contour line drawing, the artist produces a line drawing with no regard for shadows or highlights. It leaves a very direct impression of what is being conveyed, while at the same time extraneous detail can be excluded or down played. Using a single light gray or pastel fill-color helps provide body to the image that makes it visually pop. Contour techniques can range from line drawings to solid silhouettes.

3-8. The last illustrative technique is a line and block chart (figure 3-3). It is the foundation of the Army's command organization and staff relationship charts, as well as process charts. It can denote relationships or a sequence in a process. (Civilian industry has other styles for using this graphic technique. Word™ has an "Insert a Chart" application that conforms to civilian styles, and should not be used in doctrine illustrations.)

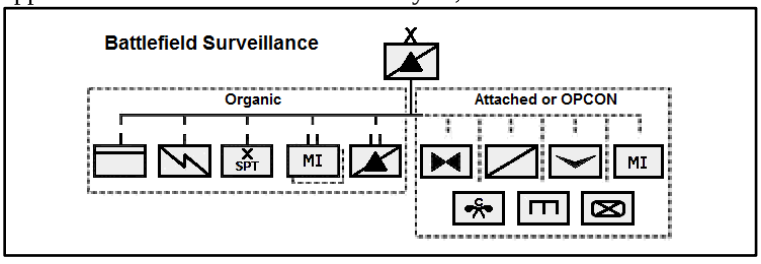


Figure 3-3. A line and block chart

PHOTOGRAPHS

3-9. A photograph is a mechanically made realistic image of an object. Visually, photographs are popular to use because for non-artists, they always look like the image that was photographed. Often, authors try to find photographs as an image to bring visual context to what they are writing.

> ***WARNING!*** Artist must question not only the visual context of its original intent; but also scrutinize that the image supports the whole informative message. The artist must address clarity, composition, clutter, and subject focus. Yet, don't reject a photograph only for being a photograph.

3-10. The problem is that a photograph is the least preferred type of image for an informative publication. There are a variety of reasons for this aversion to photographs.

- Good color photos don't translate very well into being good black & white subjects.
- Photos are prone to losing the detail in image and color discrimination.
- Photos create focal confusion due to background clutter in the composition.
- Authors have a burden to show the source of any photograph, and prove the photo is in the public domain. They are responsible for ensuring that photographs are free of copyright encumbrances before they are placed in a book. Editors and publishers in the military must know that copyrights are not being violated.

3-11. Doctrine photograph images are complicated by being reproduced in black and white, as previously mentioned. This is because gray-on-gray makes the reader's eyes work hard to discriminate and separate the central focus of the graphic message from the background clutter.

3-12. Notice in figure 3-4 how the background clutter of the two photographs on the left, distract from the central subject of the image. Now, this is fine for decoration in marketing material, or in the context of a journalistic a story about recovery operations in a brush filled environment. However, as an image of the basic vehicle or generator sets, the background is distracting.

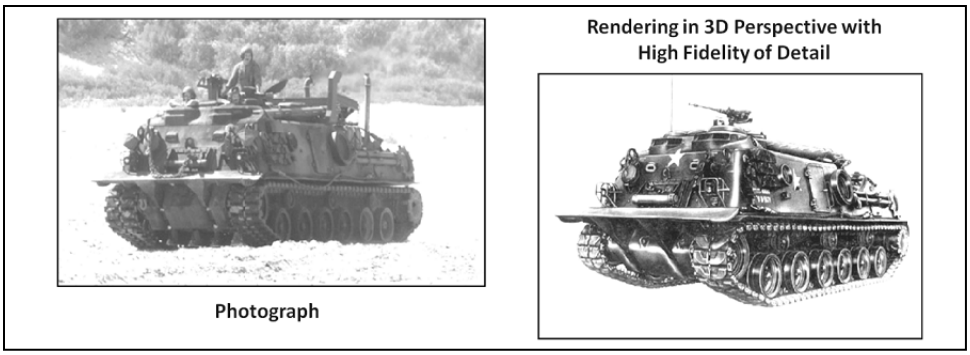


Figure 3-4. Background clutter's effect on a photograph

3-13. For these reasons, artist should treat a repurposed or random photograph with skepticism. The lack of clarity for a photograph verses the clarity of a rendering is evident in figure 3-4. The rendering on the right stayed intact and doctrinally relevant for over sixty years. It was used in many generations of technical manuals and recovery doctrine manuals until a third generation of the vehicle can along which was different in appearance.

3-14. Illustrative photographs shall be posed or staged, with controlled lighting or flash lighting. When used, photographs shall be detailed and sharp:

- Free of heavy shadows across the face of the subject.
- Free of distorted objects.
- Without cluttered foregrounds or backgrounds.
- Have good contrast from white, middle tones and black.

3-15. Photographs work well as a part of the introduction to a subject as an overview presented in its situational context. For doctrine publications, a photograph works when the subject of the manual being introduced is about an objective physical object. If the subject being introduced is an abstraction, then a picture should not be used.

3-16. Photos also work to put contour drawings into context (figure 3-5). Often contour drawings don't provide a realistic sense of proportion. In other situations, photos provide a key to the relationship between the background environment and the item under discussion. In the following figure, the picture alone would suffer by having white-on-white. Further, the goal of this figure is to label the weapon's components for readers who are not familiar with the terminology that will be used as the manual progresses. By mixing the images into a single figure, it provides a convenient way to fill the extra negative space.

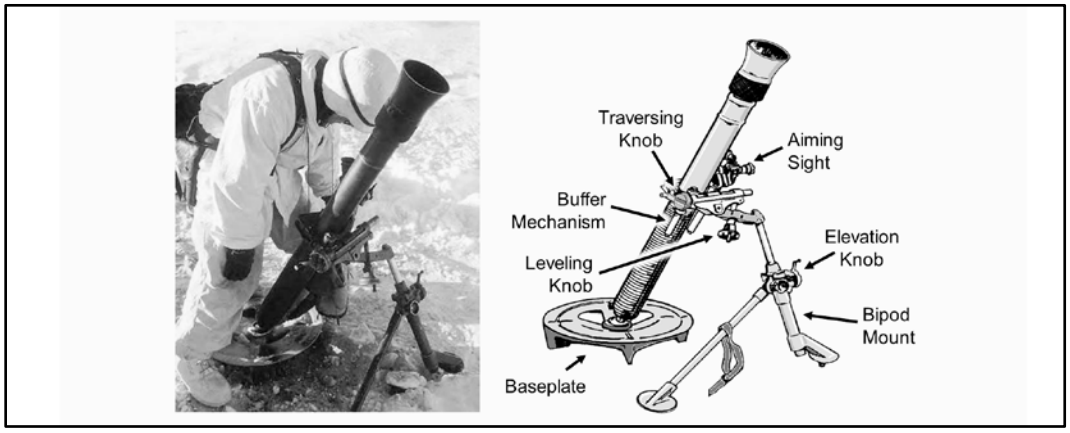


Figure 3-5. Photo supporting a contour drawing providing a real life context

3-17. The other reason against using photographs is more technical; photographs are more prone to resolution degradation when being moved from digital media to print then any of the other techniques. And once that happens, they are the hardest to recover. For example, if an image in a PDF was installed as a high resolution image, it usually prints as a high resolution image (provided it is not default set for internet only use). But, if the image is copy pasted digitally from the PDF to a Word™ or PowerPoint™ file, it will drop the resolution to somewhere between 5,000 to 9,000 pixels per square inch, which is normal for a computer monitor. However, this is a far cry from the 16,000 to 24,000 dots per square inch of a modern photocopier.

3-18. Where visual detail is desired, a rendering is more appropriate for supporting informative writing, and a contour drawing is beast. Artists have a variety of options in dealing with photograph that can enhance their usefulness in an informative publication. The ideal solution is to convert a photograph into a renderings or contour drawings. If this is not a reasonable possibility, the artist should try to ensure that color images are converted to gray scale, and apply contrast and lightening to enhance visual discrimination. Where possible, the artist should remove distracting background visual clutter. Otherwise, the use of a raw photograph requires the permission of a manager. Depending on a bad photograph will result in that aspect of the manual's message being lost.

RENDERING

3-19. Renderings are the most highly desired (though no longer common) illustrations used for doctrine publications. However, they are the most expensive to produce, because of the technical skill needed to make them.

3-20. In technical drawing, a rendering is the process of adding the color, shading, and texturing to an image subject (right side of figure 3-4). Renderings are usually defined and visually expressed as, drawings or paintings where shapes are shaded and highlighted. Renderings differ from photographs (which are not renderings) in that the artist abstracts or is selective in the details that are represented. Contour drawings on the other hand does not shade or highlight to texture an image; even if a contour image has fill-color (as shown by figure 3-6), it is not a true rendering.

3-21. The Army currently uses three dimensional (3D) gaming software to create animated training videos. From such 3D software, rendered still images can be derived for used in doctrine publications, if created by Government resources. Artists who have mastered PowerPoint™ can produce pseudo-renderings (right side of figure 3-5) that mix vector graphic lines with shading and highlights.

CONTOUR DRAWINGS

3-22. Contour or outline drawings (figure 3-6) are used in lieu of photographs (or halftones) with a gray fill color, whenever possible. Otherwise, the use of a photograph instead of a line drawing shall be determined by the practical considerations of the purpose and suitability of the image in the publication. Taking a contour drawing and adding fill-color is referred to as a pseudo-rendering (right side of figure 3-6). A true rendering does not have contours or lines of fixed width running around its edges. Existing illustrations and engineering drawings shall be used where they meet the informative objectives of the manual. Line tracings of photographs are also acceptable. (Not all contour images are computer generated vector graphics.) The resulting line drawings shall be of 200 dpi, or higher reproduction quality.

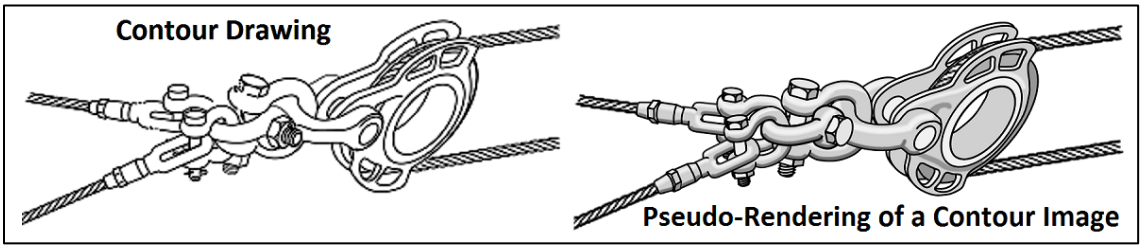


Figure 3-6. Rendering of a clevis and pulley system done with PowerPoint™

GRAYSCALE ACCENT OF THE SUBJECT

3-23. The preferred graphic illustration technique is contour or line drawings with one, two, or three shades of gray as a fill-colors (figure 3-7).

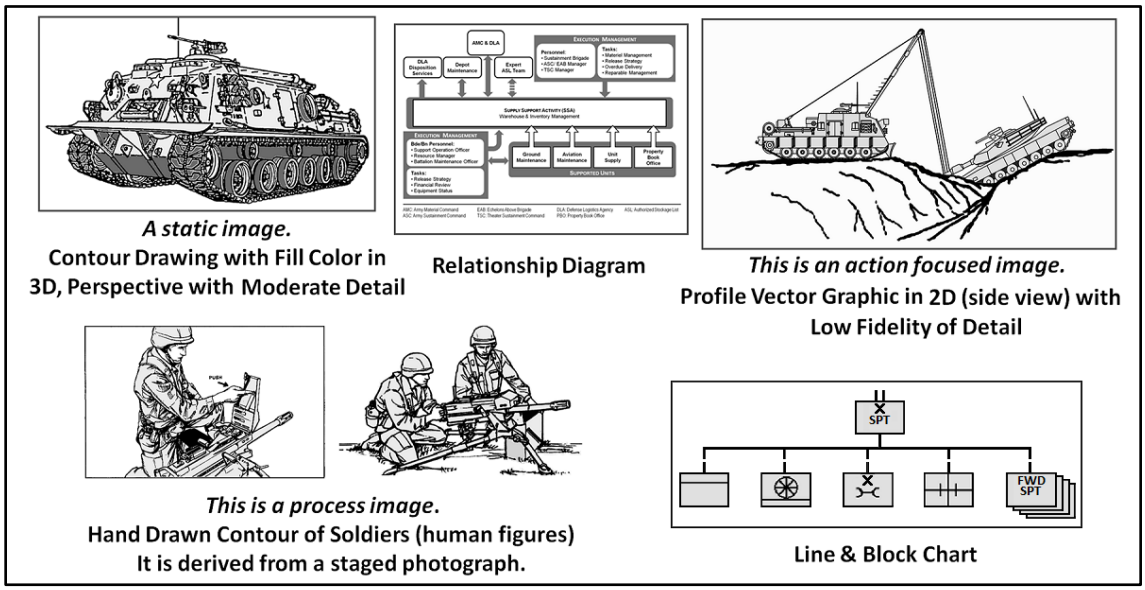


Figure 3-7. The use of a light gray fill-color to emphasize the central subject

3-24. The advantage of a light gray fill-color (figure 3-7), is that the author can elect to have the artist concentrate more detail on the parts of the picture which are the focus of the author's message. This conforms to the principles of abstract minimalism. Here, light gray color is used to accent the message in an otherwise black and white illustration. In the tank recovery picture (in the upper right of figure 3-7), notice how the

ground is visually mentioned in black and white, but the real subject which is the positioning of the two vehicles is highlighted with a gray fill-color. Here, the gray color is used to help the eye to rapidly capture the focal subjects against the white of the page. This is likewise true of the relationship diagrams and line and block chart where gray body color is given to the elements of the images.

3-25. Next (in the lower left of figure 3-7, see how the Soldiers are depicted in contour without camouflage or shadow. Determining what stays and what needs to be cut requires a careful look at all the imagery elements of a picture. The result (figure 3-8) is that the detail of the Soldiers' actions and the positioning of their bodies can stand out beyond the visual clutter, as demonstrated in the poor images compared to the correct images. Furthermore, the extra effort to hand draw these personnel in action, compared to the digitized pseudo-contour images, is what makes these images very successful at conveying the intended message. It is important to tell artists who are not graphic artists what clutter must be minimized in an image which is being converted from a photograph to an Illustration, for use in a manual. Remember, the harder it is for the nerves system to interpret the visual stimulus of an image, the more this effort distracts from telling the message of the text.

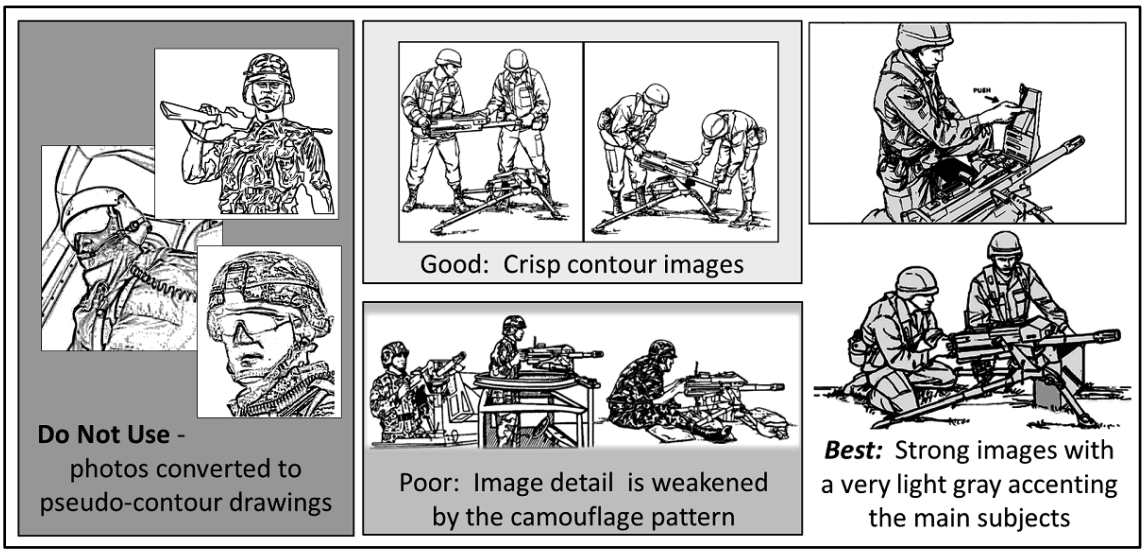


Figure 3-8. Soldiers depicted in informative illustrations

DEPICTION OF HUMAN IMAGES

3-26. Public Affairs has standards for the depiction of a soldier in Army publications. Where an illustrations may include a human figure or parts of the body:

- The human figure shall not be permitted to obscure details of the equipment necessary for a complete understanding of its operation.
- Public Affairs standards of depicting Soldiers applies to doctrine illustrations.
  - Military personnel will appear in proper uniform!
  - The human figure shall be clothed as appropriate for the activity.
  - Jewelry shall not appear in an illustration.
  - A cross section of races and sexes shall be used.

3-27. Good illustrations do not have visual nuances which over work the eyes or have conflicting messages. To avoid a cluttered appearance that obscures the actions of Soldiers, they are not to be illustrated with a camouflage pattern on their uniforms, as shown at the bottom of figure 3-8. Furthermore, authors and artists should not distract readers by images that conflict with doctrine found in other references. Therefore, Soldiers are not to be depicted as being out of uniform or in violation of Army personal appearance standards. This is not only applies to depicting Soldiers, but any other object subject to military appearance standards.

FONT

3-28. The font style (size and attributes) used in graphics must be consistent. All figures in a book must present a consistent appearance. Good doctrine images do not need to use embellished fonts to achieve the desired effect. Plain sans-serif text is the most effective style for conveying informative thought with an illustration. For reasons of both image adjustment, and consistency in style, use sans serif font (Arial (Helvetica, Calibri or a very close style) for all font type within graphics.

3-29. In trying to reproduce or photocopy images with text, Roman typeface styles tend to disappear where the letters narrow. There are times when the source image is lost or not available, and a copy of the image has to be snagged from an old document. In such instances, the artist may have to adjust the brightness and contrast of the image to restore clarity to an illustration. It is common for fonts with uneven widths to fight restoration and reuse.

3-30. With the advent of word-processors, and the disappearance of India ink styluses, it is not necessary to make all text in an illustration be in upper case. However, where this upper case convention is applied to one illustration, it must be done to all illustrations within the same document.

3-31. Use a type size appropriate for text in the graphic and its use. Text size will be between 8 and 11 points for tables and no smaller than 8 points for figures. Text may be bolded or italicized for emphasis.

3-32. It is often times desirable to offset the reduction of image size, or hedge against the loss of resolution by having the text appearance set to bold or all capital letters. Hence emphasis in illustrations will be signified with italics, for the purpose of consistency amongst doctrine images in general.

COMPOSITION

3-33. In military graphics, composition is the placement of visual elements within a graphic (table or figure). Along with the subject of the graphic, the artist is expected to exercise empathy for the reader that gives structure to the layout and the way the subject is presented. The objective of good composition is to encourage the reader's eye to take in the whole graphic and ultimately rest on the focal point of the author's message. Effective graphics have clear and understandable content; they are concise as achieved in the revision (figure 3-9). Too many lines, shades, words, bullets, or symbols become more distracting than clarifying.

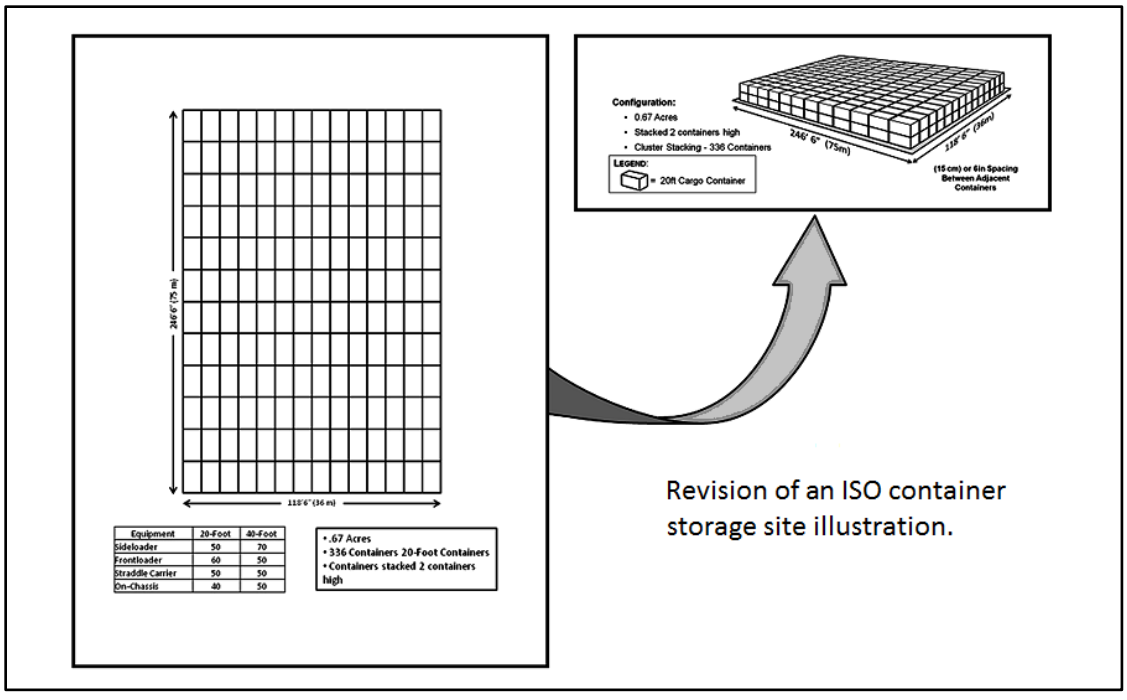


Figure 3-9. The visual effectiveness of a 3D over a 2D image for item depictions

- All graphics in a document must be consistent in style.
- Diagram charts (for example organizational charts) use either text or symbols but not a mix with some graphics as text and some as symbols. Follow these requirements:
- Any acronym or an abbreviation in a graphic requires a legend in the graphic (per, DA Pam 25-40. This changes guidance established in TR 25-30.)
- Graphic titles only belong in the table or figure caption. Often authors convert briefing slides into graphics and forget (or don't know how) to remove (or crop) the title from the original slide.
- Visual elements of the same nature (such as connection lines, text font style, levels of detail, and the like) should be depicted consistently from one figure to the next throughout the publication.
- Item depictions should appear as a person would expect to see them (figure 3-8).

COLOR

3-34. Graphics must be in black and white with grayscale because colored images are generally not used in doctrine publications. The requirement for black and white with grayscale graphics is specified in DA Pam 25-40. Color is an extra expense for an offset printer. Since the final version of any document will be in black and white, draft documents for staff review are also presented without color. A waver to colorize may be granted if the author can demonstrate a necessity for color and conduct advance coordination with the Army Publications Directorate. Otherwise, printing color publications is cost prohibitive.

3-35. Color photographs must be of sufficient quality and resolution to provide a clear image when printed in grayscale. Color does not reproduce well when copying with black ink. For conversions to black and white, artists need to be proficient in using image editing software (such as Picture Manager™) to adjust the brightness, contrast and mid tones for bring out the key elements of the photograph.

3-36. Sometimes authors wish to incorporate images, originally created in briefing slides that depend on color to convey relationships. In that case, authors need to work with an artist and an editor to develop ways to express the relationships in grayscale. Then, the color image serves as a model from which the artist can generate a grayscale illustration.

LEGENDS

3-37. Legends are critical components of informative illustrations. The author and artist cannot assume that the reader understands the topic under discussion or knows the meanings of abbreviations, icons and symbols being used to depict information. The emotional annoyance of an undefined symbol or shorten form of text (acronyms, brevity codes, and abbreviations) disrupts a reader's concentration on the authors message.

IDENTIFYING RELATIONSHIP OR CONNECTION

3-38. Relationship or connection are usually depicted by lines, color coding icons, or encompassing shapes.

NOTE: People have relationships. Material has connections.

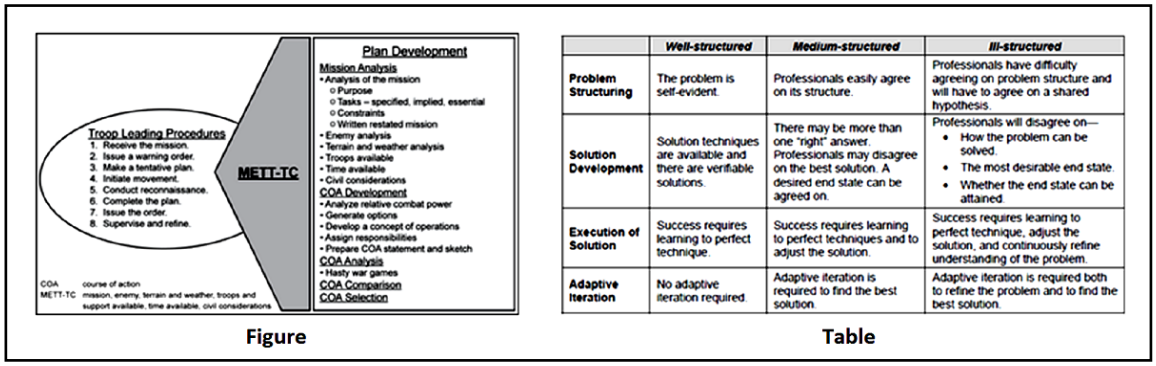
3-39. When different colors (shadings of gray) are used to differentiate one type of element from others, the significance of the depiction must be defined in the legend.

3-40. If an illustration only has a solid command line indicating a chain of command relationship in an organization, it doesn't need to be defined in the legend. However, if any other connection lines are used to depict relationships, then all the lines (including command lines) must be defined in the legend.

3-41. The legend is to be fully built into the image (not a vector graphic text box overlaid upon a raster image). Overlaying a text box or vector graphic will corrupt a template, or risk becoming disconnected from the image if it shifts position in the document.

TEXT WITHIN AN ILLUSTRATION

3-42. Whenever possible, text should be incorporated into the body of a document or a table. This allows the text to be searchable within the documents. The Unofficial CADD Editor and Author Guide, 25 August 2016, says, "If a figure has a large amount of text and can be created in Microsoft Word™, it is best labeled as a table." Figure 3-10 is the example taken from the unofficial guide which supersedes the FM Formatting Instructions, February 2005, and Word 2007 Guide for Doctrine Editors and Writers, August 2008.



	Well-structured	Medium-structured	Ill-structured
Problem Structuring	The problem is self-evident.	Professionals easily agree on its structure.	Professionals have difficulty agreeing on problem structure and will have to agree on a shared hypothesis.
Solution Development	Solution techniques are available and there are verifiable solutions.	There may be more than one "right" answer. Professionals may disagree on the best solution. A desired end state can be agreed on.	Professionals will disagree on— • How the problem can be solved. • The most desirable end state. • Whether the end state can be attained.
Execution of Solution	Success requires learning to perfect technique.	Success requires learning to perfect techniques and to adjust the solution.	Success requires learning to perfect technique, adjust the solution, and continuously refine understanding of the problem.
Adaptive Iteration	No adaptive iteration required.	Adaptive iteration is required to find the best solution.	Adaptive iteration is required both to refine the problem and to find the best solution.

Figure 3-10. Figure versus table

3-43. In doctrine document, illustrations are used as a supplement to text. Putting voluminous amounts of full sentence explanatory text (lower part of figure 3-11) into an image defeats the purpose of using an illustration. Having large legends is acceptable, even desirable. However, an image like figure 3-11, text becomes hard to read (for psychological reasons). Do not prepare simple tables (those containing rows and columns of a uniform size, on the right side of figure 3-10) as raster image files. Converting such tables to picture files adds no value to the publication. It only makes it more difficult to edit the content.

NOTE: Sometimes, complicated tables (left side of figure 3-10) may merit converting to a picture file. But, this requires the approval of the division chief or his next in authority)

3-44. In figure 3-11, there are eleven full sentences and no legend in this image. By putting too much text into a limited size raster graphic has only caused the font to blur. See how within the image area, the subtext next to the icons has fallen below a comfortable reading level.

3-45. The minimum size for text in an image is any size that prints out larger than the 8 point text of the document, after the image has been installed within the document.

3-46. Though not germane to this section, notice the other mistakes of figure 3-11:

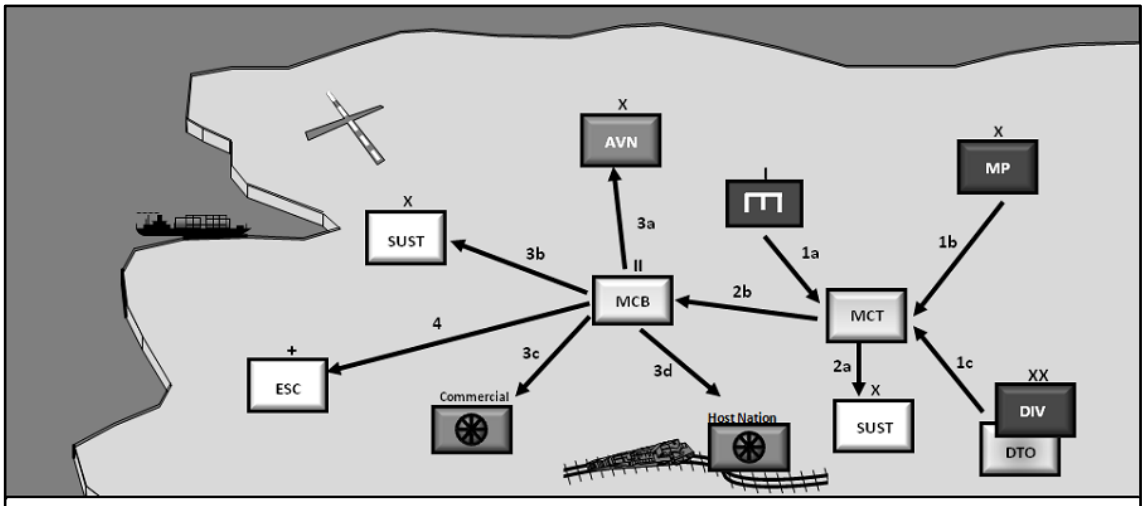
- It's a black and white conversion of a color slide.
- The unit-elements are in different colors, but without significant meaning.
- The background color is too dark, obscuring the foreground subjects.
- Progression of activity begins on the right, moving to the left.

3-47. In figure 3-11 there are five different colors used for filling the unit icon symbols. However, there appears to be no reason for doing this. When the reader is looking at an image having random colors or shades of gray to find illustrative meaning, it becomes a distraction; slowing the reader's comprehension. Furthermore, the image mixes ADRP 1-02 icons with non-standard symbols, which is not allowed.

3-48. The underlying objective of what size to make text in any document is to avoid fatiguing the eyes. Text should be placed on a page or in an image so that word phrases are visible at a glance. The font size of a phrase should not be so large that the eyes must shift left to right. Nor should the font size be so small that it causes the reader to squint his eyes. For this reason, the military has standardized on 11 to 12 point font in the body of its documents. A correctly designed illustration with the same graphical message as the preceding image is shown in figure 3-12.

3-49. Also, notice that the progression of events in figure 3-12 goes from left to right; as reader normally scan a page. It is an example of meaningful composition.

3-50. For the most part, verbiage belongs in paragraphs, while graphics are left to making their point without containing a lot of text. The limited amount of text in graphics is subject to the rules of English and the Army's writing standards of doctrine style.



1a. Unit submits movement request (MR) to their supporting MCT.
1b. Unit submits MR to their supporting MCT.
1c. Unit submits MR to their supporting MCT.
2a. MCT commits mode operator for available common user transportation (CUT) assets, based on established priority of support, to fill a MR..
2b. If military host nation (HN) or commercial CUT assets are not available, MCT will forward MR to its higher HQ.
3. MCB validates CUT is not available to MCT submitting the MR. Once validated, the MCB will determine the best common user mode/conveyance to fill the MR and commit the appropriate mode operator:
   a. The MCB may have the ability to directly arrange Army or Air Force fixed/rotary wing transportation.
   b. The MCB can commit other sustainment brigades for their common user transportation assets.
   c. The MCB may have the ability to directly arrange commercial surface or air transportation.
   d. The MCB may have the ability to directly arrange host nation surface or air transportation.
4. If military HN or commercial CUT assets are not available, the MCB will forward the MR to its higher HQ.

Figure 3-11. A poorly constructed process illustration

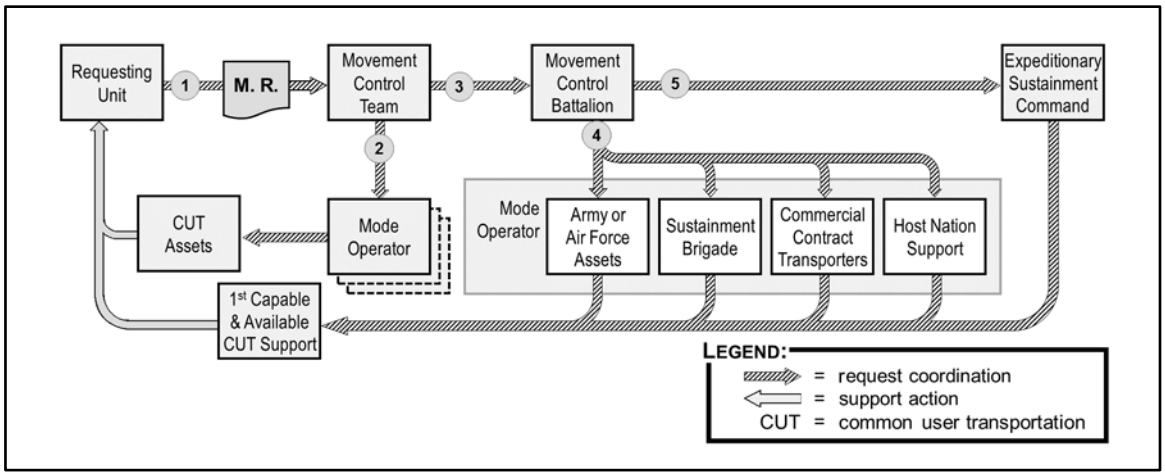


Figure 3-12. A correct process illustration

NEGATIVE SPACE

3-51. The visual free space around and between visual elements is usually referred to as negative space, or white space. It is an artist's technique for helping the readers to quickly and easily discriminate the various subjects of an illustration. The use of equal negative space, as a balance to positive space (the elements in the image), in a composition is considered good design. This basic, but often overlooked principle of design, gives the eye a "place to rest," increasing the appeal of a composition through subtle means. Likewise, good graphics must fit the space available on a page and still be readable. Depicted in figures 3-13, 3-14, and 3-15 are the same organizational elements in three correctly structured hierarchies.

NOTE: Because of the military's historical use of black ink on white paper, "white space" is the other term used in graphics to identify this visual separation.

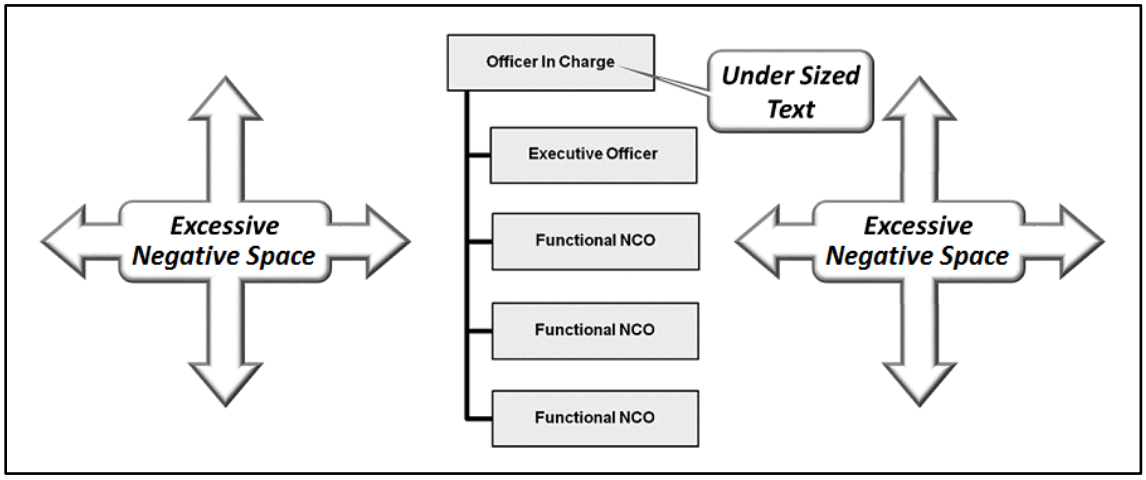


Figure 3-13. Incorrect management of negative space in a correct chart

3-52. A poorly structured image within the border of a figure can actually interrupt the flow of discourse and train of thought from the written text. Further, too much wasted space in an unnecessarily large image (such as the left side of figure 3-9, on page 3-7) in a publication adds to its expense. Space within a document is always at a premium, and should not be wasted.

3-53. The second version (figure 3-14) is a start on fixing the illustration, but not spatially efficient or visually sufficient. Illustration developers (authors or artists) must arrange the visual components to minimize breaks in the flow of reading the document's body text caused by excessive unused space, or figure height. At the same time, developers must allow for visual offset, or a margin between the component elements within an illustration.

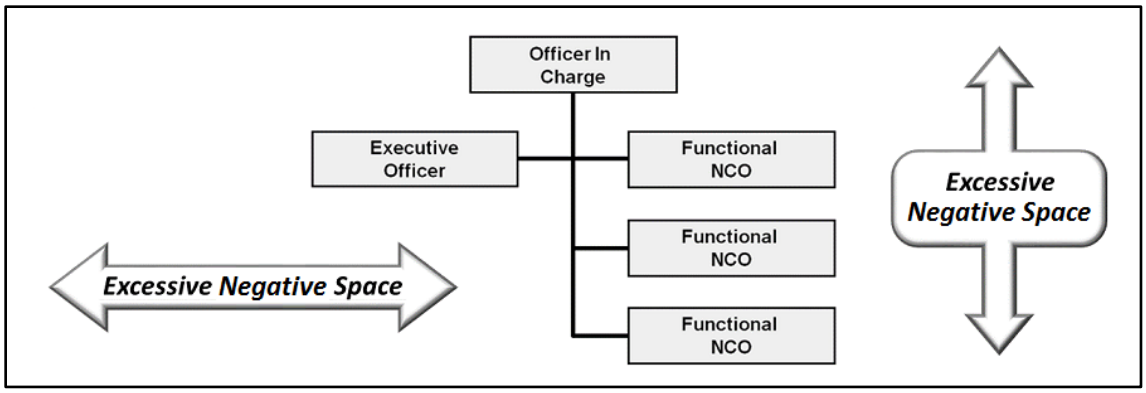


Figure 3-14. Improved, but not an optimal management of negative space

3-54. The height of the internal visual elements has been reduced as much as possible while still portraying a correct hierarchical structure (figure 3-15), keeping the greater visual message intact. Though there is a body of white space on the wings of this figure, this is acceptable since it is the optimal arrangement for the image within the border of the figure. Here, cropping the white space wings within the border is optional, but not necessary. Leaving the borders uncropped may help provide a mechanism for creating consistency in size of text and border width settings throughout a document.

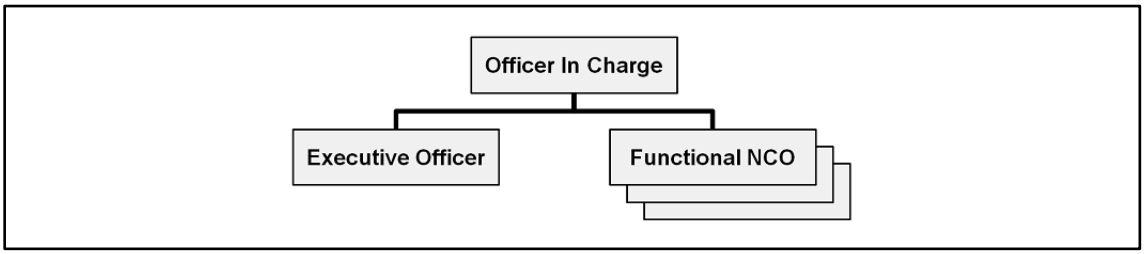


Figure 3-15. Optimal management of negative space

3-55. Even as too much negative space is poor composition, too little negative space (as shown on the right side of figure 3-16) will jumble and clutter the image with all the surrounding content.

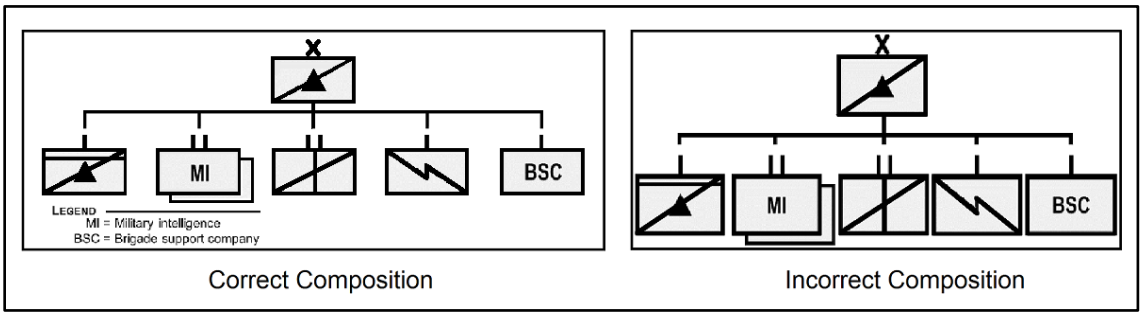


Figure 3-16. Good and bad negative space composition.

TERMS, ACRONYMS, AND SYMBOLS

3-56. Graphics within maps and organizational charts must use military terms and acronyms as found in Joint Publication (JP) 1-02 and ADRP 1-02. They must use correct Army terms for Army organizations. All abbreviations and acronyms (text based shortened forms) used in a figure will be cited in the legend regardless of how common it is in the body of the document or the Army at large, even if they are found in ADRP 1-02. Glyph icons for unit types found in ADRP 1-02 do not need to be defined again in the legend. Authors may make limited use of nonstandard abbreviations in a figure, by exception, if needed to fit information in the space available. Nonstandard abbreviations need to appear in the figure's legend but not in the book's glossary.

3-57. There are times when the official doctrine terms, graphics, or movement control measures are not sufficient to visually express the level of detail or specific point the author is trying to convey. For example, as of late as 2016, the Army had two types of multifunctional sustainment battalions: the BSB (brigade support battalion) and the CSSB (combat sustainment support battalion). However, at that time ADRP 1-02 and Field Manuel (FM) 1-02 only had one symbol; the icon "SPT" in a box with the battalion echelon marker on top. Likewise, there was no official symbol for the ESC (expeditionary sustainment command) some ten years after these units had been developed and deployed. In such cases, these unique units have to be defined in the legend along with the illustration.

ORGANIZATION CHARTS

3-58. This section endeavors to establish minimum style standards for presenting organizational charts. Most guidance on depicting unit structure is usually found in ADRP 1-02, "Terms and Military Symbols." Likewise, authors and artist need to be familiar with the figure 2-1 of what used to be ATTP 5-0.1 Commander and Staff Officer Guide, September 2011 depiction for Staff Structure (figure 3-17). Although the civilian graphics industry has conventions on the design of organizational charts, those conventions barely meet the diversity of informational demands placed upon military symbology. Hence for the sake of consistency, doctrine organizational charts are subject to more rigorous standards.

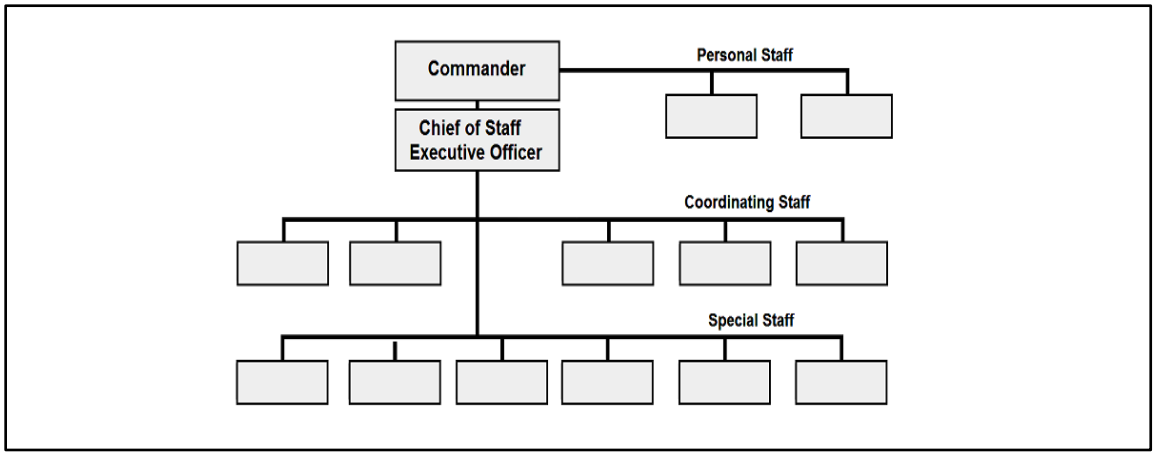


Figure 3-17. The depiction of commander to staff relationship from ATTP 5-0.1

NOTE: ATTP 5-0.1 has been superseded by FM 6-0. The figure was not brought forward into the new field manual, but here the old illustration has instructional relevance.

3-59. ADRP 1-02 is the basic reference for glyphs used in military maps and charts. However, that manual is focused on how to use glyphs to depict location on maps, and the symbology for depicting tactical movement. It offers negligible guidance on how to craft illustrations for printed literature. Still, ADRP 1-02 makes some very important points about military symbology, in general. For organizational charts used in doctrine, the following principles for symbology are in effect:

3-60. Originally, military symbols were not code signals, like traffic lights, where red means stop and green means go, but part of a complex language where the meaning of a symbol depended on the context. Military symbology were abstract and intuitive, in regards to human interpretation, and not constrained like the exact spelling of a word. However, this intuitive characteristic has changed because of the limitations and rules that govern its use due to the nature of computers used to display graphics.

- Military symbology still has grammatical characteristics with subjects, predicates, and modifiers. (This is why military symbols are considered to be glyphs.)
- Military symbols aren't using text as a phonetic representation; such text are still formal symbols.
- Avoid mixing organizational charts of four or more levels with process flow charts that have decision options, such as the lower right side of figure 3-22 on page 3-21. Such charts are too complex to visually absorb. (Doing such equates to a run-on sentence.)

3-61. For doctrine documents, there are four types of organizational charts:

- Command Chart: A parent unit and its component elements, with command channels.
- Staff Chart: The commander's staff organization, with internal staff coordination channels.
- Coordination Chart: A unit's relationship to external units for support coordination.
- Map/Location Chart: Shows the positioning or movement of a unit.

3-62. The command chart and staff chart should not be mixed into a single illustration for a doctrine document. These are separate subjects with discrete messages. Although such charts are of the same general illustration category, there are different visual principles applied to the depiction of each type of chart.

GENERAL STANDARDS FOR ALL ORGANIZATIONAL CHARTS

3-63. Although a map board in the field may have a lot of latitude in the depiction of graphics, in doctrine manuals optimal style and visual continuity dictates that certain conventions be observed in organization charts.

3-64. If an ADRP 1 02 unit symbol is used as a part of a map or process chart, the prohibition against hybrid mixed symbology is still in full effect. Military symbols cannot appear with abstract clip art functioning as symbols, business flowchart symbols (such as the above figure), or with terrain map backgrounds.

3-65. If a graphic (such as maps and organizational charts) use military symbols found in ADRP 1-02, then any military terms and acronyms shall conform to JP 1-02 and ADRP 1-02. They must use correct Army terms for Army organizations. They must contain legends interpreting all shortened forms (acronyms, brevity codes, and abbreviations). Authors may make limited use of nonstandard abbreviations, by exception, if needed to fit information in the space available. Nonstandard abbreviations appear in the figure's legend but not in the book's glossary. (This is per, Unofficial CADD Editor and Author Guide, 25 August 2016.)

3-66. Simplicity is the hallmark of a good organizational chart. In principle, embellishments are to be avoided. All graphics in a book must be consistent in style. Diagram charts (for example organizational charts) use either text or symbols but not a mix with some graphics as text and some as symbols. For the sake of consistency throughout all published doctrine, all organizational charts will adhere to the following stylistic standards:

- Organization charts shall be drawn in a descending hierarchy, showing the senior element somewhere on top, with subordinate elements progressing downward.
- Element boxes framing unit symbols or element titles within an organizational chart shall be the same size. There is no exception.
- Military symbols shall/must be used consistently. When an illustration uses military symbols, they must be consistent with ADRP 1-02. CADD will not accept hybrid symbology (mix of approved ADRP 1-02 symbols with unapproved symbols).
- Illustrations of coordination charts, process or procedures shall not use military symbols.
- Special effects will not be applied to element boxes. Assuming the use of Microsoft Office™ programs: shadowing, border glow, beveling, textures, gradients, or patterns are not to be used with or within an element box.
- The color of an element box is not to be the same as the background color surrounding the box. The colors within element boxes are limited to black, white, or shades of gray. It is best to color fill a box with is at about 5% (RGB=242/242/242) to 10% (RBG=234/234/234) gray when it is sitting on a white background.
- All element boxes should be limited to a gray fill-color. Different shades of gray can be used to differentiate and prioritize a unit element that is the focus of discussion. However, the elements of primary focus should be of a lighter gray than the incidental or visually supporting elements. Seniority of an element in a hierarchy is not in itself alone a justification for having a different fill-color.
- A note in the legend must indicate the meaning of each fill-color (figure 3-20), when more than one color is used for element boxes.
- It is one thing to use a light gray to offset the foreground from the background, but be judicious in the use of grays. The excessive use of grays in both the foreground and background is hard on the eyes (like trying to read in a poorly lit room).
- An accent box (lower right of figure 2-3, page 3-8) in gray with rounded corners may be placed behind element boxes that have a unique relationship within the overall depiction. The accent box cannot be of the same color as the fill-color of the element boxes sitting on top of it. The accent color must be explained in the legend.

- The border of an element box is limited to black.
- The line bordering an element box is to be solid or dashed. Double lines and dotted lines are not to be used as borders for element boxes.
- Unit echelon marks over an element box are to be composed from vector forms, and shall not use text boxes. The "X"s used to symbolize brigade or higher elements is to be made from two diagonal lines that are grouped together. Battalions and companies are to be represented by vertical lines, not the letter "I" in a text box. Then, these vector graphic indicators are to be grouped with their affiliated element box. This way if the image is resized, it maintains its appearance.
- Command lines used to connect boxes shall be one step to twice the point (or pixel) thickness of the unit box border (figure 3-17). This helps visually to quickly distinguish the unit/elements from the relationship connection lines.
- The lines and boxes of a chart are to be offset by a white margin from the border of the figure that is at least half the width of an element box. See the discussion on negative space in the section on composition
- If only a single type of command line is used, it does not need to be represented in the legend. However, if any other type of line is used to represent coordination, attachment or some other relationship, then all lines (including the command line) must be defined in the legend.
- Depiction of similar units overlapped upon each other shall extend down to the right, such that the fully visible unit block is on the upper left. (See the Forward Support Company in figure 3-18.)
- Modularity has brought about the existence of units that perform solely administrative supplement activity. Such units which were forbidden during the division centric era; are now common. This has created a graphic's confusion for doctrinal depiction. If such an element is depicted in a Command chart, coordination chart, or map/location chart; the unit is depicted with glyphs in a box-frame and echelon markers on top. Otherwise for a staff chart, glyphs in a box-frame and echelon markers on top are not used; use text in full form or short form (initials and abbreviations).

COMMAND CHARTS

3-67. Command charts are focused on the organizational structure underlying the mission functionality of a military unit. They are expressed as a hierarchy in echelon order (figure 3-18). If military symbols are used at all, only military symbols can be used, and not mixed with non-military symbols.

- The senior element on a command chart is the parent organization representing the whole organization. The commander, the command staff's internal organization is assumed and these elements are not represented within a chain of command illustration.
- Each command and leadership element shown is represented using the formal unit symbol, glyph, and unit echelon marker.
- Deviations from ADRP 1-02 on operational terms and graphics (such as the liberal use of acronyms and abbreviations) must be accounted for in the legend.
- Only ADRP 1-02 or MIL-PRF-2525 symbols can be used within or on top of unit fraims.
- The unit echelon size indicators for elements consisting of less than 50 personnel will be based on the number of personnel and not the unit's title. Three circular pips is 15 to 49 Soldiers; two pips is 8 to 14 Soldiers; one pip is 4 to 7 Soldiers; and a null pip with bar is 1 to 3 Soldiers. Hence, a team with 25 Soldiers is depicted with three circular pips. (The exception is where a unit of less than 50 Soldiers is led by a commander with UCMJ command authority. In which case, it is depicted as a company.)
- The unit headquarters or lead element (not the commander or leader, alone) is always depicted with the parent element. Notice that in figure 3-18, that the Headquarter and Headquarters Command (HHC) for the Brigade Support Battalion (X/SPT/II) is depicted, and that the command element for each company is also represented. If the component elements of a platoon were to be depicted, the leader, NCOIC and driver would be separately depicted as a command team or lead element.
- Command lines only originate from the bottom of a parent element. That command line may extrude from the center, or be offset from the center (company elements in figure 3-18). To

accommodate a crowded image, the connector may extrude from the off center left, but still must be from the bottom side. (In figure 3-22 at the lower left, we see this standard violated in the depiction of the company's relationship with their subordinate elements.)

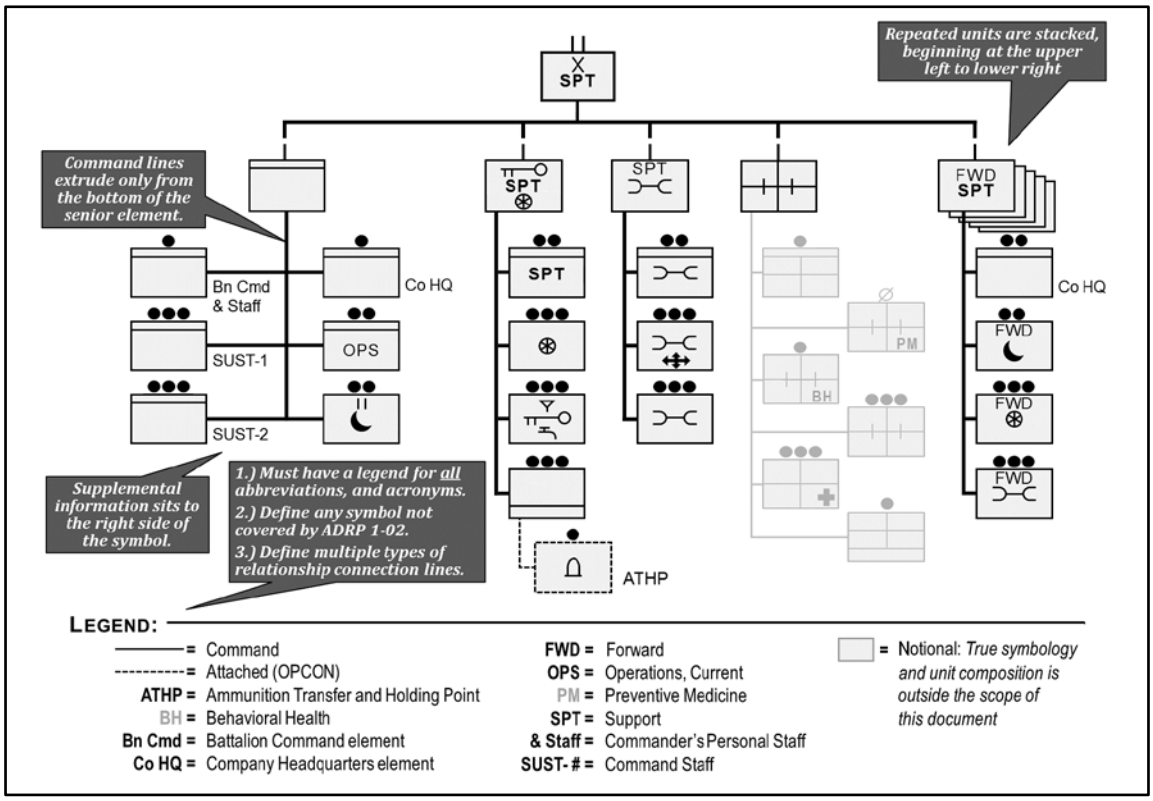


Figure 3-18. Command chart, correctly developed with legend

- Command lines moving down the hierarchy only terminate above or on the sides of a subordinate element; not on the bottom.
- A center is both a unit, and a staff element. As a unit within a chain of command, it is depicted with a company echelon marker under the special troops unit. If a center has detachable elements; as advisors, liaisons, or controllers; that can be distributed throughout a theater, it is depicted as a battalion. As an element attached to a staff in a staff chart, it is depicted as a solid line box with the "(+)" shown at the upper right hand corner, and connected to the staff with dashed lines.

STAFF CHARTS

3-68. There are technical understandings which authors and artist must have before depicting organizations and their command relationships. Doctrine authors should be familiar with the distinctions between personal staff, special staff, and coordinating staff as found in ATTP 5-0.1, before undertaking the design of a staff chart. Figure 3-19 demonstrates the proper construction standards for a staff chart.

- Although the subject of military staff charts is about military organizations, military symbology (as found in ADRP 1-02) shall not be used.
- The senior element on a staff chart is the commander; not the unit symbol. Staff charts shall not use echelon markers.
- The commander is the start point of the organization chart. It is important that the box representing the commander be readily, visually distinguishable from other elements within the chart.
- To distinguish ADRP 1-02 military symbol organization charts which don't depict staff elements from staff charts, each element represented is depicted in text without an echelon marker. Text (not glyphs or icons), are used on a staff chart. Text for block titles may be written in full, acronym,

initial, or abbreviations. However, shortened forms must be incorporated into a legend if the full text is not directly accompanying.

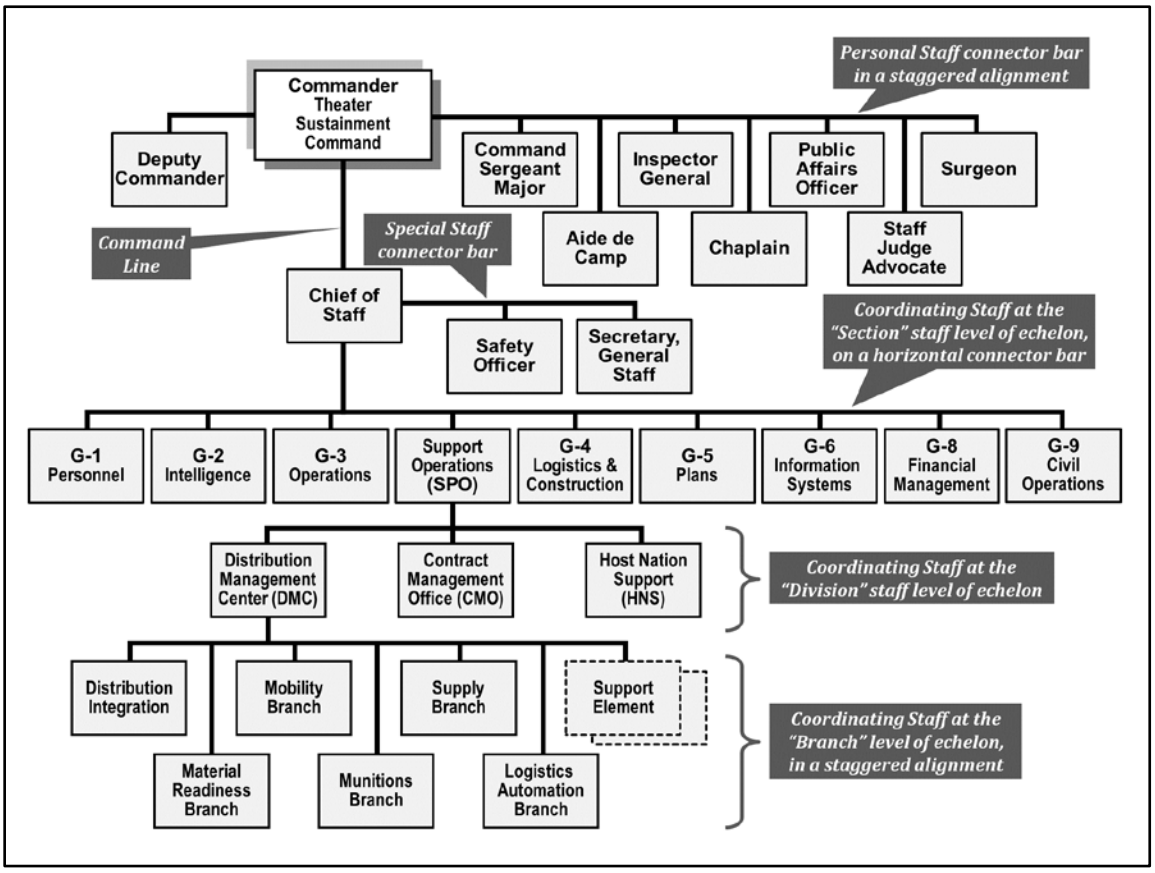


Figure 3-19. Staff chart, correctly developed, and annotated with design principles

- The deputy or executive officer and the unit's senior noncommissioned officer are accorded their own boxes as personal staff, and not lumped together in a generic command section box.
- The personal staff connection lines (or command lines) always extrude from the left or right side of the commander's box. The deputy commander or executive officer is treated as personal staff, unless being chief of staff is a part of his or her duty description.
- A command line for the special staff and coordinating staff always extrudes from the bottom of the commander's box.
- The chief of staff's box is either interposed along the line extruding down from the commander, or connected by a T-junction into the side of the command line, just below the commander.
- Special staff and coordinating staff are kept on separate horizontal connector bars along the command line.
- Staff sections that are at the same level of echelon may be staggered in the image, but must be connect to the same connector bar. That connector bar can be either horizontal or vertical depending on the limiting factors of the available space.
- Commanders for subordinate units are commanders, and not depicted on a staff chart. Subordinate commands are not represented on a staff chart; that is a separate message for expression by a command chart.
- The hierarchical order of personal staff and special staff (not coordinating staff) is "office," unless otherwise named by the Table of Organization and Equipment (TO&E).
- The hierarchical order of coordinating staff (unless otherwise specified by TO&E) is:

- Staff Section (or General Staff Section)
- Staff division
- Staff branch
- Staff department
- Staff bureau or office
- Staff cell

- A center is both a unit, and a staff element. As a unit within a chain of command, it is depicted with a company echelon marker under the special troops unit. As an element attached to a staff in a staff chart, it is depicted as a box with the "(+)" shown at the upper right hand corner.

COORDINATION CHARTS

3-69. These charts (demonstrated in figure 3-20) are really a form of process chart. However, because of the use made of unit element text and the regular use of boxes and bars, it is still categorized along with command and staff charts. Remember that no matter how complicated the image design may be, illustrations are in principle focused on a single message. In coordination charts the message is about how different elements support each other; the emphasis being on support.

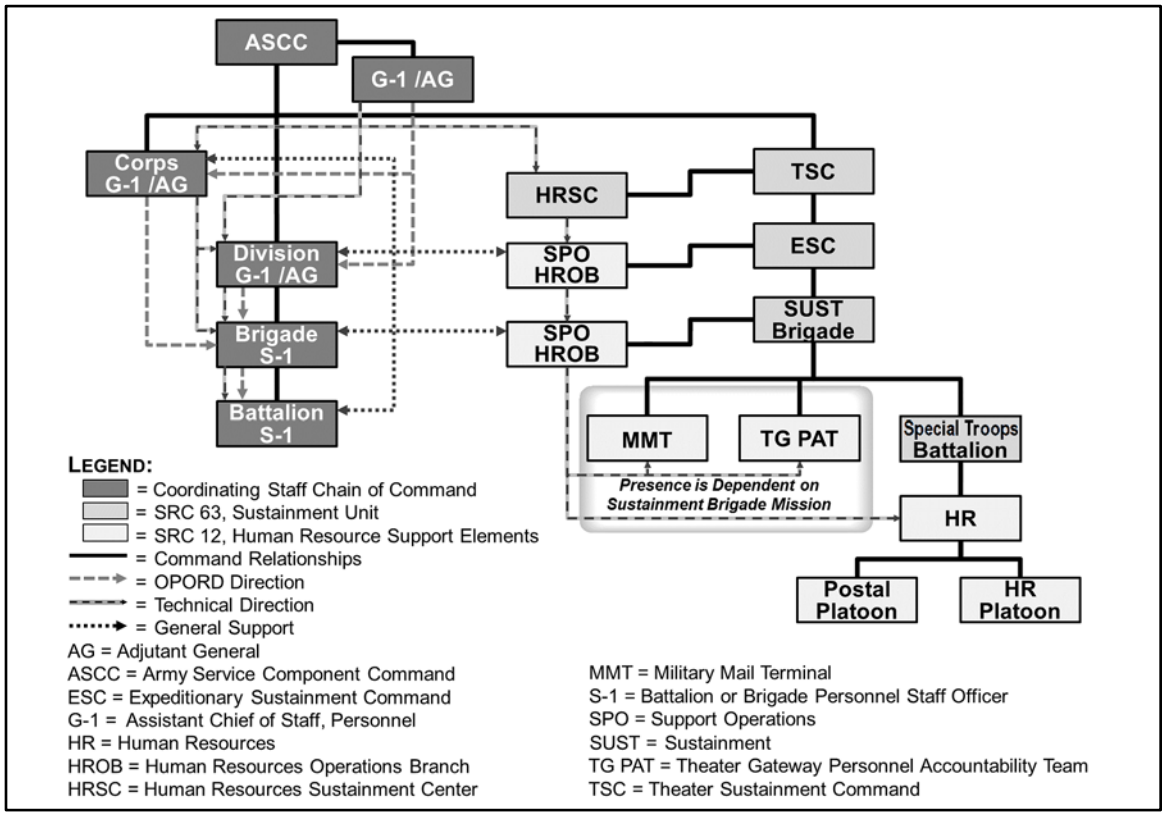


Figure 3-20. A correctly developed (complicated) coordination chart

3-70. All of the general design standards for charts still apply to coordination charts. In specific, legends in coordination charts must be built to the highest standards, leaving nothing to be guessed or assumed.

3-71. In coordination or process flow charts developers should endeavor to flow from left to right, top to bottom. For readers in the western hemisphere, this is the way we read and the way we intuitively attempt to interpret graphic images. Even with long flows that weave back and forth, the process should begin at the upper left. There is the less common alternative flow of center to rim. However, always avoid right to left.

3-72. A word of caution; be very judicious in trying to represent all of the coordination channels into a single image. Many times, authors want to use an organization chart with a functional process overlaid on top of it. This can be exacerbated by a system that has different start points for different users with different objectives. The chart designer needs to pick a single user, and just tell one story with the chart. In the lower right of figure 3-18, such a chart escalated into something that was too busy for the reader. Such busy charts become the visual equivalent of a run-on sentence or an over wordy paragraph with no topic sentence. Just as a doctrine author should keep sentences short and paragraphs limited to a single subject, the same principle of conciseness is true of illustrations.

MAP CHARTS

3-73. A map/location chart (figure 3-21) is a combination of a command chart, coordination chart, or process chart overlaid on a map. The use of a map serves as an intuitive aid to give the reader context for unit relationships or movements represented by an abstraction of a real world environment.

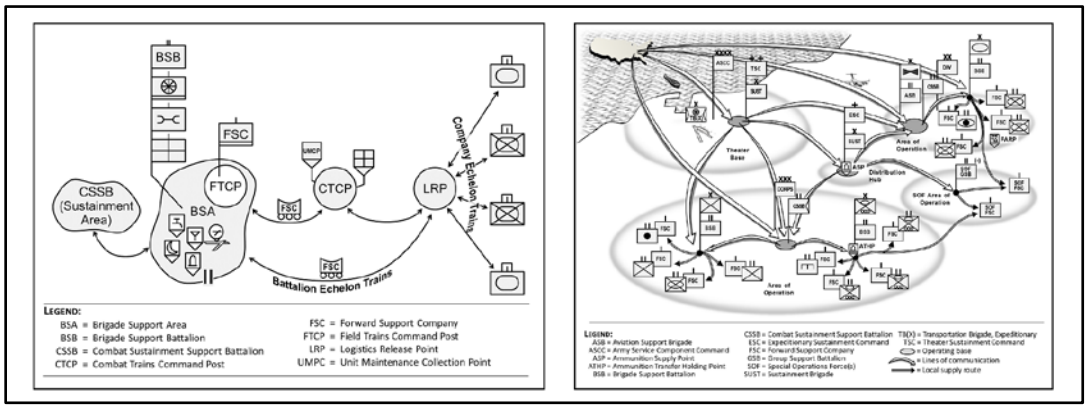


Figure 3-21. Various map charts; acceptable (left), versus unacceptable (right)

MISMANAGEMENT OF CHART STANDARDS:

3-74. Most of the development standards for figures are intended to limit mixing messages, or against meaningless embellishment. The intent is to leaving nothing to be guessed or assumed. The goal is to produce a product that has clear messages with a consistent visual style throughout the document and even between different documents. Too often, these standards are not achieved (figure 3-22).

TASK – Identify Incorrectly Formatted Charts

3-75. The preceding figure depicts different organizational chart styles that have been used in doctrine documents. The top two charts were both put in the same manual, yet have little visual similarity to each other. Even without being able to see the fine detail of the separate charts, certain poor quality issues can be easily seen:

Upper Left:

- Too much empty white space within the image. (For a correct depiction of this TSC emphasizing the SPO, see figure 3-18 on page 3-15.)
- Inconsistent sizing of unit-element boxes.
- Technically wrong by lumping dissimilar elements together on the same relationship line. (RST, SJA, PAO, and surgeon are personal staff are not coordinating staff. Further, the placement of the SPO is separated from the rest of the coordinating staff.
- Use of obsolete terminology (RST = Religious Support Team, which has been changed).

Lower Left:

- Parent company and component elements both extrude from the left side.
- White on white, failing to distinguish between the subject and the background with a light gray fill-color.

Upper Right:

- Not enough white space where separate elements are bumped against each other.
- There is no margin from the image border.
- Text is underwhelming in size.
- Technically wrong by lumping dissimilar elements together on the same relationship line. (HHD is subordinate command, not staff. UMT is personal staff, not coordinating staff.)
- It has acronyms, but no legend (even though the bottom of the original is not visible in this figure).

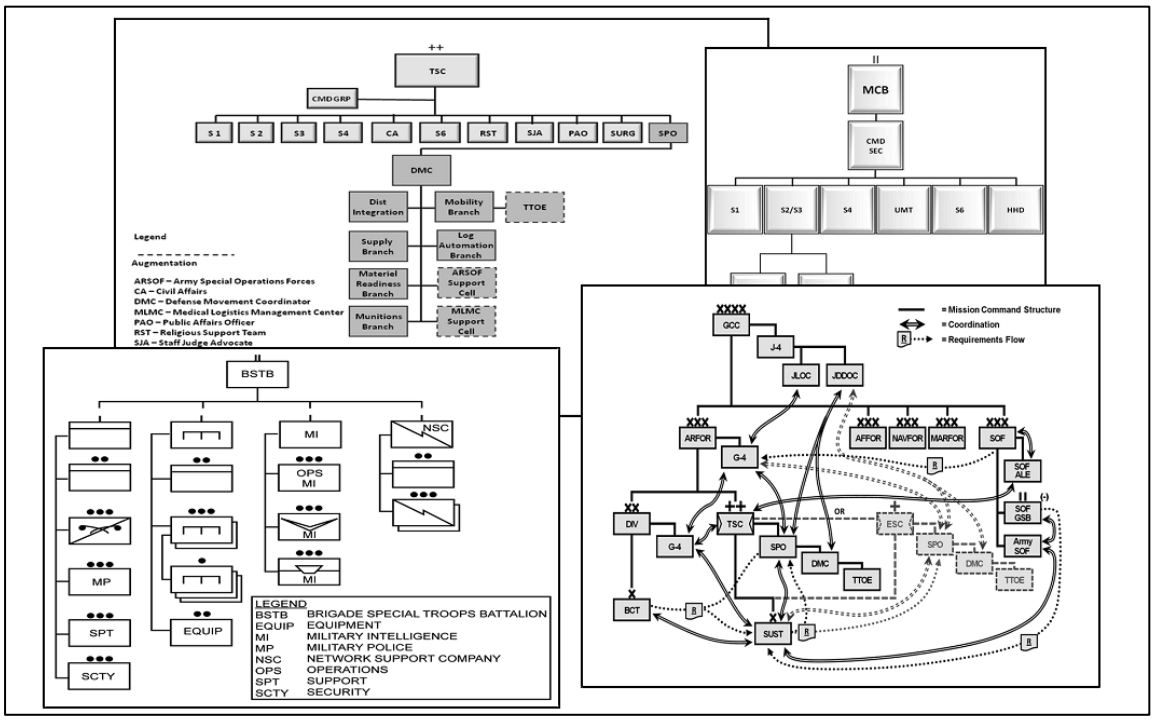


Figure 3-22. Examples of poor organizational charts

Lower Right:

- Too hectic.
- No legend for the acronyms.
- Can't tell were to begin the process

FORMS IMPLICATIONS

3-76. Graphics and tables must not contain forms implications. This means it must be impossible for readers to photocopy or print any graphic or table as a form, and use it to record their own data. It means a publication must not give the least impression it is prescribing a form; this rule is inflexible.

3-77. If a doctrine publication is indeed proponent of a DA form (a rare situation), the program directive will state it, and authors will adhere to Department of the Army Forms Management Program policy in chapter 4 of AR 25-30. DA forms are distinct from report and message formats and checklists. The official repository for electronic DA forms is Army Publication Directorate at http://www.apd.army.mil/Forms/browse_forms.asp. Army doctrine establishes report and message formats only in FM 6-99, *U.S. Army Report And Message Formats*. Teams must review their publications for forms implications (see DA Pam 25-40 for guidance) before submitting them for authentication. Authors should identify items such as checklists as example in their graphic or table captions. Authors must fill out boxes with sample information. Editors should watermark such items with the word, sample. Publications should not illustrate DA or DD forms, with or without sample data, unless they are proponent.

ROLE OF THE ARTIST

3-78. From the stand-point of a graphic artist, there are four types of messages conveyed by forms:

- Correspondence with prescribed formats.
- Map layouts.
- Records of static data.
- Living documents.

CORRESPONDENCE WITH PRESCRIBED FORMATS

3-79. To effectively illustrate a letter or memorandum, an artist's image must conform to AR 25-50, Preparing and Managing Correspondence.

3-80. The author should prepare the correspondence form as a Word™ document. The author must have resolution downsampling set to, "Do not compress images" (see chapter 6).

INTELLECTUAL PROPERTY RIGHTS

3-81. The use of graphics is subject to intellectual property rights rules. For this reason, authors must ensure all illustrations are their original creations or available for fair use. If copyrighted images cannot be avoided, authors must follow their installation's procedure to obtain written permission and acknowledge the copyright owner according to the release. (See, Army Regulation 27-60 for guidance.) Despite the fact that numerous standards and limiting factors apply to graphics, teams should approach them as a creative endeavor. An artist collaborates with authors and editors to develop, enhance, or select graphics so they are effective for the medium and the purpose.

3-82. No copyright images shall be used in a manual produced by the doctrine division, unless their use conforms to AR 25–30.

3-83. Army wide publications will not contain the insignia of or a notice indicating the preparing agency. This restriction does not preclude identifying the proponent to encourage user comments. Official publications will not contain credit lines or bylines of Army authors, artists, illustrators, or photographers, or the names of persons who assisted in their preparation.

3-84. Courtesy credit lines may be given only for un-copyrighted materials contributed or loaned by non-Government parties. Do not give courtesy credit lines for materials purchased by the Army. This rule does not apply to notice of copyright when a license to use copyrighted material has been purchased.

3-85. Army publications prepared or produced with either appropriated or non-appropriated funds or identified with a Government activity will not contain any material that implies that the Government endorses or favors a specific commercial product, commodity, or service.

3-86. Products cited in publications will be described or referenced with standard Army nomenclature or specification. (The use of trade names will be kept to a minimum; such use could be claimed to be the Army's endorsement of the product.)

OPERATIONAL AND INFORMATION SECURITY

3-87. Graphics are subject to operational security and information security rules. Security is the first among several reasons to avoid the unnecessary use of photographs depicting military subjects. If the author or artist has security or controlled information questions about an image, this should be brought to the attention of the office division or branch manager. The author is responsible for notifying the first government manager in the supervisory chain of command.

IMAGE SOURCE LOG JOURNAL

3-88. In those circumstances were the use of copyright material cannot be avoided, authors shall identify the source of all graphics they do not create themselves. Copyrighted material requires a release from the

copyright holder. An Excel™ spreadsheet titled "Image Source Log" as demonstrated in figure 3-21, must be placed by the author in the graphics folder (preferably within the image planning folder).

WARNING! Converting a copyright photo into a drawing does not circumvent or negate the intellectual property ownership of the original image's holder. Courts have ruled that "derivative" work still belongs to the original copyright holder.

IMAGE SOURCE LOG

Figure #	Book Author	Artist	Images Source	Accepted Date
Intellectual Property, Comments:				
1-5	Smith	Douglas	US Army Transportation School	14Mar20XX
Intellectual Property, Comments: Picture of M-XXX truck lifting a flat-rack. Original photograph by the U.S. Army Transportation School				
1-8	Smith	Roberts	Idaho Automotive Manufacturing	6May 20XX
Intellectual Property, Comments: Public Affairs secured free use of the original commercial image, which was in part converted into a contour image to highlight the use of the frameram with a hopilator. See "Figure 1-8 Approvals.PDF" for supporting documents.				
Intellectual Property, Comments:				

Figure 3-21. Notional spreadsheet format for logging the use of intellectual property

3-89. Each photograph or image derivative of a photo will use the figure number in the final draft to journalize the source and authority to publish. Book Author is that person at the time the image was added to the document. Artist is the name of the person who worked on preparing the image for incorporation into the document. The image source is the person or entity that is the true source of the image (this cannot be left blank or anonymous). Accepted date is the date that the image secured permission or the Army source delivered it to the author. Image source is the name of the person or entity holding intellectual property ownership of the image; in part or as a whole. Comments shall pertain to possible intellectual property considerations and how they were addressed.

3-90. Graphics taken from nongovernment material must be credited in the source notes. A copyright graphic taken from a government site is still copyrighted and requires a copyright release. All photographs require a source line below the photograph. All photographs not from government sources require a copyright release.

3-91. Graphics derived from government sources do not require a credit line with the image, but the source does need to be noted toward the end of the document on the source notes. Still, the author shall record the source of any photograph used directly in the document, or from which a derivative image was developed for the document.

3-92. Download photos for doctrine publications from the U.S. Army's photostream on flickr at http://www.flickr.com/photos/soldiersmediacenter/ (provide a photo credit crediting the U.S. Army) and http://www.defense.gov/multimedia/multimedia.aspx (this web site can be very slow but has good quality photos).

3-93. Though a photograph may be converted into a drawing, such conversions do not suspend or negate the copyright protection. Derivative art work (as this is called) must still disclose the source and obtain a copyright release, as required. Images from outside the Army can be used as a reference (in house) for the

art department, but original or derivative images which closely resemble the original cannot be incorporated into even a draft doctrine product that could be released to anyone beyond CASCOM. Exceptions to this rule must have the written approval of the Doctrine Division's director. PDF copies of copyright releases and the director's approvals must be stored in the Graphics folder prior to a picture being placed in a draft document for staffing.

PRIVACY

3-94. The author is responsible for ensuring that Personally Identifiable Information (known as, PII) is not visible in photographs or images used in doctrine figures. Where PII is visible in a raster graphic, Paint™ can be used to redact it. Photographs must not violate anyone's privacy. Photographs must not reveal any person's name, rank, or identity.

CREDIT LINES

3-95. The artist's name shall not appear on any artwork; neither shall a manufacturer's name, symbol, or trademark appear on artwork for the purpose of identifying an illustration.

Chapter 4

Construction of Illustrations

> "When words and visual elements are closely entwined, we create something new and we augment our communal intelligence ... visual language has the potential for increasing 'human bandwidth'—the capacity to take in, comprehend, and more efficiently synthesize large amounts of new information."
>
> Robert E. Horn, Visiting Scholar Stanford University

At this point within the guide the material transitions from issues of style and syntax to the technical mechanics of desktop publication. The objective of correctly built illustrations is to have legible high resolution while keeping the document's file size to a minimum. Image construction for doctrine illustrations involves several processes. Going through each of the steps produces a professional appearing graphic image that shows professional attention to detail in conveying the intended message.

Although there are many very powerful graphics development programs available on the market, for the type of images used in doctrine publications, Microsoft programs on an office computer are quite sufficient for desktop publishing of military briefings, concept papers, and doctrine manuals.

NOTE: Due to the ubiquitous nature of Microsoft™ and Adobe™ software in military office computers, it is necessary to directly reference them and their commercial products. This is done because this document contains individual work instructions used to achieve specific tasks related to the development and production of doctrine graphics. Therefore, any reference to either of these commercial entities or their products does not imply that the Government endorses or favors a specific commercial product, commodity, or service.

COMPUTER AGE DOCUMENT PRESENTATION

4-1. This guide is oriented toward producing publications that are sufficient for the Army Publication Directorate, offset printing techniques, and display on ever-present office computers with Microsoft Office™ programs.

4-2. This document is written at both the policy level, and the technical level. It provides policy with its principles of doctrine visual design for doctrine development managers, doctrine authors, and doctrine development artists. At the technical level, this document is provides individual work instructions for not only use by professional authors and artists to produce illustrations, but likewise for doctrine authors to insert the images into figures of Word™ processor documents and track their image file management.

4-3. This document assumes that all doctrine developers have access to Microsoft Office™ software and is focused on the use of Office Word™, PowerPoint™, Picture Manager™, Photo Gallery™ and Windows Paint™. However, this is not intended to infer that other graphic software is any less applicable.

4-4. The conventions for expressing resolution measurements are done in two formats: pixels per inch (abbreviated, ppi), and dots per inch (dpi). Vector graphic files and raster graphic files (which includes digital photography) produce their products in a matrix of colors, where each color is referred to as a pixel. This pixel image development system is used within artist's imaging software. Once the pixel image is ready for printing by a copier or display on a computer monitor, the image file is turned over to a "print driver." The

print driver interpolates the resolution of the digital image versus the resolution capabilities of the output printed (or viewed) copy. If an image was configured in a Word™ document at 96 ppt, (or less) the printer driver will rescale and print the copy at 1200 dpi (for example); and, the resolution will look fuzzy. If an image was configured in a Word™ document at 300 ppt (or greater), the printer driver will again print the copy at 1200 dpi (for example); but, the resolution will look much better.

4-5. In the professional printing industry, the output standard for magazines is over 600 dpi. Usually, high fashion art is generally created and printed at between 1200dpi and 2400dpi. At those resolutions most human eyes are incapable of distinguishing a well-created bitmapped curve from a "real" curve. Otherwise, at the print resolutions more common in business and home environments (such as 600dpi), artwork, however well created, will always look a little fuzzy or jagged. To that affect, Adobe™ has created a line of software programs (a suite) that is oriented to the magazine industry.

4-6. The Army uses an older standard of 300ppi for its black and white publications. This standard is sufficient to capture 3/4 point lines and 8 point font, while minimizing the bandwidth size needed to send images through the internet.

NOTE: For this guide, the term “black and white” includes grayscale (shades of gray), unless otherwise specified.

GENERAL SIZE CONSTRAINTS

4-7. Figure images must be appropriately placed and sized in the manuscript. The size of graphics should look consistent throughout a book. No graphic can exceed 6 inches in total width, as depicted in figure 4-1. This width keeps it within the image area (page borders) when printing. It applies to both tables and figures.

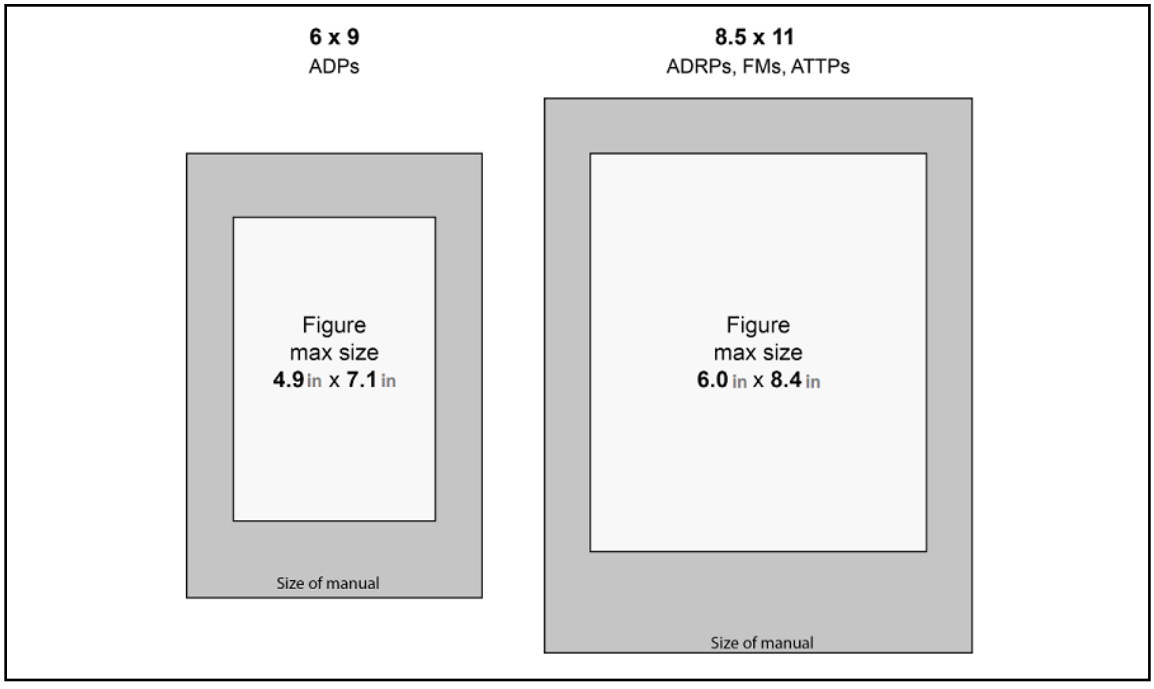


Figure 4-1. Maximum graphic sizes

4-8. All graphics in a doctrine publication do not need to be the same size. However, use as few sizes as possible—two or three at the most (small, medium, large). In the full-size figure, where the page orientation is portrait rather than landscape, the width of the illustration is still limited to six inches. Margins, headers, and footers take up space on a page, which is narrower than it is tall. This means large graphics (and tables) derived from sources using landscape orientation may not translate easily from a landscape slide into the correct format.

4-9. The Page Setup properties to achieve acceptable resolution in PowerPoint™ are 20 inches of width, by 28 inches of higth; maximum image development size. (For more information, read “Change Page Setup Properties” that is following latter in this chapter.)

4-10. When converted (Save As) from vector to raster graphic file, it yields an image of 1920 by 2688 pixels.

4-11. At this point, a raster image manipulation program or application such as Microsoft Paint™ can be used. To minimize image aliasing (shown in figure 4-2) and fuzzy resolution, changes to a raster image should be done at a higher resolution then that of the finished product. The specifics of manipulating raster images are addressed in further sections.

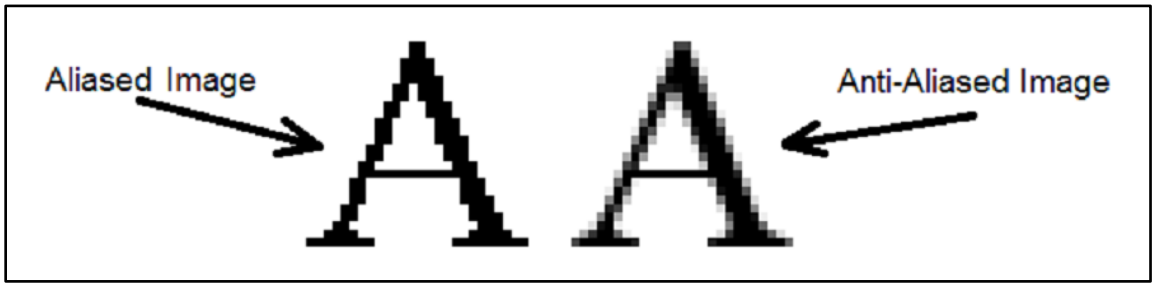


Figure 4-2. Smooth text imaging for optimum resolution

4-12. To optimize the bandwidth without compromising resolution for printing standards, multiply the working raster image by 0.9375. This reduces the size and cleans up resolution from 320 ppi, to 300 ppi. In Paint™, the artist has the option to set the resolution by specifying the pixel width of 900 pixels or 1800 pixels.

NOTE: The finished maximum size figure of a 6.0 inch by 8.4 inch image that is publication ready becomes, 1800 by 2520 pixels.

FILE FORMATS

4-13. There are two major categories of image formats: vector and raster. Raster images are pixel and resolution dependent (such as photographs). Vectors are line art images based on mathematical formulas (such as diagrams and logos). Each of these file formats has its own particularities. Yet, they often come together in doctrine graphics. Raster image file formats that are usable with Word™ templates include:

4-14. PNG: Portable Network Graphics is a raster graphics file format that supports lossless data compression. It features 48-bit (over 280 trillion) color, including an alpha channel, built-in gamma and color correction, with tight compression. It is flexible with the ability to display at one resolution and print at another. For print media publication, this is the preferred compression format for doctrine images.

4-15. JPG or JPEG: Joint Photographic Experts Group, which is both the image compression format, and the committee that developed the standards for this format. This format uses a lossy logarithm that can reduce a bitmap raster image by up to 90%. This is the most common image format for internet web pages, but not the most current image technology.

4-16. GIF: Graphic/Graphical/Graphics Interchange Format is an 8-bit color (256 colors) lossless image file compression format. Color graduation is achieved by stippling and half toning.

4-17. TIF: Tagged Image File format is the industry standard raster format when print quality is of primary importance. It supports both the CMYK and RGB colour models, vary high resolutions, colour depths of up to 48-bit. However, it is a non-compressible format that results in very large bit files, consuming a lot of memory and bandwidth. For commercial print media publication, this is the preferred full value (bitmap) high resolution file format. It is not used by the Army because most documents are released in both paper print and internet digital mediums.

NOTE: Another important file format is the PDF (Portable Document Format). However, it was developed as a "publication" file format (not an image file). It preserves the fonts, formatting, graphics, and color of a source document. (For more information, see chapter 7.) It is only mentioned here to warn readers to not get PDFs confused with either vector or raster image file formats.

4-18. Vector images can be installed into a normal Word™ document, but not a "template" Word™ document.

NOTE: For the explanation, see "File Types to Not Use" in the following sub-section.

FILE TYPE TO USE

4-19. All figures should be inserted into a Word™ template as a raster image (colloquially referred to as picture files). Portable Network Graphics (PNG) is the preferred file format for illustrations in digital products intended for distribution by paper or PDF media. PNG files compress the bit file size while keeping the pixel datum of the image unaltered; compressed with negligible effect on the image color. TIF files are exact copies of the actual bitmap image, which results in the maximum bit file size bandwidth; high bandwidth with high resolution. GIF and JPG files are designed to scale down the bit file size of an image, but compromise the image resolution and color clarity in the process; low bandwidth with distorted imaging. Illustration developers should avoid (but not stopped from) using TIF GIF, and JPG (or. JPEG) image files.

FILE TYPES TO NOT USE

4-20. What the common user of the Microsoft Word™ program should understand is that a "Word™ template" (file extension of, "DOTX") file is a completely different type of file from a normal "Word™ document" (file extension of, "DOCX" or "DOC") file. On the computer screen of an Office Word™ program, they both look the same; but, they're not. Behind the curtain, documents and templates are two distinct types of files, with different structural foundations and different programming code that behave differently from each other. Word™ documents use a binary file format, while Word™ templates use Extensible Markup Language (XML) file formats. Current, vector graphics use an XML-based format for graphics, and their behaviors are defined in XML text files. This allows vector graphics to be searched, indexed, scripted, and compressed. To a Word™ template, the vector graphic definition coding appears as being a macro which can conflict with Word™ template instruction scripts.

4-21. When a vector image (such as 3D art, Visio™ images or PowerPoint™ direct installs) is installed in Word™, it has back side programming which define the different objects as separate micro codes. To hold these objects together, they are joined together within a "picture viewer file" at a low resolution for internet quality called a, "metafile." Metafile is a nonspecific term for any file format that can store multiple types of data; particularly graphics. The problem is that the metafile of a picture viewer file coding conflicts with the micro coding used in Word™ templates. For the same reason, never insert Visio™ (.VSD, .VDX, .VSDX or .VSDM file formats) plates, PowerPoint™ slides, individual vector shape objects, metafiles, embedded animation, animated GIFs or Excel™ spreadsheets because they carry formatting code (also known as, "macros"). For this reason, vector images must be converted to raster image file formats for military documents, since they risk corrupting templates, locking up PDFs, and freezing all the work that has gone into writing and developing it.

4-22. Never attempt to modify a raster image with unconverted vector forms (or objects). To insert or group any non-raster image into a raster image (called grafting) creates instruction conflicts for the macros of a template. In Word™, this is done through the control ribbon ***Insert*** tab***, > Illustration*** box, ***> Shapes*** function. A grafted image in a Word™ template risks corrupting the template and locking up all the work that has gone into it.

WARNING! - It is always safest to first create images in PowerPoint™, save them as PNGs, and then insert the PNG (or raster file image) into Word™. See the subsection, "Converting a PowerPoint™ Vector Graphic into a Non-Manipulative Raster Graphic," on page 4-11 for procedures.

WARNING! - Do not copy-paste a PowerPoint™ slide directly into a document! This creates a "metafile" within the document, and they don't function like other normal images. They are not amenable to the controls found on the "Picture Tool – Format" tab. Always convert them to a raster image (PNG) through the "Save as" function that is described in the "Converting a PowerPoint™ Vector Graphic into a Non-manipulative Raster Graphic" subsection.

WARNING! – The maximum bandwidth/size for Army manuals being transmitted as an e-mail through the internet is 20 megabytes.

4-23. Good raster images can be created within PowerPoint™. There are a variety of other programs that artists can use to create raster graphics for insertion into a Word™ template. PowerPoint™ has the option to create an image as a vector graphic, and then regenerate and save the slide as a raster graphic without the need for a special graphics conversion program. For instance, an organizational chart originally created in PowerPoint™ as a vector graphic must be converted to a raster graphic before being installed into a template document. Authors, who are not comfortable with their artistic skills, are encouraged to develop preliminary (or draft) images in PowerPoint™. This is especially needed if the services of an artist are not available. Authors can save each slide they create as a PNG in a graphics draft folder.

RESOLUTION STANDARDS

NOTE: The information in this subsection is technical background information on how resolution is controlled, digitally. It is limited to prescriptive information as applied to the FM-Format2 template. For a full understanding of this template, the doctrine author or artist must rely upon other sources.

4-24. The standards of determining the quality of resolution is more complex then what is relevant to this guide. However, there are some measurements that are reoccurring. Measurements of raster file image resolution are focused on the color dots (called pixels) running across a one inch line; referred to as, pixels per inch; or ppi. By arraigning the pixels into a 1-by-1 inch square, they form an image. 72 ppi is the standard resolution for images on the internet. Their low resolution makes them faster to download when you're surfing the net, but their low ppi makes them bad candidates for printed publication. Typical computer displays range from 67 to 130 ppi, though some desktop monitors have exceeded 200 ppi and small-screen devices often exceed 300 ppi. Industry standard for good quality figure (a raster graphic) for use in a print publications is usually at or above 300 ppi.

- Images need to have a certain minimum resolution to be printed at a good quality. The Ghent PDF Workgroup (GWG, which is headquartered in Belgium, is a major professional standards association for printers), recommends that color and grayscale images have a resolution above 150ppi for offset printing.
- Images that have a resolution that is too high can lead to bloated files that take longer to transmit or process. The GWG sets the maximum resolution to 450ppi for color or grey-scale images. (Image file compression helps address bloated bandwidth by down-sampling or file compressing images. Uncompressed, maximum bandwidth file formats include BMP [bit map] and TIF [Tag Image File]. Most other raster graphic file formats perform some type of file compression.)
- The default setting for PowerPoint™ is designed for computer monitors at 96ppi, and installs into a 6 inch wide format at 160ppi. That ends up being 140ppi or over 40% short of the necessary 300ppi resolution for a printed material format.
- The Adobe™ preflight process can check on a PDF file to verify that all image resolutions exceed a minimum threshold value.

- If a design contains very thin lines, these may disappear on the printed result. Check the minimum line weight. For newsprint and commercial offset printing, a minimum line thickness of 0.125 points is required. For screen printing 0.15 points is required. Practically speaking, keep lines above 0.75 points for Army doctrine illustration images.
- It is never acceptable to cut raster images from PDF documents, Web sites, or briefings and then insert or paste them directly into a Word™ template document. Although such images are usually raster images, ripping them (as the practice is called) from a published source results in a degraded resolution that is usually insufficient for doctrine publication. Most of these images have been down-sampled to meet the internet's low bandwidth standards.
- Do not bypass the ***Insert*** **>** ***Picture*** function on the control ribbon by copy-pasting an image directly from a folder on the computer or another Word™ document. The copy-paste function uses "Windows, Picture Viewer™" (which is organic to the operating system) to capture images. It automatically reduces images to about 96ppi before inserting the image into the document. Conversely, the ***Insert*** **>** ***Picture*** function preserves the true raster image resolution.

CALCULATING RESOLUTION

4-25. A pixel is the smallest graphic element of any digital image. A dot is the smallest element of an ink printer or photocopier image. The actual file size of an image digitally contains a certain number of pixels, for instance 800 x 600 pixels. DPI (dots per inch) expresses the resolution as the number of ink dots per a linear inch for printed digital images. For video monitors, the display resolution is expressed likewise expressed as pixels per a linear inch. Yet, in spite of both digital image file size and monitor display size is expressed using the common term of "pixels," the numbers can be wholly unrelated to each other. Resolution is the relationship between a one inch area, and the number of individual graphic elements that will go into that area.

4-26. Doctrine artists focus on the "image file size" of raster graphics, in pixels. Changing a picture's space on the printed page (resizing) without changing the total number of pixels results in the variation of the image quality (resolution). Either way, a higher DPI or PPI resolution corresponds to a better quality picture. Figure developers should aim for at least 300ppi, and never go below 250ppi digital image resolution when developing an image for ink offset or photocopy printing. If the file size is high resolution on the input side of the display process, it will be printed at a high resolution on the output side.

TASK - Calculate the Resolution of an Image File:

1) On a computer using Windows Explorer, right click on the image and select "Properties." Then choose the tab "Details."
2) Read the image size in pixels, for example 2400 x 1600 pixels (width and height).
3) Decide on the size of the picture you need to print; for example, say the figure is 6" x 4" picture.
4) Divide the width in pixels by the figure size in inches to calculate the horizontal PPI resolution. In our example: 2400 pixels wide image file, divided by a 6 inches wide figure area, equals 400ppi. To get 300ppi in a 6 inch wide figure area, multiply 6 inches times 300ppi, to total 1800 pixels wide.

4-27. Armed with this information, the artist can use raster editing software to format an image at the optimum resolution with a minimal bandwidth.

CHANGE SLIDE SETUP PROPERTIES:

4-28. All illustrations must begin with the creation on the image stage (figure 4-3) of PowerPoint™.

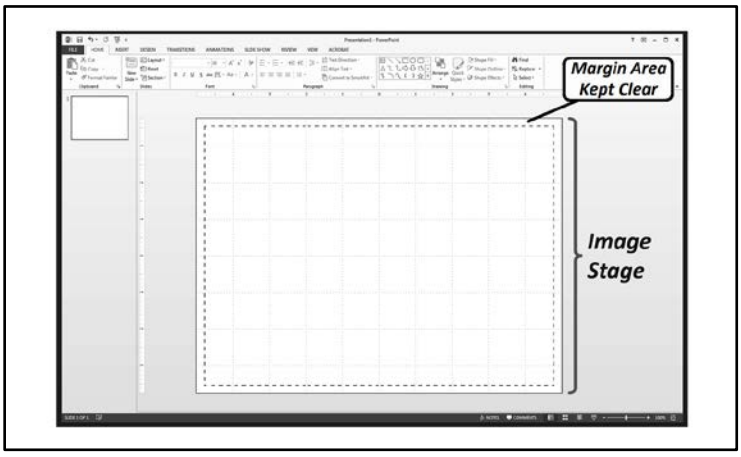


Figure 4-3. Image stage of PowerPoint™

4-29. To get good resolution on an image made in PowerPoint™, the *Page Setup* properties function has to be reset. PowerPoint™ was originally created for fax machines and 15 inch CRT (cathode ray tube) monitors. The default setting is ideal for 96ppi used in digital media imaging on a Web site or a computer screen. Word™ is likewise set by default to install images at 96ppi, unless constrained by the margin settings. Today, photocopiers have four to five times as much resolution. Manually enlarging an image automatically also accents the low clarity. To get a clear, full width PowerPoint™ vector graphic image, the *Page Setup* properties have to be enlarged before the image is converted into a raster image file. The industry standard for high resolution of digital images converted to print media is 300ppi.

TASK - Configure PowerPoint™ for High Resolution Images:

4-30. The steps for adjusting the landscape *Page Setup* properties, as depicted in figure 4-4 are:

1) Go to the ***Design*** tab,
2) Click on the ***Slide Size*** icon
3) This opens the ***Slide Size*** window.
4) Change the default ***Width*** from 10 inches, to 20 inches.
5) Change the default ***Height*** from 7.5 inches, to 15 inches.
6) Click on the ***OK*** button.

NOTE: Resizing the PowerPoint™ stage (working area show in figure 4-3) to 20 inches wide is essential for creating correct resolution, print publishable illustrations.

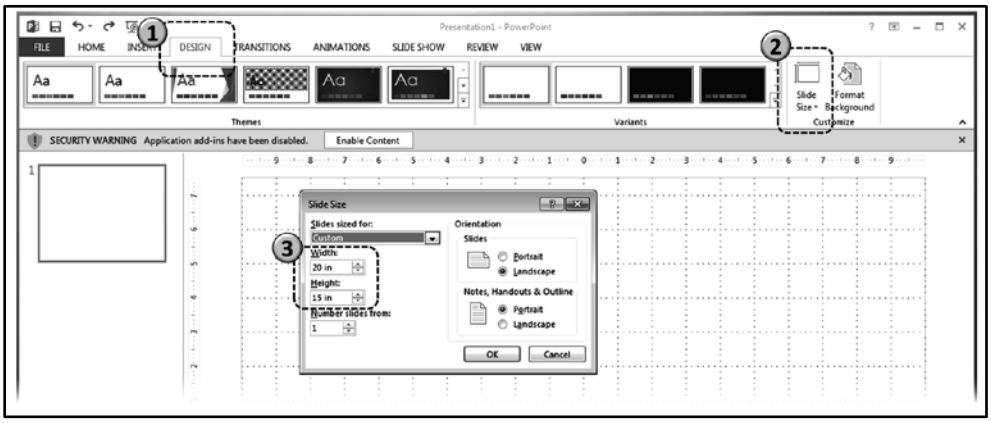


Figure 4-4. Adjusting slide size properties

4-31. Once this is done, you can use PowerPoint™ as you might normally use it. However, you will need to double the font sizes, and line point thicknesses.

4-32. Raster graphics created in PowerPoint™ for use as illustrations in doctrine documents shall have the 10x7.5 inches image resolution doubled from its default setting of, to 20x15 inches; with a maximum of 20x28 inches for a full page, portrait formatted image. In all cases, the width shall be set to 20 inches to ensure a good 320ppi resolution image for a six inch wide figure.

4-33. Raster graphics created in software other than PowerPoint™ shall be created at 1800 pixels wide by a maximum of 2520 pixels high, for a full page image of 6x8.4 inches. This will ensure a 300ppi image.

4-34. Using the adjusted page setup properties, 26 point font will equate to a clear 11 point font once the finished raster graphic is installed into a Microsoft Word™ document.

SNAP TO GRID

4-35. For many operations, an artist will need to bounce back and forth between having objects snap to grid or it being a free floating object.

TASK – Control Snap to Grid Settings:

4-36. To adjust the "Snap to grid" function for PowerPoint™ 2007:

1) Go to the ***Home*** tab on the ribbon.
2) Click on the ***Align*** window. This opens the ***Grid settings*** dialog box.
3) Click on (or off) the ***Snap to grid*** check box within the ***Grid settings*** dialog box.
4) Click on the ***OK*** button.

4-37. To adjust the "Snap objects to grid" function for PowerPoint™ 2013 (figure 4-5):

1) Go to the ***View*** tab on the ribbon (item #1).
2) Click on the ***Show*** dialog box opener (item #2). This opens the ***Grid and Guides*** dialog box.
3) Click on (or off) the ***Snap to grid*** check box within the ***Grid and Guides*** dialog box (item #3).
4) Click on the ***OK*** button.

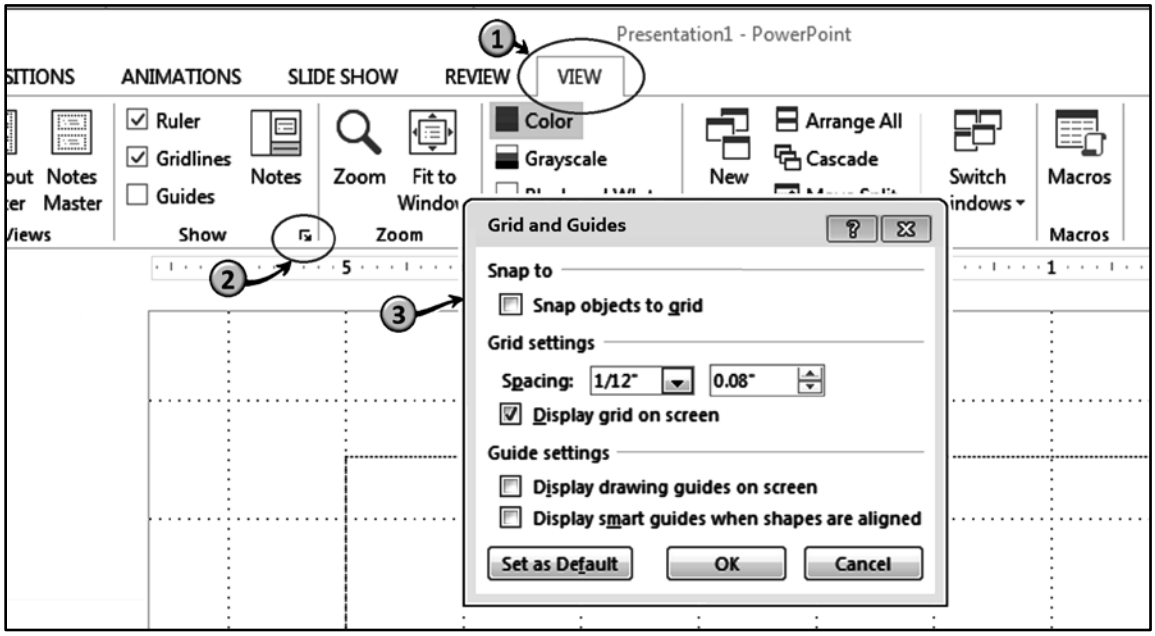


Figure 4-5. Checking or unchecking the "snap to grid" function

CREATE UNIT BOXES

4-38. Assuming the use of Microsoft Office™ programs (in particular, PowerPoint™) or a vector graphic program, text boxes are not to be used inside an element box. To incorporate text or unit identification text into a unit box, place the curser into the box and type in the text directly. Geometrical forms will automatically convert to text boxes when you type into them.

4-39. It is more efficient and exacting to type text directly into the box shape. Then use the paragraph dialog box or the formatting tab to control the positioning of the text. This way, the text doesn't become disoriented from the box if the element must be ungrouped, moved, layered, or resized.

TASK – Line & Block Chart Formating:

4-40. When using high resolution the PowerPoint™ setup instructions, it is advisable to:

- Use a ***3 point line*** for boxes and symbols.
- Use a ***6 point line*** for connectors between boxes.

4-41. When PowerPoint™ is in its default settings:

- Use a ***1.5 point line*** for boxes and symbols.
- Use a ***3 point line*** for connectors between boxes.

TASK - Making a Unit Box Symbol:

NOTE: A good military unit box has a 7:10 height to width ratio.

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1) Type in the desired text (don't worry about font size or text wrapping just yet).
2) Click the "***Format***" tab on the control ribbon at the top of the PowerPoint™ screen.
3) From the ***WordArt Styles***, open the ***Format Text Effects: Text Box***.
4) Set the ***Internal Margin, Top*** and ***Bottom*** to, ***0.***
5) Un-check the ***Wrap text*** in ***shape option.***
6) Select the desired ***Vertical alignment.***
7) Change font to ***black*** (not automatic).
8) If the verbiage in the box will require two lines, put the ***curser*** between words and break the line at the desired point with the ***Enter*** key.
9) Click on the border of the box and change font type and size to fit the box width (ignore the height for the moment).
10) Go to the ***Paragraph*** toolbar box:
11) Open the ***Paragraph*** dialog box. Set the ***Line Spacing*** at, ***Exactly*** for one or two points less than the font point size being used (fixing the height issue).
12) For multiple line text, click on the ***Align Text*** icon, and check that the text is set to ***Middle-Centered***.
13) Go to the ***Drawing*** toolbar and open the ***Shape Fill***. Set the unit box color to ***5% gray*** (the lightest gray setting).

TASK - Add Unit Glyph Symbols:

1) Click on the box to be modified.
2) Add the needed geometric shapes within the unit box, with a line thickness equal to the lines of the box border.
3) Create the symbol used to represent unit level or echelon (i.e., ✕, ✚, and ***I***) using vector lines; not text box lettering. It should equal the point (or pixel) thickness of the unit box border.

WARNING! If a typed text box is used as an echelon marker above a vector graphic unit symbol, they resist adjustments. Using an Areal font in a text box is a simple way to make an echelon maker, but a nuisance later to adjust. Typed text box echelon markers are prone to breaking away from the unit box, inappropriately changing font style, or not properly rescaling size.

4) Echelon markers will be 30% to 50% of the height by 20% of the width, of the unit box. Hence, when grouped with the box they will always maintain their relative size when being moved or resized.

MIXING VECTOR SHAPES WITH PHOTOGRAPHS

4-42. An important goal for those working as doctrine staff is to create intelligible documents for the readers. The creation of raster graphics using PowerPoint™ is the start point and foundation of most doctrine images. A real challenge for authors is to make images from PowerPoint™ for insertion into a document.

4-43. Although it is possible to directly mix the text of a Word™ document with photographs, table cells, and vector graphic shapes, it creates conflicts in the macros that threaten to overwhelm the programming of any Word™ document file. If this type of mixed media is used with a template, it will really overwhelm and collapse the document. At a very minimum, it will interfere with Microsoft Office™'s or Adobe Acrobat™'s ability to convert the document into a PDF electronic file.

4-44. The solution is to create a raster graphic first, in PowerPoint™ (or any other graphics development software program), and then insert (not past) it into the Word™ template file. Since raster graphic images are free of macro coding, they will have no adverse impact on a template.

4-45. In the following scenario, an author working with a photographer and subject matter expert have written a technical manual. This manual is comprised of many single cell table boxes that contain illustrations supported by task step work instructions. One page is shown in figure 4-6. In the rectangular callout boxes on the left side of figure 4-6 identifies the errors that in a raw form would corrupt a Word™ template document. The estimated time for such a design project is almost a full day.

Task - Recapture a Raster Image:

4-46. Recapturing a raster images is done by copy-pasting each of the raster images from Microsoft Word™ into a new folder as depicted in figure 4-6:

1) Click on the ***raster image*** (the picture). This will frame the image with toggle controls.
2) Right click on the ***raster image*** to open the ***options menu***.
3) Scroll to, and click on the ***Save as Picture*** option. This opens the ***File Save*** dialog box.
4) At the ***File name:*** control box, type a fresh name.
5) At the ***Save as type:*** control box confirm it says Portable Network Graphics. If not, perform steps 6 and 7, below. If so, go to step 8.
6) Click in the ***Save as type:*** control box, which opens a menu of raster file format options
7) Scroll to ***Portable Network Graphics*** and click on it, populating the control box with desired file format.
8) Click on the ***Save*** button (or Ctrl-S).

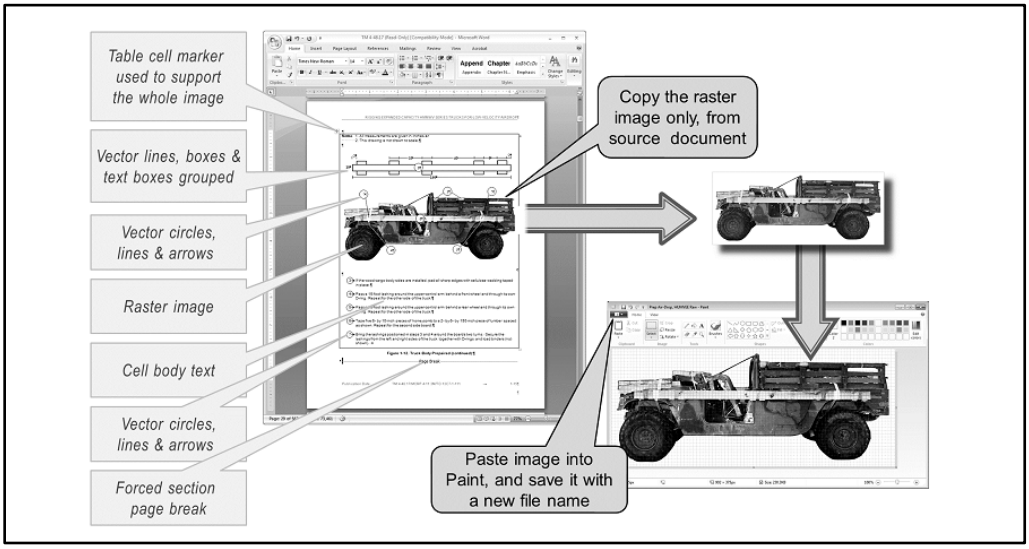

Figure 4-6. Recapturing a raster image by ripping

4-47. From this point, the PowerPoint™ procedures in figure 4-7 are the same as the creation from scratch of any full size page illustration using mixed media.

TASK – Join a Raster Image with Vector Graphics:

4-48. ***1st Sub-Task:*** Open PowerPoint™ (figure 4-7, item #1) and reconfigure its page setup (paragraph 4 27 and figure 4-3): To conform to the maximum picture size of 6x8.4 inches and meet the 300ppi standards for high resolution on photocopiers, the PowerPoint™ page setup has to be changed from its default setting. If the document is to contain a large number of images, it might be necessary to accept PowerPoint™'s lower resolution default settings, just to save on the whole document's file size and bandwidth even though it compromises resolution. Recall, the 20 megabyte limit on what most e-mail servers can accommodate.

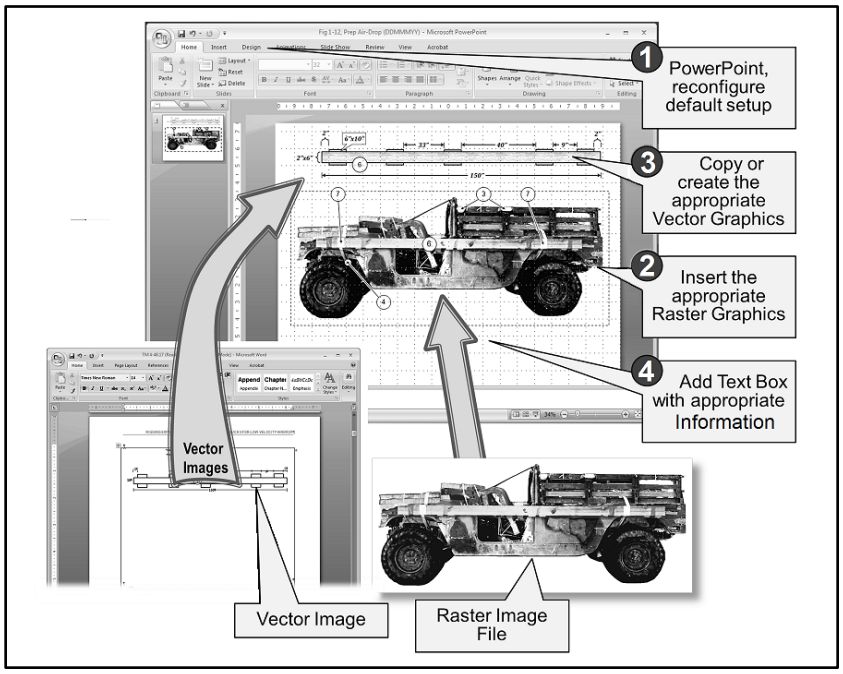

Figure 4-7. Steps for mixing vector and raster images into a single raster illustration

4-49. Rule of thumb for resetting the page setup to support a full page image is to use, 20x28 inches and triple the font size from 11 point text to 32 points. Paragraph 4-27 describes this formatting procedure. Later, it might be possible to use Paint to resize the image, for reducing to its optimal bit size bandwidth. (If there is a need to have an exact 300ppi, high resolution full page image, then use a PowerPoint™ width and height setup at 18.75x26.25 inches for a true 1800x2520pixel size image.) See the preceding subsection, "Change Page Setup Properties" for task steps to reconfigure page setup default settings.

4-50. ***2nd Sub-Task:*** Add the raster images (figure 4-7, item #2): The insertion of a raster image into an enlarged PowerPoint™ stage should always be done through the insert tab of the control ribbon; never copy-past directly from an outside Office program. Doing this is not a threat to the template, but could results in a drop in the picture's resolution. The image should be retrieved from a Windows Libraries folder to ensure the best quality.

4-51. ***3rd Sub-Task:*** Create vector graphics (figure 4-7, item #3): At this point, more vector objects can be added; such as the numbered sequence markers. For pointer arrows in this example, a 10 point white background line was first laid down followed by 3 point arrow on top, causing the arrow to stand out against the darkness of the tactical vehicle.

4-52. Fundamentally, this is the same as any other PowerPoint™ vector design. However, the artist should remember that the stage (the working white area) is three times larger, and will later be reduced to six inches. This means that all lines and fonts have to be almost three times larger than the sizes envisioned for a Word™ document. In figures 4-2 and 4-3, a 32 point font was used with a 2¼ point line around the callout boxes. Notice that on the wooden bumper guard (in this example), to avoid the placing white on white, a wood grain texture was shape filled. Then, "Picture Tool, >Format, >Recolor, >Gray" was applied to create a realistic look and feel, consistent with the image design.

4-53. ***4th Sub-Task:*** Add text (figure 4-7, item #4): The last step is to add text boxes and callouts. Remember that these are vector image *objects*, and open to size and shape formatting within PowerPoint. These vector objects are for inclusion in what will be the final raster image. (The information describing the procedure steps is inserted separately as text in the document.)

4-54. ***Composition:*** Composition deals with the placement of elements within an image. It is at this point in the image development process that the artist needs to consider how the final illustration will fit on the page and its appearance in conjunction with the rest of the body text that it is supporting.

- Negative space was addressed in chapter three. Illustrations seldom take up the whole working space of 6x8.4 inches in a page. The focus of a doctrine document is on keeping the flow of information moving.
- The decision to mix image with full sentence text is an uncommon tactical decision done for a specific practical reason. Otherwise, text should be in the body of the document, or at least in a separate table cell.
- Most images usually fit better if they are inserted as landscape (wider than they are tall) images.
- Regardless of landscape or portrait, height and width, always compose images to fill the majority of the PowerPoint™ stage (the white working area of figure 4-5).
- With a 20 inch wide image, no matter how high they are, the artist should plan on leaving a half inch margin around the border of the image. Once the image is installed this will equate to about ¼ to ⅜ of an inch.
- Try to keep the progressions of a process moving from left to right, and levels of authority moving from top to bottom.
- Pack elements as high and wide within the stage as possible, while not forgetting to leave a margin. This will facilitate cropping from the bottom, later in the illustration construction process.

4-55. ***5th Sub-Task:*** Save the whole PowerPoint™ in the Draft Image folder. This ensures that the original vector graphic images are preserved if the image needs to be later recovered or modified.

CONVERTING A VECTOR GRAPHIC INTO A RASTER GRAPHIC

4-56. Raster graphics are used in doctrine manuals because they have a neutral impact on the styles of a Word™ template used to format fonts and paragraphs. Hence, vector graphic images or mixed media images created in PowerPoint™ must be converted into a raster image before insertion into a Word™ document.

TASK – Convert a PowerPoint™ 2007 Vector Graphic to Raster Graphic:

1) To save an individual slide as a raster image, click on the ***Office Button*** (at the upper left for the PowerPoint™ window). See figure 4-8. A function options menu will drop down.
2) Select the ***Save As*** function (figure 4-8). This opens the ***Save As*** dialog box (figure 4-8). (Do not cross over into the "*Save a copy of the document"* part of the pop out menu.)

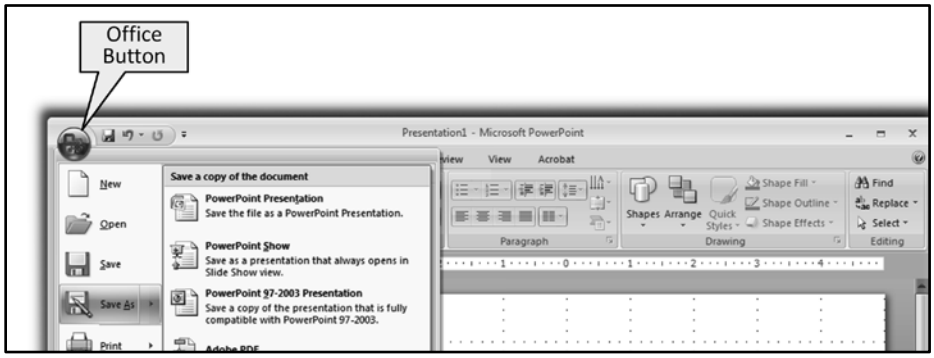

Figure 4-8. Office button, and save button for PowerPoint™ 2007

3) Go to the ***Save as type*** option window (figure 4-9) which at this point says PowerPoint™ presentation, and click on the ***selection arrow*** at the right to open the option menu.
4) Select ***PNG*** (or the desired final image format). Once the selection is clicked on, the type file will appear in the window. See figure 4-9.

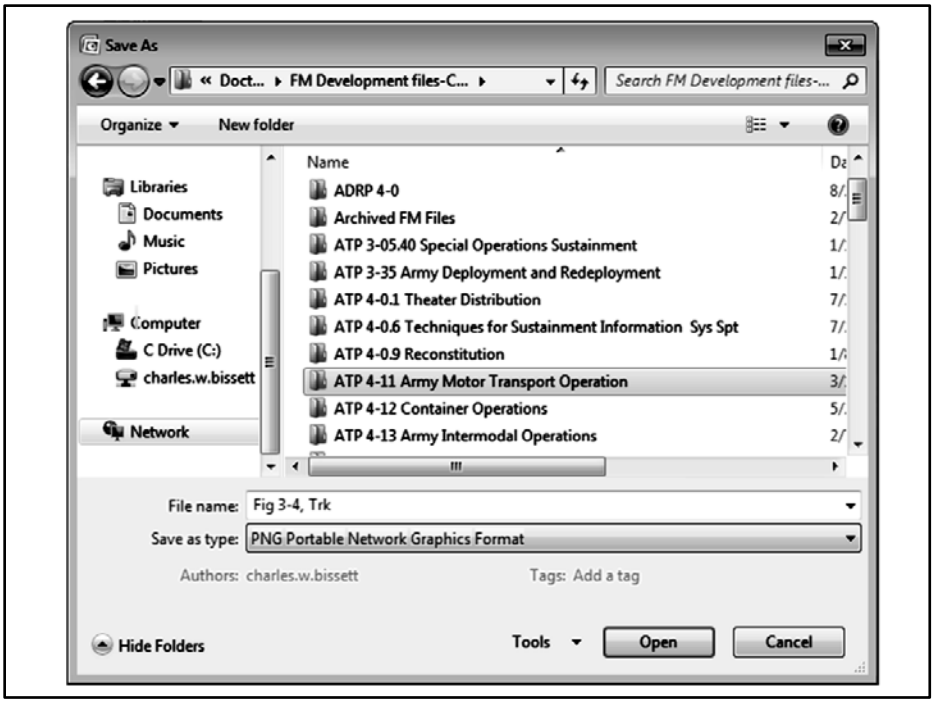

Figure 4-9. Identify the save to location of the image, name file, and file format type

5) For ***File name*** box, give the image a name that reflects the planned figure number, caption title and a date-time group.
6) 6. For ***Save as type***, click on the ***arrow*** to the right of the menu field. Scroll down to ***PNG Portable Network Graphics Format***, and click on it.
7) 7. Identify the location where the image needs to be saved to. It should be the Graphics folder, within the Draft Image folder.
8) 8. Click on, ***Save button (or Ctrl-S)***
9) 9. A decision window (figure 4-10) will open asking you if you want to save all the slides as PNGs, or just the current slide as a single image. In most instances, you should click on the ***Current Slide Only*** button. However, if all the images have been created in an initial continuous series of PowerPoint™ slides, then click on ***Every Slide*** to create a slide folder within the graphics folder.

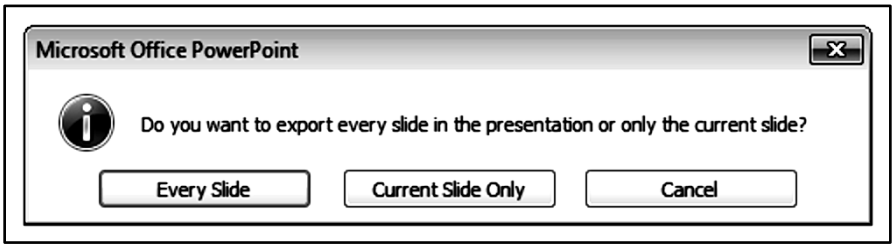

Figure 4-10. The decision window on how to save

TASK – Convert a PowerPoint™ 2013 Vector Graphic to Raster Graphic:

1) Save the whole PowerPoint™ in the Draft Image folder. This ensures that the original vector graphic images are preserved if the image needs to be later recovered or modified.
2) To save an individual slide as a raster image, click on the ***File tab*** (figure 4-11, item #2) at the upper left for the PowerPoint™ window. An ***information screen*** will appear.

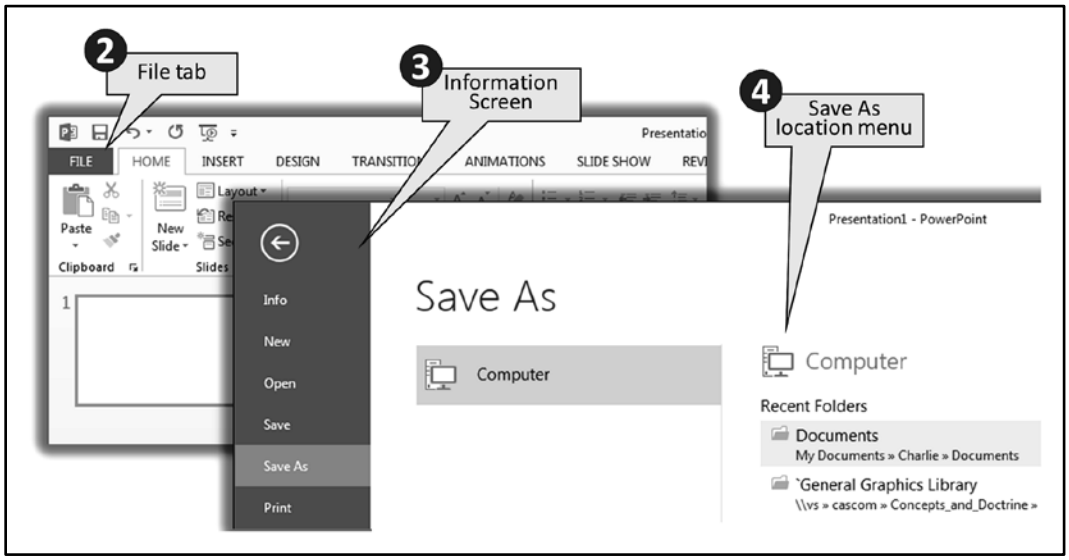

Figure 4-11. Initiating the conversion of a vector graphic to raster graphic

3) Click on the ***Save As*** option (figure 4-11, item #3). The ***Save As location menu*** will open.
4) Click on the location where the image needs to be saved Figure 4-11, item #4). This opens the ***Save As*** dialog box (figure 4-12).

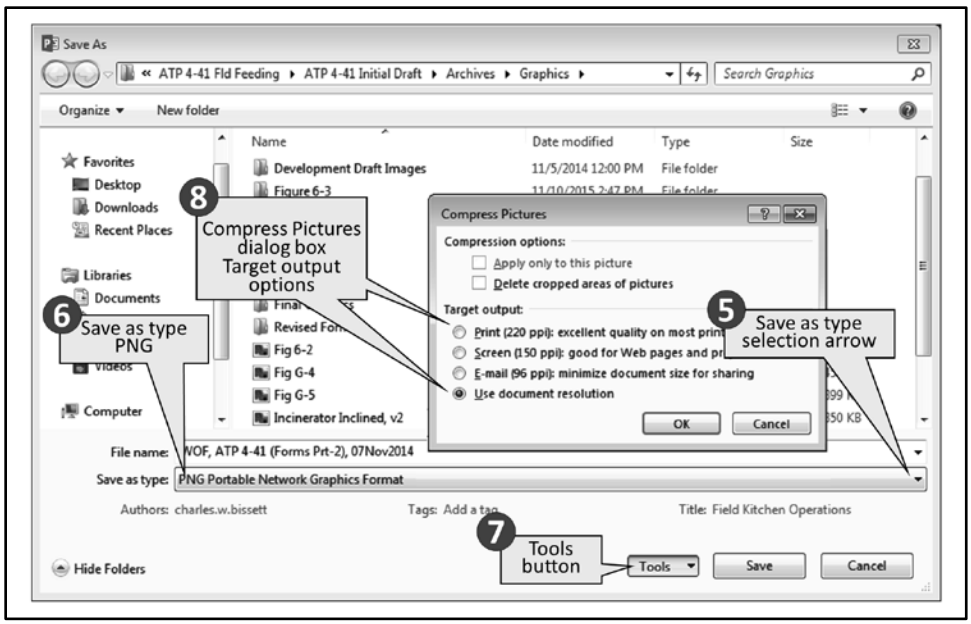

Figure 4-12. Identify the save to location of the image, name file, and file format type

5) Go to the ***Save as type*** option window which at this point says PowerPoint™ presentation, and click on the ***selection arrow*** at the right (figure 4-12, item #5) to open the option menu.
6) Select ***PNG*** (or the desired final image format). Once the selection is clicked on, the type file will appear in the window (figure 4-12, item #6).
7) Click on the ***Tools button*** (figure 4-12, item #7)to open the ***options menu***. Select ***Compress Pictures*** to open the dialog box.
8) Click on a ***Target output, radial button*** (figure 4-12, item #8) for the desired level of image resolution.

NOTE: If the image involve photographic detail or fine print (that will appear as less than 11 point font) select, ***Use document resolution***. For simple bold element slides use, ***excellent quality (220 ppi)***.

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9) 8. Click on, ***OK***.
10) For ***File name*** box, give the image a name that reflects the planned figure number, a shortened caption title and a date-time group.
11) 8. Click on, ***Save*** button ***(or Ctrl-S)***
12) 9. A dialog box (figure 4-13) will open asking you if you want to save all the slides as PNGs, or just the current slide as a single image. In most instances, you should click on the ***Current Slide Only*** button. However, if all the images have been created in an initial continuous series of PowerPoint™ slides, then click on ***Every Slide*** to create a slide folder within the graphics folder.

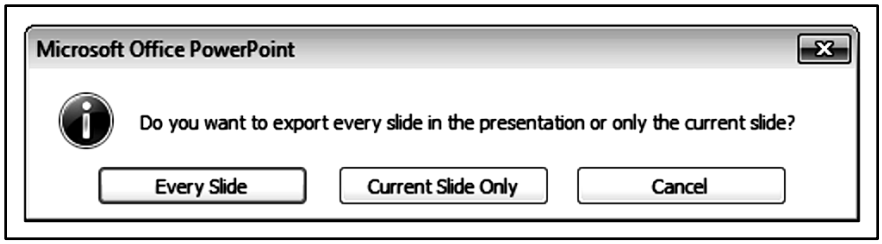

Figure 4-13. The decision window on how to save

MANIPULATION OF RASTER IMAGES

NOTE: Picture Manager™ was ideal for image cropping and color balancing the. Microsoft™ discontinued Picture Manager™ in 2013. Military desktop publishing artists will need to have their G-6 helpdesk do a special software installation for Picture Manager 2010™, or Photo Gallery™ as a stand-alone software program.

4-57. Once the artist has a raw photograph or raster image, the artist must next prepare the illustration for insertion into the document. In the absence of an all in one desktop publishing software, Microsoft Picture Manager™ (figure 4-14), and Photo Gallery™ has a variety of valuable tools for making broad picture adjustments to raster graphics (as different than the pixel by pixel adjustments done by Paint™).

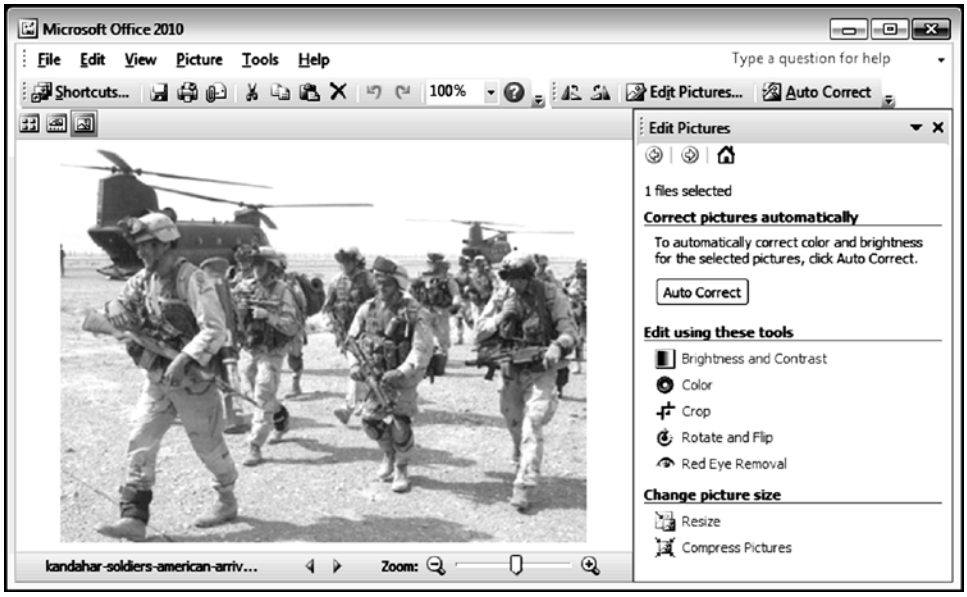

Figure 4-14. Picture Manager™ screen shot view

USING PICTURE MANAGER™ TO CROP IMAGES:

4-58. Cropping an image is the process of trimming off excess white space or unwanted image from the borders of a picture. The purpose of doing this is to first emphasize the subject of the illustration. Second, cropping helps size the image to fit into its allotted space in the document. Once an image is installed into a Word™ template, it will not allow for Word's cropping function to be applied to an image, after the fact.

4-59. If the image is too small, using Paint or Picture Manager™ to enlarge the image can create an "aliasing" problem (figure 4-2). Aliasing is the appearance of jagged pixels in the lines or hard edges of vector elements in an image.

4-60. When aliasing increases in large photographic images, a moiré distortion (pronounced, "mor-ray") develops. In computer graphics, moiré is a visible distortion; a form of aliasing whereby false patterns can be observed in an image. Moiré distortion is also very prevalent with JPG file images. The best way to avoid most aliasing distortions is to insert the image as a PNG, into PowerPoint™ and enlarge it there. However, doing this will not save the image clarity from a loss of resolution.

NOTE: Any time the image is enlarged, the resolution, in one way or another, is compromised; exaggerating its poor resolution.

TASK - Opening and Cropping with Picture Manager™:

4-61. Opening the target image for cropping with Picture Manager™ is a four step process as shown in figure 4-15:

1) Locate the storage site (figure 4-15, item #1) of the image in its Windows folder.
2) Right click on the image file icon (figure 4-15, item #2) to open the file management menu.
3) Click on the ***Open with*** function (figure 4-15, item #3) which opens a menu (figure 4-15, item #4) of various imaging applications and programs.
4) Click on, ***Microsoft Office Picture Manager™*** (figure 4-15, item #4 opens the application on right half of figure 4-13).
5) Click on the ***Edit Picture*** button (figure 4-15, item #5), after the Picture Manager™ program is open. This will open the ***Edit Picture*** menu on the right side of the program frame.
6) Click on the ***Crop*** function (figure 4-15, item #6) to open the Crop menu controls.

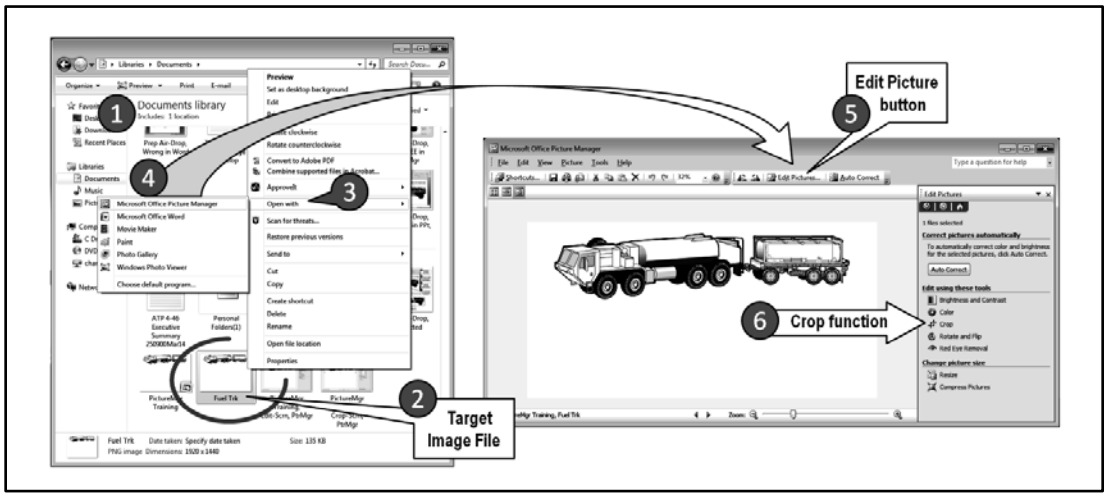

Figure 4-15. Opening an image in Picture Manager™ for cropping

4-62. Use Microsoft Office™ Picture Manager™ to crop the image. If the image is at its default setting for an unadjusted PowerPoint, which is 960 pixels wide (low resolution), leave a margin of 25 to 40 pixels. If the image size has been doubled to 1920 pixels wide, leave a white space margin of 50 to 80 pixels. Doing this is as important as placing a period at the end of one sentence and capitalizing the first letter of the next. It prevents the border of the image from encroaching upon the message of the illustration.

4-63. Once the target image is opened with Picture Manager™ in the crop function (figure 4-16), the image can be sized. This is a four step process:

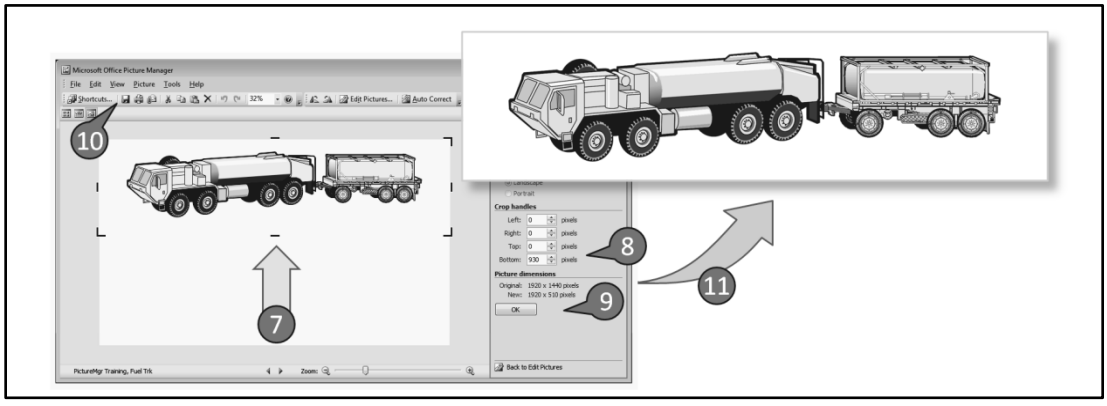

Figure 4-16. Cropping an image in Picture Manager

7) Place the cursor on the bottom-center cropping handle (figure 4-16, item #7). Then, hold click and slide the handle up.

NOTE: In Picture Manager, the borders cannot be made larger than the original image size or any subsequently saved values. (Whereas, Paint™ is capable of extending the image.)

---

8) Finalize the desired image dimensions using the ***text boxes*** (figure 4-16, item #8) in the ***Crop handles information box***.

4-64. The assumption in figure 4-16 is that during the original image construction, the artist centered the image and positioned it offset from the upper edge of the stage, leaving an imaginary margin. Having done this will make cropping from the other sides unnecessary.

4-65. Remember to allow for the imaginary margin between the inner elements and the outer border of the image, as the image is cropped. Don't crop right up against the visual image elements.

4-66. Check the pixel size numbers in the ***Crop handles information box***, and the ***Picture dimensions information box***. Because of the numerous calculations being made by the software logarithms, it is preferable to have new "Picture dimensions" numbers to end in "•••0 x •••0" pixels. Grose adjustments can be made by moving the crop handles. Fine adjustments for hitting the mark are better done by using the ***text boxes*** of the "Crop handles" information box.

9) Click on the ***OK*** button (item #9) to reset the image borders.

WARNING! It is important to ***OK*** resetting borders before going to ***Save*** for two reasons:

1.) If the adjustments are not visible on the application's screen stage, what is visible is what gets saved.

2.) Clicking on the ***OK*** button without saving allows for the previewing of the finished product without being forced into the new size values. Just in case the artist needs to undo the cropping, it is easily done by simultaneously pressing, "Ctrl-Z."

---

10) Click on the ***Save*** icon (upper left, figure 4-16, item #10)) to accept the changes.

11) The finished image as a file (figure 4-16, item #11) that can be found in the folder.

USING PICTURE MANAGER™ TO ADJUST COLOR BALANCE:

4-67. In the military, most equipment is painted to obscure its form and blend it in with the background environment. This appearance is exactly the opposite of illustrative objectives in graphic arts, which is trying to highlight the subject of an image. Picture Manager™ has color adjustment capabilities that can transform a color image to black and white. This is followed by the rebalancing of the lighting and contrast to highlight the subject of the illustration, as is depicted in figure 4-17. Though PowerPoint™ has some color adjustment ability, it is nowhere near as finely tuned or as robust as Picture Manager. Further, the changes of appearance to a raster image in PowerPoint™ are superficial, and limited to the slide it's on. Adjustments made using Picture Manager™ are permanently incorporated into the raster image file.

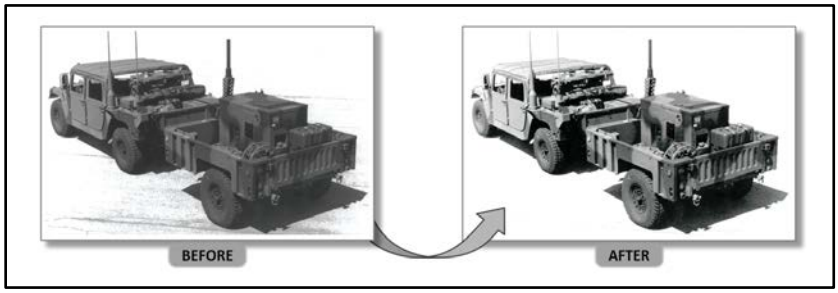

Figure 4-17. Highlighting the subject of an illustration with Picture Manager™

4-68. In this scenario, it is assumed that the image is still open after being cropped. Just after cropping an image is usually the best time to begin the color rebalancing process. Still, it is likewise possible to directly access any image within a Windows folder, using steps one through five in the preceding subsection to open an image in Picture Manager. The process in figure 4-18, on the right, begins by converting a color picture to being a black and white image.

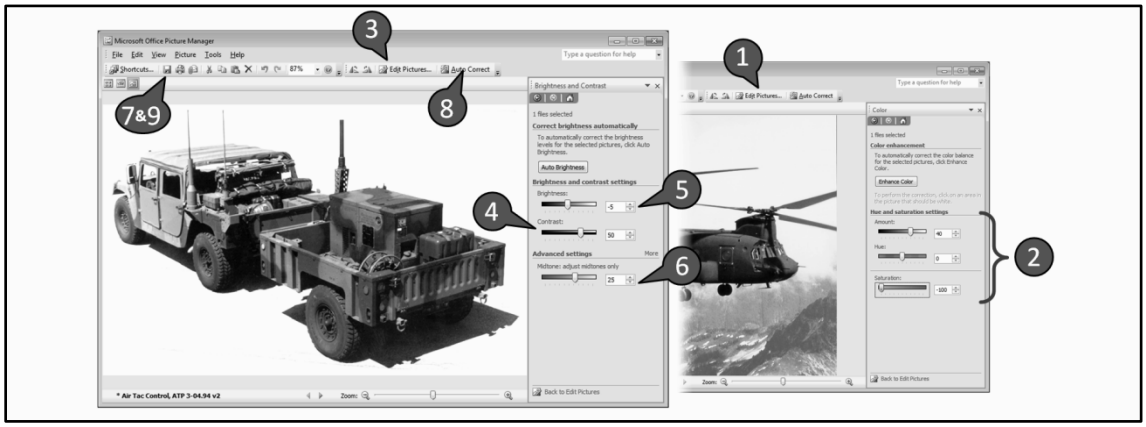

Figure 4-18. Converting to black and white, then adjusting color balance process

TASK: Converting Color Image to Black and White:

4-69. If the image is colored in multiple hues, there are two steps for converting it to black and white:

1) Use item steps 1 through 4 under figure 4-18 in, *Opening an image in Picture Manager*™….
2) Click on the ***Edit Pictures*** button (figure 4-18, item #1) to open the ***Edit Pictures*** menu.
3) Click on the ***Color*** tool to display the ***Hue and saturation settings*** control box (figure 4-18, item #2).
4) Put the cursor on the ***Saturation*** slide toggle and move it all the way to the left; giving the saturation a value of, -100%.
5) Put the cursor on the ***Amount*** slide toggle and slide it left and right until the best appearance is achieved.
6) If done with all adjustments, Click on the ***Save*** icon (or use, Ctrl-S [this means the simultaneous pressing of the control and "S" keys]) to accept the changes (optional step).

WARNING! Do not click on "Auto Correct" or "Enhance Color" at this point since it will over-adjust the image. Corrections and enhancements should be first attempted manually with the brightness, contrast, and midtone tools.

TASK - Adjusting Color Balance:

4-70. The process for adjusting the color balance for an already black and white image does not require that the artist first go through steps 3 through 6, in the above task.

4-71. To adjust the grays, open the "Brightness and Contrast" edit tool:

1) Click on the ***Edit Pictures*** button (figure 4-18, item #3) to open the "Edit Pictures" control strip dialog box menu.
2) Click on the ***Brightness and Contrast*** tool icon. This opens the "Brightness and Contrast" control strip dialog box.
3) Put the cursor on the ***Contrast*** slide toggle (figure 4-18, item #4) and slide it left and right until the best appearance is achieved. Usually, 5 to 10 points is sufficient.
4) Put the cursor on the ***Brightness*** slide toggle (figure 4-18, item #5) and slide it left and right until the best appearance is achieved. Usually, 5 to 10 points is sufficient.

5) Put the cursor on the ***Midtone*** slide toggle (figure 4-18, item #6) and slide it left and right until the best appearance is achieved.

NOTE: The artist has the option to repeat steps 4, 5, and 6 (in the same sequence) until the best appearance is achieved. If at any point the artist wants to undo an adjustment, he can click the undo button, or press Ctrl-Z [this means the simultaneous pressing of the control and "Z" keys]) to undo the adjustment. The undo function or Ctrl-Z is an available option as long as the save function has not been used, yet.

---

6) Once fully satisfied, click on the ***Save*** icon (figure 4-18, item #7) to accept the changes.
7) Click on the ***Auto Correct*** (it does the same thing as the "Auto Brightness") button (figure 4-18, item #8) and assess the effect of this function on the image (optional).

NOTE: The "Auto-Correct" button will automatically adjust the extreme high and low tones to an even greater black and white, without affecting the midtones. If the automatic adjustment creates an undesired effect, the artist can use "Ctrl-Z" to undo the adjustment.

---

8) Click on the ***Save*** icon to accept the changes (figure 4-18, item #9).

4-72. At this point the artist can exit the program, and find the revised image in their Windows folder.

MANIPULATION OF RASTER IMAGES WITH WINDOWS PAINT

4-73. Paint is ideal for converting images to PNG, editing raster images, and resizing the resolution. This is ideal for pictures that are derived from JPEG, GIF, TIF or some other undesired raster graphic format.

CONVERTING THE FILE FORMAT TO PNG

4-74. Prohibited raster or picture image file formats can be converted to a PNG file (figure 4-19) through the Windows Paint™ accessory-program that comes with Microsoft Windows operating system.

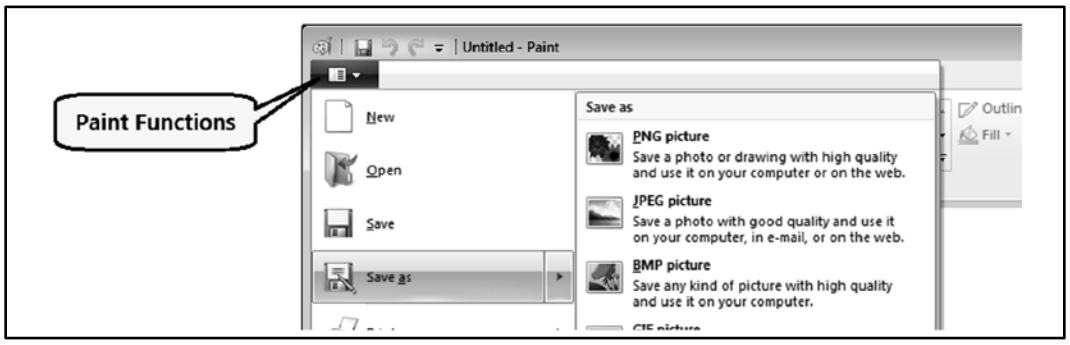

Figure 4-19. Paint functions menu showing the "Save as" options

TASK – Convert Image to PNG:

1) Go to the Windows folder location where the raster image in the low quality file format is stored.
2) Right click on the ***image file***, which opens a ***function menu***.
3) Click on, ***Open with***.
4) Click on the, ***Paint*** option, where the controls depicted in figure 4-14 along with the image become available.
5) Click on the, ***Paint functions*** tab (figure 4-19).
6) Click on the, ***Save as*** button.
7) Click on the, ***PNG picture*** button, where a Save As file window opens.

8) At the, ***File name*** information field, type in the desired file name for the image. (It should be different from its previous name.)
9) Click the, ***Save*** button (or Ctrl-S).

NOTE: The JPG or JPEG file compression logarithm corrupts the image pixels within the file in order to achieve bandwidth reduction. Successive re-copying or re-saving of such file formats causes further image degradation which eventually contrasts the picture into a dark gray blob. This warrants the conversion of a picture into being a PNG file.

EDITING RASTER IMAGES WITH PAINT

4-75. Paint's major contribution is in its ability clean up cluttered raster graphic images; leaving behind a minimalist illustration. In this scenario (figure 4-20), the author has a black and white line drawing as shown on the left side. It has information that is not relevant to the message or text of the document being developed. The author wants to remove the size dimensions from the image, and visually accent the trains.

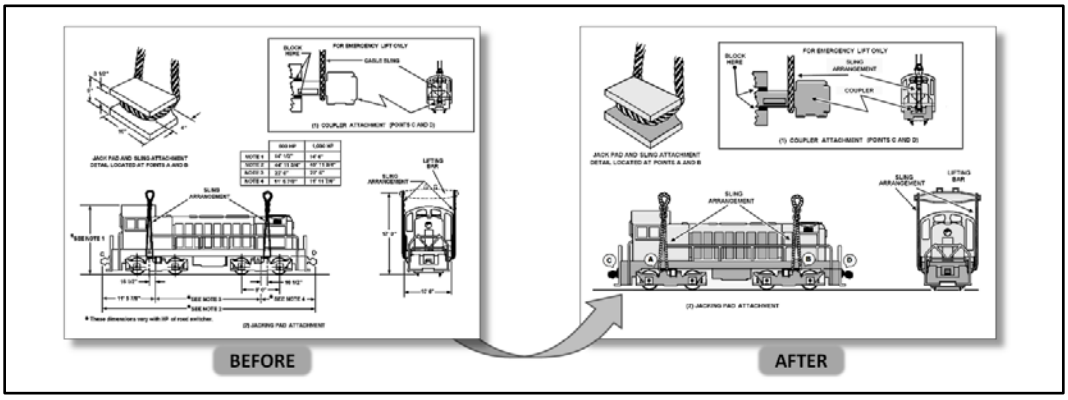

Figure 4-20. Removing clutter and highlighting the subject with Paint

4-76. The process of removing clutter from an image begins with identifying the elements of the picture that are relevant to the discussion in the text, verses what is extraneous. In the case of a sling lifting a train, the actual dimensions of the train and its components are irrelevant to the message in the document. Therefore, these dimensioned are clutter that need to be removed with Paint™ (figure 4-21).

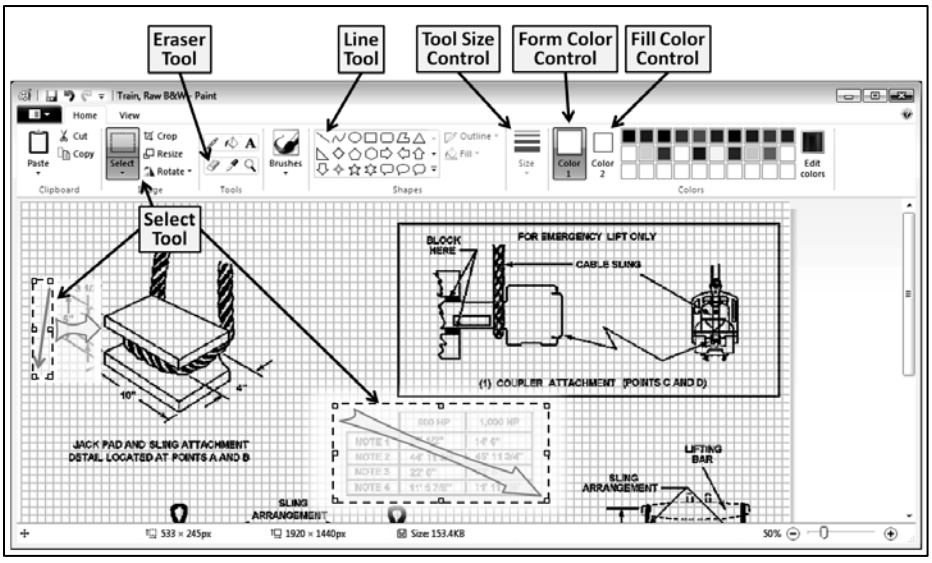

Figure 4-21. Removing clutter with Paint tools

4-77. Having the image opened in Paint, there are three major tools used to remove or delete an element from within an image. The location of these tools are depicted at the top of figure 4-21. Remember, if an unwanted deletion of an element occurs, press Ctrl-Z to undo the previous action. Paint only holds the last three actions in memory. However, once "Save" is pressed, the cursor's action history is cleared.

TASK - Use "select-box-delete" technique to remove unwanted elements:

1) Click on the, ***Select*** tool.
2) Move the cursor to the upper corner of the area to be cleared (as shown in the lower-center of figure 4-21).
3) Click-drag to the opposing corner over the top of the whole area to create a select box.
4) Press the ***Delete*** key.
5) Click on the, ***Save*** icon (or press Ctrl-S).

NOTE: When working with the select tool, the motion must be from one corner to the diagonal opposite corner. Do not go from top-center to bottom-center, or side-center straight across. It will only mess up the picture; failing to capture the desired area.

TASK - Use the "select-box-drag" technique to overwrite unwanted elements:

1) Click on the, ***Select*** tool.
2) Move the cursor to the upper corner of a spot just outside the area to be cleared (as shown in the left-center of figure 4-21).
3) Click-drag to the opposing corner away from the area to create a small select box.
4) Using the cursor, click on the ***side-toggle*** of the select box nearest the unwanted element. This will cause the cursor to change into a two headed arrow.
5) Drag the side of the select box across the unwanted elements, up to just beside to good material. This will stretch the clear white pixels over the other material. Then, release the mouse button.
6) Move the cursor away from the area and click on a blank spot. This causes the overwriting to take effect, and the process to terminate action.
7) Click on the, ***Save*** icon (or press Ctrl-S).

TASK - Use the "Eraser" tool technique to overwrite unwanted elements:

4-78. Eraser is actually a paint brush that replaces or overwrites with the fill-color. Other brushes overwrite with the form color. For this reason, the fill-color has to match the background against which the eraser is working.

1) Check that the ***Fill-color*** control is showing white. If not, click on the ***fill-color swatch*** causing it to border with the orange activation box. Then, click on the ***white*** swatch of the ***Color pallet***, just to the immediate right. The ***fill-color*** control swatch should turn white.
2) Click on the, ***Eraser*** tool icon.
3) Move the cursor to the element that needed to be deleted.
4) ***Left Click*** and hold, while moving the cursor over the elements that need to be deleted.
5) Release the click to pause or finish the deletion action.
6) Click on the, ***Save*** icon (or press Ctrl-S).

TASK - Use a white line to overwrite or trim burs off elements:

4-79. There are occasions when dimension lines pass over or intersect the angled contours of an element. Using the other ways to delete lines will sometimes leave a bur on a line that leaves the illustration looking sloppy or jagged.

1) Make sure that the ***Form Color*** control is set to white.
2) Click on the, ***Line*** shape icon.
3) Move the cursor to the area of the bur.

4) Click and hold, while drawing a line that parallels the line that will be kept. When the hold is released, that line will still be active, and able to morph. Manipulation toggles will still be visible.

NOTE: If the line size is not appropriate, the "Tool Size" control can be used to change the line's width size.

5) Adjust the ***toggles*** so that the white line nudges over the bur. The line can also be moved as a whole, by using the ***move arrows*** located between the letters and numbers keypads.
6) Move the cursor away from the area and click on a blank spot. This causes the overwriting to take effect, and the process to terminate further action.
7) Click on the, ***Save*** icon (or press Ctrl-S).

4-80. Once having removed the extraneous clutter from the image, the "paint bucket" tool is used to colorize the focal subjects of the illustration. Figure 4-22 shows a paint bucket tool with a form control color set to light gray. If the area into which the gray is to fit is not enclosed and unbroken, use the line tool or pencil tool set to black or gray to close breaks in the line.

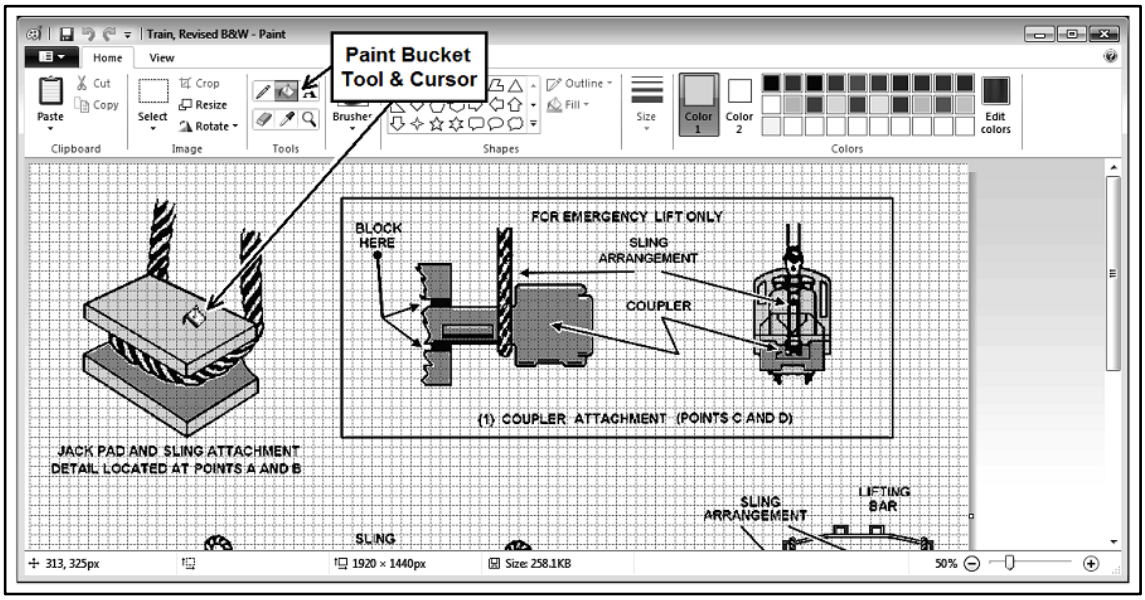

Figure 4-22. Colorizing with the paint bucket tool

4-81. If the final size of the above steps results in an image width greater than 1800 pixels, both Picture Manager, and Microsoft Windows Paint have a resizing capability. Because of the fine detail in figure 4-17, this type of six inch wide image needs to be fully resolvable at 300dpi for photocopiers. Thus, for a six inch wide figure, an image width of 1800 pixels is used, in spite of the heavy cost to file size and bandwidth demand. Paint is usually best for resizing an image, and automatically maintaining the aspect ratio.

NOTE: The eraser cursor is available in four sizes. Extra-small is best for deleting small detailed elements in tight areas. Larger erasers are better for being quicker in deleting across larger areas. If the size is not comfortable for the artist, the "Tool Size" control can be used to change the eraser size.

RESIZING RASTER IMAGES WITH PAINT

4-82. Completed images are resized to provide the optimum balance between high resolution and low demand for bandwidth or random access memory (RAM). The standard for Army publications is that eight point font must be legible and of clean appearance. The commercial industry standard is 300 pixels per inch

(ppi). To meet this standards for an image which will appear in print as a six inch wide picture, the image must be 1800 pixels wide.

4-83. To garner a smooth image with minimal aliasing, and high clarity, it is best to develop a raster image at 125% to 150% of its high resolution size of 1800 pixels wide. PowerPoint™ images that are doubled in size and converted to raster graphics will be 1920ppi (for a standard, 4:3 slide), or 2592ppi (for a widescreen, 16:9 slide). Otherwise, this can mean that if direct changes have to be made to a previously completed raster graphic image, it might have to be enlarged, first. Then after being modified, the image will need to be resized to comply with the 1800ppi or 900ppi requirement. To perform resizing with Microsoft Paint™, see figure 4-23 and follow the item numbered procedures.

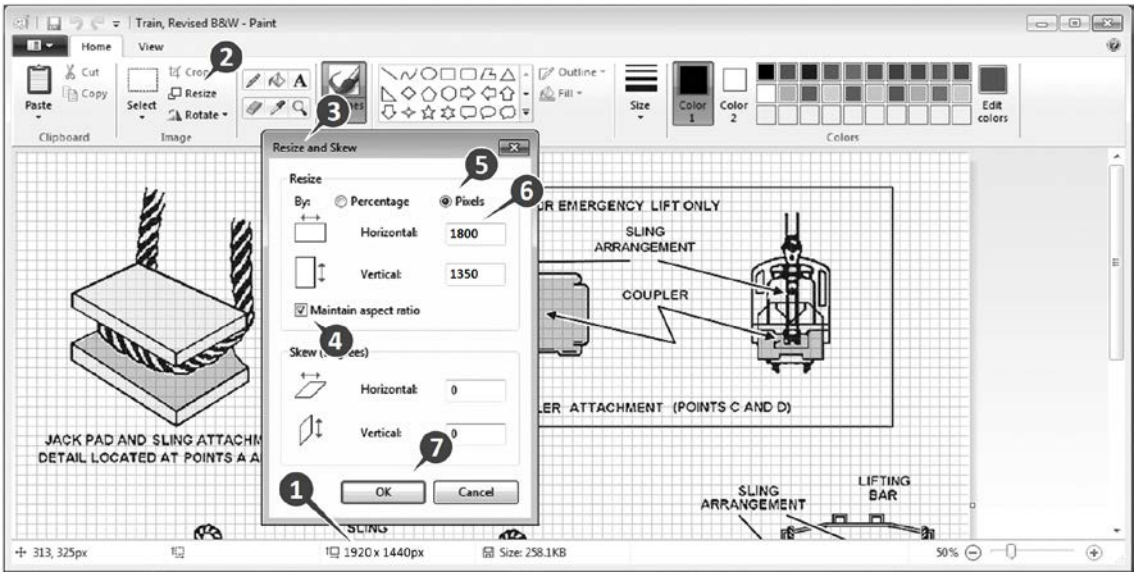

Figure 4-23. Resizing a raster images with Paint™

TASK – Size an Image with Paint™

1) Verify the image size.

NOTE: The image pixel width at the start of the resizing process should be greater than the final size to avoid causing a fuzzy resolution.

---

2) Click on the ***Resize*** window opening button.

3) This opens the ***Resize and Skew*** decision window.

4) Click on the ***Pixels*** radial button.

5) Verify that the ***Maintain aspect ratio*** box is checked.

6) Type 1800 (or 900) in the ***Horizontal*** selection box.

NOTE: The 1800 pixel width is used to make a high resolution image at optimum file size. The alternative 900 pixel width makes the smallest file size using moderate resolution.

---

7) Click on the ***OK*** button, to complete the resizing process.

8) Save the resized image in the archive graphic file folder, as appropriate.

9) Close Paint™.

Chapter 5

Job Ordering Graphics Support

"If there were no military symbols, Soldiers and Marines would create them."

ADP 1-02, *Operational Terms and Military Symbols*, 31 August 2012

Graphics in general should be the original work of the team, developed using consistent standards. The work of the artist takes time, so authors should initiate collaboration as early in the development process as possible. If an artist is not directly available, how would an author write a request for an outside artist to produce an image?

AUTHOR TO ARTIST COMMUNICATION

5-1. Requesting graphic art support is covered in DA Pam 25-91, "*Visual Information Procedures*." The author uses a DD Form 1995-1, "*Visual Information Production Request, Evaluation and Approval*," as a work order. Because doctrine documents are in constant fluctuation until it is fully staffed and approved, one solution is for authors to request that the visual support agency produce their graphics product as a PowerPoint™ vector graphic. This way, authors can later make subtle changes to the slides, and generate a factually correct illustration with minimal need to incur rework delays from the visual support agency.

5-2. Let's say the author has a message about Chinook helicopter operations and needs an item depiction of such an event. Beside each image in figure 5-1 is a description of the type of technique needed to achieve the pictured result. Such information will go in block 8, "Objective and Key Points."

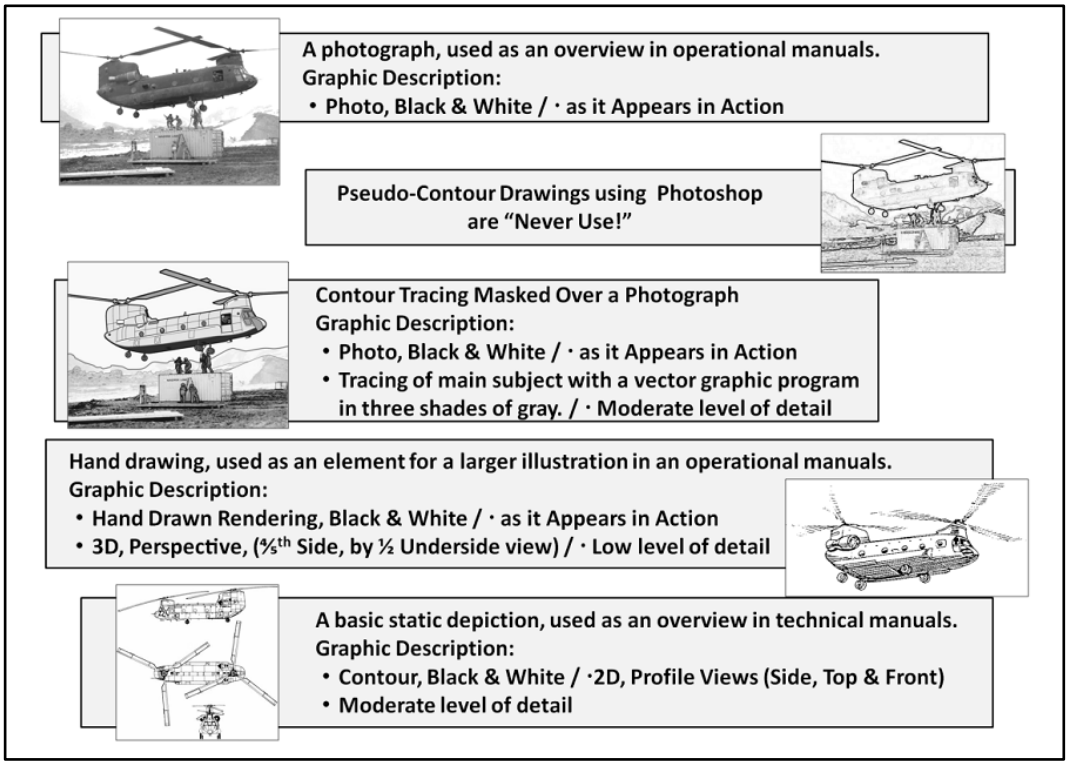

Figure 5-1. Using words to describe a desired illustration

5-3. If doctrine authors have organic graphics support within the department, they can send drafts of figures to the artist in any format: PowerPoint, hand drawing, figures from other manuals with changes written. If the department or installation lacks VIS support, the file format recommended is a PNG at 300 ppi (the PPI of an image is its digital file resolution or its pixels per inch) for a total of 1800 pixel width for a presumably six inch wide image.

5-4. We begin our message by considering the use of a photograph.

5-5. Are there options? Yes. But, pseudo-contour drawings are not allowed.

5-6. Can the photograph re-generated as a contour drawing? Sure, but the artist might tell the writer that to get a good level of detail, a hybrid is the quickest solution or a hand drawn rendering could be done. It is a, contour tracing masked over a photograph as shown in the center image of figure 5-1. They offer very good longevity, and they are comfortable to look at. Here is how it is described:

5-7. Put this all together as a complete set of instructions for the artist, as show in figure 5-2. In this example, the author wants the artist to produce a process chart of a water distribution site that combines schematics with low fidelity item depiction.

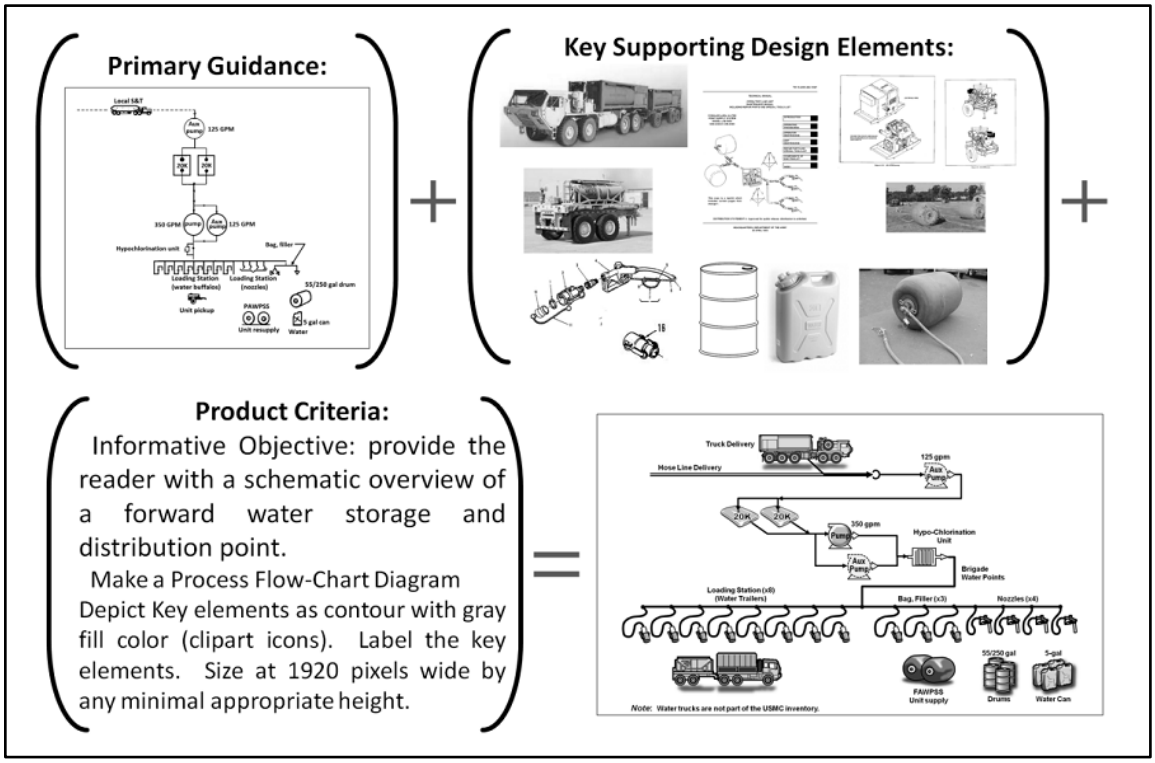

Figure 5-2. A complete set of instructions for the graphic artist

5-8. Primary Guidance: Begin by making a rough sketch of what you want, or providing a photograph of the whole image. Please don't be intimidated by your own lack of drawing skill. Drawing is like writing; treat the first drawing as a draft, and then make a second drawing. Though the quality of the final graphic product is the responsibility of the artist, the artist still is dependent on the author for technical focus.

5-9. Key Supporting Design Elements: Go through the drawing and examine each element. Since you are the author and subject matter expert, you will have to provide the artist with an example of each element that will go into the final product. This is the only time you can use proprietary images. You can use them because they will not be directly incorporated into the final product.

5-10. Product Criteria: Write up the Job-Order and Product Criteria. All the visual elements can be incorporated into a PowerPoint™ file or a PDF to provide the artist with a digital version of the requirement, or it can be done in a paper-documented form.

5-11. Once you have provided the job-order, each image should take a day or two to develop; plus a week to get your project in front of the artist.

THE JOB ORDER PROCESS:

5-12. An author, as a book manager is responsible for identifying, defining and job ordering the images needed to support the manual or document. If the author has to go to external resources for art support, an early start is needed on this process. Don't push this off until the last moment. According to DA Pam 25-91, there is a process for securing needed images. Stick to the process as shown in figure 5-3, and it will all come together.

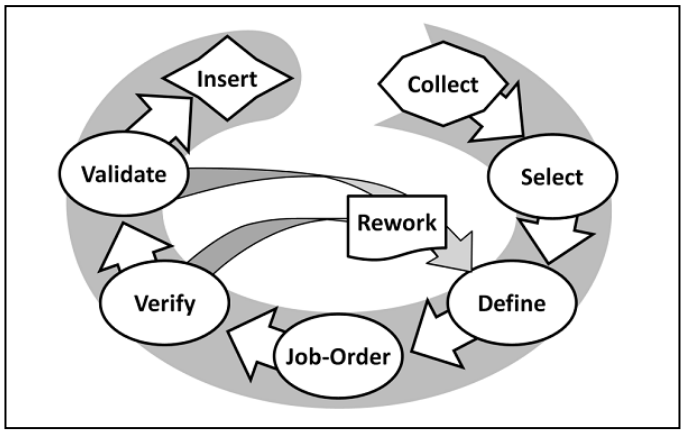

Figure 5-3. The image production process for doctrine products

5-13. Collect: Find all the old images from the preceding manual, and gather images of new items and processes. These are to be arranged in a PowerPoint™ file as one image per slide. This file is to be archived as a "baseline file" as a reference of possible figures.

5-14. Select: Based on the command guidance and intended outline of the manual, make a figure planning file. Copy the baseline file and rename the copy as "figure planning" file. Now, you make a decision, choosing from what you got, and making a draft of image of what you need. Delete slides of images that won't be used, even in a revised context.

5-15. Define: The manual author must define what is needed to make to old images current, or the new images relevant and legal for use in the document. This step has several sub steps where you define the artistic style of the final product.

5-16. Job-Order: Send a request to the department's artist, G-3 Training Support, or the appropriate school for the needed images. It usually takes a week for training aids managers to put an artist on a work-order. From there, it takes an artist a day (up to a week) to produce each image. When using the instillation's visual support agency, the author generates the request on a DD Form 1995-1.

5-17. Verify: Once the images are produced and delivered, they need to be inspected that they conform to the request description. Ensure that the style is appropriate for doctrine, background image does not upstage or distract from the main subject, and meets the job-order specifications. If the deliverable is a photograph or raster graphic, check that the resolution is high enough, while bandwidth of the file size is kept to a minimum.

5-18. Validate: During the course of writing any document, the message will evolve. Doctrine proponents and reviewers will invariably want something added, deleted or changed as they read the manual drafts. Hence the author will have to check that as the product moves toward finalization, the images are still on subject, consistent with the message of the text.

5-19. Rework: All images should be viewed as draft illustrations until the doctrine document is itself approved as final. If an artist is internally available, an illustration might be reworked three or four times. When depending on external graphics support, illustrations being reworked for both lack of verified

conformity or factual validation will usually only get one opportunity for rework before the document's delivery date. Usually, the external support agency will require a fresh DD Form 1995-1.

5-20. Insert: Place the images in the document in accordance with the guidance from the template editor. Part of the insertion process for PowerPoint™ slides is their conversion to raster graphics, as described in chapter 7.

Chapter 6

Inserting and Laying Out Graphics

Inserting an image into a document that is managed by a Word™ template has very specific constraints which a normal Word™ document usually does not have to be limited by. The document author has five responsibilities for properly installing an image into a Word™ template Word™ document.

- Correctly create a caption line.
- Use raster image file formats, for caption figures.
- Insert and configure the image properties for optimal relationship to the text.
- Create and style a table.
- Correctly change an image or update a table, when needed.

The proper installation of images is critical. What appears in just fine in Word™ can get screwed up as the document is converted into a PDF. By following the layout instructions in the order provided, it simplifies preparing the final electronic file and maintains document quality.

CONFIGURING IMAGE RESOLUTION IN OFFICE WORD

6-1. Doctrine graphics must be of high visual quality, while keeping the file size and bandwidth low enough to transfer through the internet. Most Word™ processor document production programs are designed to accommodate sending documents as e-mails through the internet. These programs routinely go through a document file and reduce the resolution of images to a Website standard of about 70ppi to 100ppi. The image compression process is called, "downsampling" for reducing file size. Downsampling of images may not be noticeable on a computer screen (which usually has a resolution of 96ppi to 120ppi), but it can be well distinguished on a paper printout (because most current printers do 600dpi to 1200dpi, or higher). Microsoft Office™ programs perform a basic file compression of images upon clicking to save a document at 72ppi or 96ppi (depending on which version and service pack has been installed). There is an option to reconfigure the default image compression setting to 220ppi (twice that of a generic office monitor), or to completely turn off this compression function.

6-2. If you have a document that was saved without making the following redefining of the ***Save*** function, all images will have to be reinstalled. For this reason, all images should be archived in a graphics folder which supports the document labeled: "FullRez Figures, (Book Type & #-##). Otherwise, it is not possible to recover the resolution of pictures that have already been compressed. (More on file and folder management is addressed in Chapter8, "Archiving Graphics.")

6-3. Turning off the image compression results in the high resolution figures, but it also results in the larger document file sizes.

SETTING RESOLUTION IN WORD™ 2007:

6-4. Word 2007 automatically compresses images in documents. This function cannot be universally turned off for the program without making adjustments to the register files of the computer's operating system. (This is an action which only a G-6, Director of Network Administration and IT Security can authorize on a government computer.) Instead, Word™ 2007 only allows the computer user to disable image compression for an individual document, on a file-by-file bases.

6-5. Image compression can be disabled on the bases of each individual file as shown in figure 6-1 by the following steps.

TASK - Disable image compression for Word™ 2007:

1) Click the ***Office*** Button, of the control ribbon.
2) Click, ***Save As***.
3) Click, ***Tools***.
4) Click, ***Compress Pictures***.
5) Click, ***Options***.
6) Click to clear the, ***Automatically perform basic compression on save*** in the check box.
7) Click, ***OK***.
8) In the ***Compress Pictures*** dialog box, click, ***OK***.
9) At the ***Save as*** window, click, ***Save***.

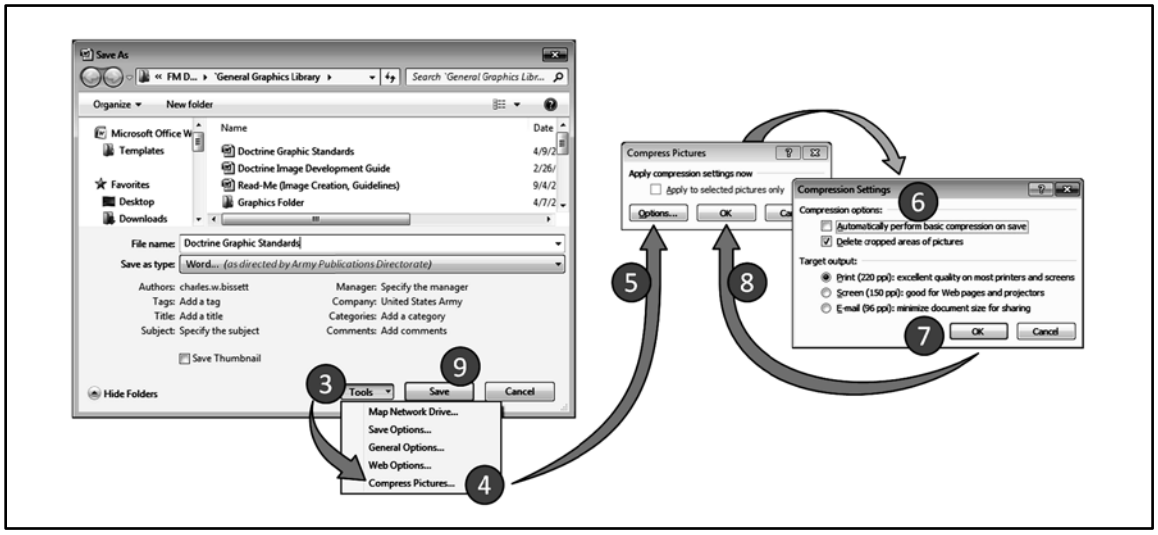

Figure 6-1. Disabling image compression for Word™ 2007

SETTING RESOLUTION IN WORD™ 2013:

6-6. Resetting image resolution in Office Word™ 2013 requires universal adjustments to the default settings of the whole program in the Word™ Options window (figure 6-2). Doing this has no effect on the operating system.

> ***CAUTION!*** This will not only affect the doctrine document, but every document created on this computer, until the compression function is restored. Not manually overseeing and controlling image pixel size may result in unnecessarily large bandwidth of a document.

TASK - Disable image compression for Word™ 2013:

1) Click on the ***File tab*** of the control ribbon
2) Click, ***Options.*** This will display the ***Word Options*** dialog box as shown in Figure 6-2.
3) Click, ***Advanced*** at the left side of the dialog box.
4) Scroll down until you see the ***Image Size and Quality*** section.
5) Click the ***Do not compress images…*** check box.
6) Click, ***OK.***

6-7. When set, this causes Word™ to ignore whatever you have specified in the "Set default target output…" control and, instead, include any pasted images at their original resolution.

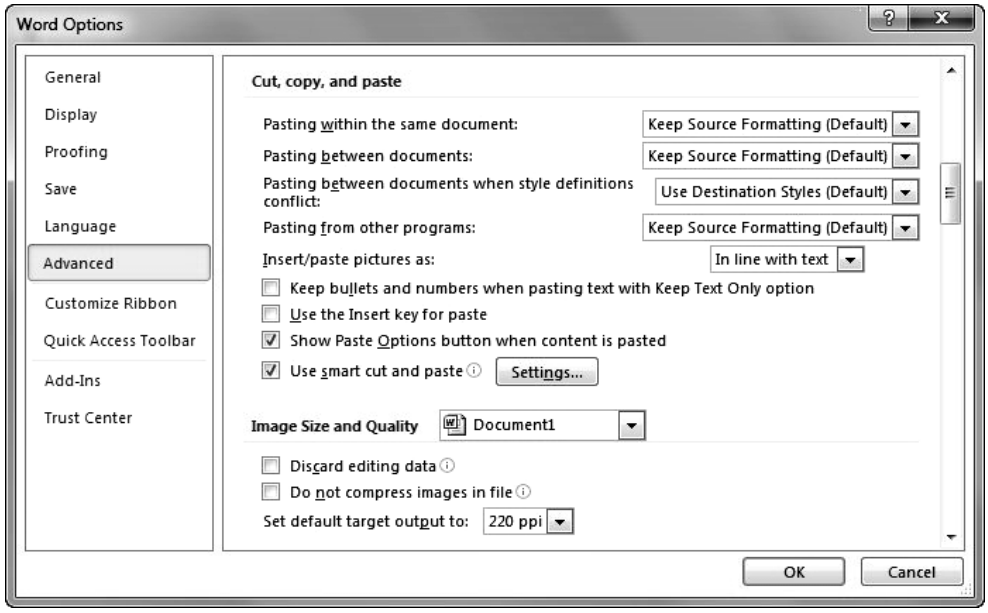

Figure 6-2. The image settings in the Word™ 2013 Options dialog box

INTRODUCING AND REFERRING TO GRAPHICS

6-8. Introduce all graphics—tables and figures—in the preceding paragraph (for example, "See figure 2-1" or "See table 2-1." If the graphic does not appear on the same page or a facing page, include a page number in this reference—for example, "See figure 2-1, on page 2-4." Follow these guidelines:

- Be consistent in referencing: all as lone sentences (for example, "(See figure 2-1.)" or "(figure 2-1 portrays….) or as parenthetical clause (for example, "…(see figure 2-1)…). Note the differences in capitalization and placement of the period. You may use a different referencing style when appropriate to a specific context.
- Keep the Word™ figure and table in the paragraph in lower case. (Required by DA PAM 25-40, which is a change from TR 25-30.)
- Cross-references to a graphic other than the introductory reference must include a page number unless the reference is on the same page or a facing page as the graphic.

6-9. To insert a figure, first save the figure as its own file. Then, insert it as a raster graphic file image.

CAPTIONS

6-10. If in the course of typing text, the author determines that he has reached a point where a figure or table is needed, the author must first create a caption line. The Word™ FM-Format2 template standardizes the font for captions. There are two ways to approach the creation of a caption line in a Word™ template document: Graphic Caption, or Table Title.

GRAPHIC AND TABLE CAPTION STYLE

6-11. In principle for print publications, titles are not incorporated into the graphic, itself. This means authors and artists must not place words expressing a graphic's title or topic in the image. Instead, the caption serves as the title of a graphic; it expresses the graphic's topic as a noun phrase. However, captions as titles are not sentences and do not contain periods at the end. There are two types of captions: Figure for graphics, and Table for tables. The author first opens a fresh paragraph. Then, the Figure or Table moniker is typed,

followed by the sequence number and a period. Next the caption body is typed using sentence case (capitalizing only the first word and proper nouns), but without a terminal period.

6-12. There are two ways to format captions for graphics and tables: 1.) the Add-Ins ribbon tab, and 2.) the Styles task pane. The vast majority of all style formatting for a document can be done through the Add-Ins tab; it's faster to use.

6-13. The Styles task pane is available through the ribbon Home tab. It provides a comprehensive list of all styles available throughout a doctrine document; it's very detailed to use. To open the Styles task pane, go to the ribbon Home tab, and at the Styles box click on the task pane opener. The task pane opener is the little box and arrow at the lower right corner of the Styles function box; click on it and the pane opens to the right of the document.

6-14. Manuals that contain even a single graphic illustration (including charts and graphs assigned figure numbers) shall have a "List of Figures" following the table of contents, and showing the figure number, title, and page number of each figure. This formatting is built into the FM-Format template; work with it, don't corrupt it. Likewise, the "List of Tables" follows the List of Figures, and will be used if there are one or more tables.

TASK - Create a Caption

6-15. To create a caption in a Microsoft Word™ templated document, follow these steps:

NOTE: The caption should not appear as a title within the image or table.

---

1) Click on the ***Enter*** key at the end of the paragraph just before where the caption (figure or table) is to occur.
2) Type the word, ***Figure*** in title case, followed by the ***sequence number***, and a ***period***
3) Type the ***title body phrase*** using sentence case.

NOTE: In a caption title body, only proper nouns are typed in title case.

NOTE: There is no period at the end of the caption title body.

---

4) ***Highlight*** the whole of the ensuing caption paragraph, and paragraph marker.
5) In the ***Add-Ins*** tab, click on ***Graphic*** for a figure, or ***Table Title*** for a table; as appropriate.
6) The caption will automatically be formatted and sit centered, in the caption paragraph.

WARNING! The Graphic style and Table Title style setting contains macros that are critical to latter formulating an automatic table of figures or tables. Hand cranking the paragraph marker to; undo the paragraph numbering, setting the font to bold, and setting the paragraph to centering the text; to create a caption *will corrupt the template*.

6-16. Doing this, results in a caption line. Next, the author installs the image file, or creates a table; as appropriate.

INSTALLING ILLUSTRATIONS:

6-17. Once the author has obtained or created an image to insert into a figure, it must first be saved as its own file in a folder. It is best to store the picture file in a graphics archive folder associated with the document being produced. This way the picture can be easily relocated for future revisions of either the document or the image. (The development process has been described in the two preceding chapters.) Technically, print images are best file formatted as PNGs; and, ideally sized to about 1800 pixels wide by a height of whatever the illustration's aspect ratio dictates to be the appropriate number of pixels tall.

6-18. Microsoft Office™ programs usually provide two or three ways to achieve the same functional results. This is true of installing images in to Word™ documents. For the sake of simplicity, these instructions will focus on accessing the installation functions through the ribbon tabs.

WARNING! Never insert a PowerPoint™ slide, Excel spreadsheet, or other such files in which you can change the text. Doing this will corrupt a Word™ template. Only insert a file that is a non-manipulative text, raster image, such as TIF, PNG, GIF, or JPG.

NOTE: PNG image files are the preferred file format for print publication.

WARNING! Never copy-past an image directly from any source into a template (this is known as, ripping). Doing this will reduce the resolution. It will install a previewer image with a 96ppi resolution. It must be installed through "Insert Picture" process or the "Change Picture" process to prevent degradation of resolution.

INSERT PICTURE PROCESS:

6-19. After obtaining or creating an illustration, and after having created a figure caption, the picture can be inserted into the template:

NOTE: Cursor placement is very important, in the following process for inserting pictures.

TASK - Insert Picture:

1) Place cursor to the left of the "F" of figure for the caption; not in the middle of the caption or at the end.
2) Select the, ***Insert*** tab. This opens the ***Illustrations*** box as shown in figure 6-3, which lists five or six types of illustration functions: Picture, Clip Art (or Online Pictures), Shapes, SmartArt, Chart, and the recent Screenshot. When working in a template, only use the ***Insert*** tab function to insert figures (not tables) from files. Inserting illustrations with the other choices will corrupt a template.

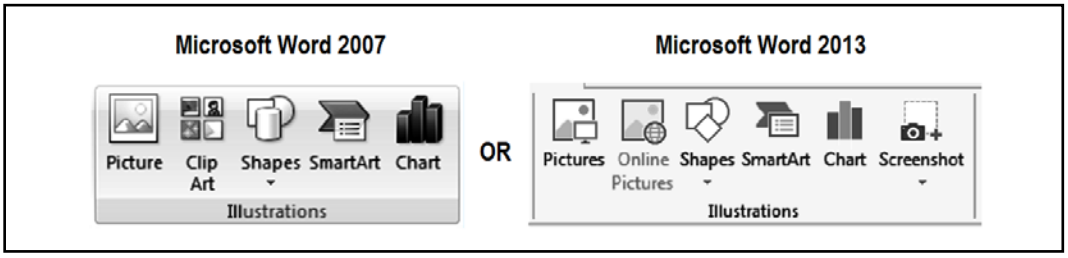

Figure 6-3. Illustrations box under the ribbon's Insert tab

3) At the ***Illustration*** box (see figure 6-3) on the ribbon, click on, ***Picture(s).***
4) This will open the ***Insert Picture*** window.
5) Navigate to the place where the ***desired image*** file is residing.
6) Click on the ***desired image***.
7) Click on the ***Insert*** button (at the lower right of the window).

6-20. The picture will appear on the page, at what might be a random location. The image will have to be configured, next.

CONFIGURING AN IMAGE IN A WORD™ TEMPLATE

6-21. After inserting a figure in a document, ensure the figure has proper size, proper text wrapping, proper positioning, and a black border. If the figure characteristics are check in this order, it can lay out the figure once. If the order is changed, some figure layout functions will probably have to be redone a few times.

6-22. Left click on the image over the figure caption in the document and the control ribbon adds a Picture Tools tab with a subordinate Format tab as shown in figure 6-4.

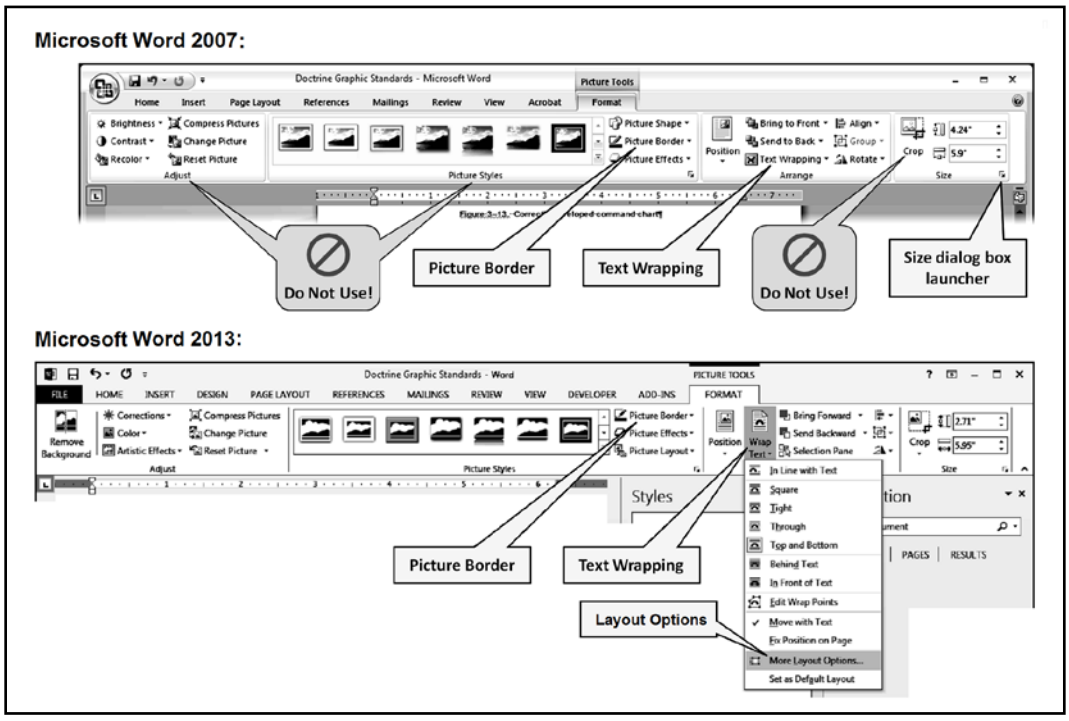

Figure 6-4. Picture Tools tab>Format tab

6-23. Four function groups appear in the "Format" tab:

- Adjust
- Picture Styles
- Arrange
- Size

6-24. Avoid the Picture Tools > Format > Adjust re-settings that usually are not necessary for a properly constructed image. If the image does not look correct, open the original raster graphic file in Microsoft Paint or Office Picture Manager™ to adjust/edit the image. Save the adjusted image with a new file name, date or version number.

6-25. Do not use the preformatted Picture Styles, as demonstrated by the framed icons. They dump a lot of extraneous formatting information into the background data of the picture, which is very hard to remove or correct. This background data can corrupt a Word™ template.

6-26. Do not attempt to Crop an image which is in the Word™ template.

WARNING! Do not use the ***Adjust,*** preformatted ***Picture Styles***, or ***Crop*** control functions. They can corrupt the template.

6-27. To prevent corrupting the Word™ template only use the following functions, and avoid the others:

- Wrap Text (or Text Wrapping) > ***More Layout Options*** in the Arrange group.
- ***Picture Border*** button in the Picture Styles group. Set to black, at a one-point weight.
- ***Size*** dialog box launcher at the lower corner of the Size group, only for pre-2010 Word™.

6-28. To avoid resetting the layout, make your changes in that order.

APPLYING THE SIZE FUNCTION

6-29. High resolution images will automatically insert into a page at the 6½ inch column width of the body text. Hence, it will be necessary for all images to be resized to somewhere between three to six inches.

6-30. Next, go to the Size dialog box launcher (for Word™ 2007), or the Layout Options, > Size tab (for Word™ 2013) as shown in figure 6-5. Again, follow the steps in order, exactly.

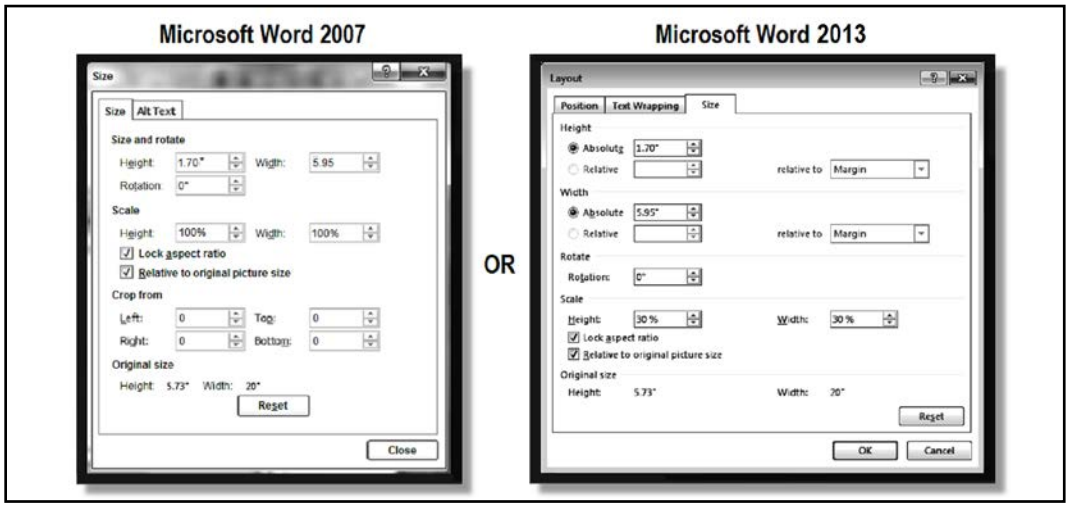

Figure 6-5. Size dialog box launcher

TASK – Size Figure Image:

1) Make sure that the ***Scale*** options section has the ***Lock aspect ratio*** and ***Relative to original picture size*** boxes checked.
2) To size the image, set the ***Size and rotation***, ***Width*** (for Word™ 2007), or the ***Width***, ***Absolute*** (for Word™ 2013), to the planned size that is less than six inches.

NOTE: Up to this point, figures cannot be set to exceed 5.95 inches in width or 8.35 inches in height. It saves space for later when the one-point black border is applied to the image. This assures that the total image will not exceed 6 inches.

---

3) Check that the ***Scale*** options section, ***Height*** and ***Width*** do not exceed 105%. If it does, the image will lose resolution, and may have to be redeveloped.
4) Then, at the ***Crop from*** section of the 2007 dialog box launcher, *do not* crop the image.
5) Then click, ***Close*** or ***OK***.

WARNING! Do not use the picture ***toggles*** (the little squares and circles along the picture border) to resize an image! Using the picture ***toggles*** to directly adjust the picture size causes the ***Lock aspect ratio*** to automatically turn off, skewing the image.

APPLYING THE ADVANCED LAYOUT OF TEXT WRAPPING

6-31. This function positions the image relative to the text of the page it sits upon.

TASK – Position the Image on the Document Page:

1) Clicked directly on the image
2) Click the ribbon ***"Picture Tools," "Format"*** tab, do the following:
3) Click on, ***Text Wrapping*** (for Word™ 2007), or ***Wrap Text*** to open the drop down menu of Wrapping Styles.

4) Go to the bottom of the menu, and click on the ***More Layout Options*** button to open the ***Advanced Layout*** (for Word™ 2007), or ***Layout*** (for Word™ 2013) dialog box, which is depicted in figure 6-5 and figure 6-6. (The 2007 box has two tabs, and the 2013 box has three tabs. Address ***Text Wrapping*** before ***Picture Position***.)

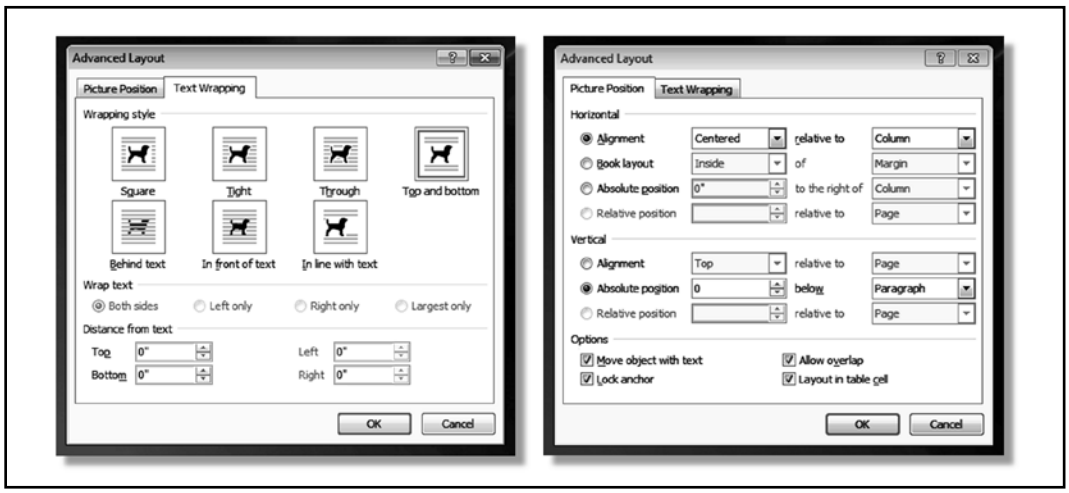

Figure 6-6. Advanced Layout dialog boxes for Word™ 2007

5) Click on the ***Text Wrapping*** tab.
6) In the ***Wrapping Style*** section, click on the ***Top and bottom*** icon.
7) In the ***Distance from text*** section, ***Bottom*** information box, type ***"0.05"***.
8) At the ***Picture Position*** tab, in the ***Horizontal*** section, click the ***"Alignment"*** radial button.
9) Move the cursor right into the ***information box***.
10) Click in the ***box*** to open the dropdown menu.
11) Click, ***Centered*** relative to ***Column***.
12) At the ***Vertical*** section, click the ***Absolute position*** radial button.
13) Move the cursor right to the ***information box***.
14) Type either number ***"0"*** or ***"0.05"*** into the box.
15) In the ***Options*** section click in the ***"Move object with text"*** check box, leaving it checked.
16) In the ***Options*** section click in the ***"Lock anchor"*** check box, leaving it checked.
17) Go to the bottom of the ***Advanced Layout*** (for Word™ 2007), or ***Layout*** (for Word™ 2013) and click, ***OK.***

NOTE: In Word™ 2007, the **Advanced Layout** box only carried two control tabs, as shown in figure 6-6. Now, in Word™ 2013, the **Layout** box carries three control tabs; having added a **Size** tab as shown in figure 6-5.

6-32. If at some latter point in editing the text, the picture appears to be disconnected from the caption, return to the Advanced Layout (for Word™ 2007), or Layout (for Word™ 2013) box. (Don't try to move the image with the cursor or nudge arrows, at first.)

TASK - Realign an Image with its Caption:

1) At the "Picture Position" tab, in the "Vertical" section, check that the ***"Absolute position"*** radial button is active (blue bubbled).
2) Move the cursor right to the ***information box***.
3) Type the number ***0*** into the box.
4) In the ***Options*** section click in the ***Move object with text*** check box, leaving it checked.
5) In the ***Options*** section click in the ***Lock anchor*** check box, leaving it checked.

6) Go to the bottom of the ***Advanced Layout*** box and click, ***OK.***

6-33. Doing this causes the image to jump to just above the caption. Sometimes, one line of the preceding paragraph may hover orphaned between the image and the caption. At this point, with the image toggles still visible, the down nudge arrow can be used to crowd the orphaned line back into its paragraph.

APPLYING THE PICTURE BORDER

6-34. In the Picture Styles group, use the drop down for the "Picture Border" button.

TASK - Applying a Picture Border:

1) Click on the ***image***, to open the Picture Tool, Format tab.
2) Click on the ***"Picture Border"*** button next to the icon. This will open a dropdown pallet of Theme Colors and line styles.
3) Click on the ***"black color square"*** which will cause a black border to appear around the image
4) Click on the ***"Picture Border"*** button next to the icon. This will open a dropdown pallet of Theme Colors and line styles.
5) Click on, ***"Weight"*** to open a menu pallet of lines at different sizes.
6) Click on the ***"1 pt"*** line.

6-35. It is important for publication consistency that the weight for the border is 1 point and the color is black. Do not add shadows or anything else!

EXCHANGING IMAGES

6-36. There are times when, during the course of editing, where a picture the image in place has to be exchanged for an updated image. In such instances, deleting an image is possible but, it results in the new image having to go through all of the configuration steps for installing an illustration, again. Microsoft Office offers a simpler solution; use the "Change Picture" function.

TASK – Updating an Image:

1) Develop the ***replacement illustration*** as a raster graphic file and store it in the appropriate Windows folder.
2) Go to the ***"obsolete illustration"*** in the document.
3) Right-click on the image to open a ***"formatting"*** menu.
4) Click on, ***"Change Picture…"*** to open an ***"Insert Picture"*** dialog box.
5) Browse to the desired folder, and click on the ***desired illustration***.
6) Click the, ***"Insert"*** button.
7) Apply the ***"Size"*** function if desired.

INSERTING AND CONFIGURING A TABLE

TABLE STANDARDS

6-37. Beyond any other requirements for Army publications, when not otherwise prohibited, doctrine tables will conform to the following standards:

NOTE: Authors have two choices for types of tables: Quantitative Tables, and Qualitative Tables. Chapter 2 addressed the communicative principles and informative characteristics of tables.

- The table caption is set above the table, and shall be centered 1 point above the applicable table.
- The table-title shall follow two spaces after the table-number.
- Table titles should begin with an identifying name.

- The first letter of the first Word™ and of each principal Word™ shall be capitalized.
- Tables with two or more columns shall have identifying column headers.
- Table for column headers shall have a cell fill-color that is set to 15% darker than white (RBG= 216/216/216).
- Full page tables, placed sideways on a page, shall be turned 90 degrees counterclockwise.
- The table number and title for a turned table shall also be turned 90 degrees counterclockwise to stay centered above the table.
- Where the table breaks beyond the initial page, each subsequent page will have a table caption, and a repeated table header. (See figure 6-9)

WARNING! Never mix Vector images with Raster images, or place two images in the same table cell. There is a very high risk that ***during the PDF conversion, the images on the top layer will be shifted to the rear***.

TABLE CONSTRUCTION

6-38. Tables are a form of graphic. Like figure graphics, a table has to be introduced in the document's body text before the table can be presented in a document. The title for a table is constructed outside the table, the same as a figure title. Unlike figures, the table title goes before the actual table.

WARNING! Do not ***Save*** work being done to create a table and populate the data until the writer (author, editor, or artist) is sure that the table will not extend across pages. If the table does go over to the next page, do the ***Splitting a Table Procedure*** in the next subsection before saving work. There is a very high risk that ***during the PDF conversion, an un-split table will fail*** to automatically split resulting in the latter half of the table information disappearing from the page.

6-39. Table construction begins with the author first drawing a draft version of the table to be inserted. The draft table provides a column and row count that will be needed for the table size numbers, amongst other uses.

1) Begin the table installment and construction process by typing the table number and title, as a fresh paragraph.
2) Clicking on the ***Add-Ins*** ribbon tab, as depicted in figure 6-7.

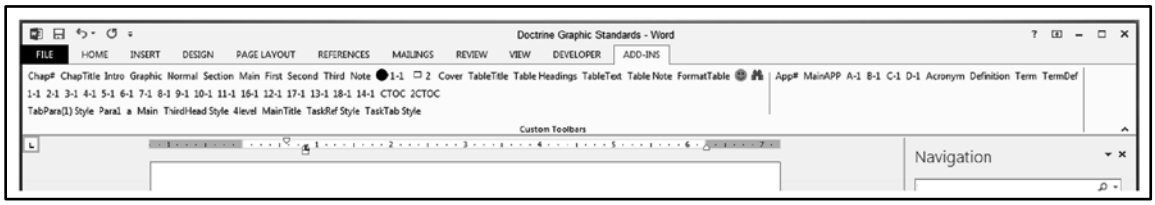

Figure 6-7. Add-Ins ribbon tab

3) Highlight the title.
4) Click on ***Table Title*** within the ***Add-Ins*** ribbon tab.
5) Locate the curser at the end of the ***Table Title***, and press the ***Enter*** key. This creates a new paragraph marker.
6) Highlight the paragraph marker, and click on ***Normal*** within the ***Add-Ins*** ribbon tab.
7) With the curser located in the new empty paragraph, clicking on the ***Insert*** ribbon tab, as depicted in figure 6-8.
8) Click on the ***Table*** application opener. This will open the ***Insert Table*** menu.
9) Click on the ***Inset Table*** function. This will open the ***Insert Table*** properties dialog box.
10) Within the ***Table size*** section, add the numbers for the needed columns and rows.
11) Within the ***AutoFit behavior*** section, click on ***Fixed column width*** radial button.

12) Behind the ***Fixed column width***, it should say, "***Auto.***"
13) Click, ***OK***.

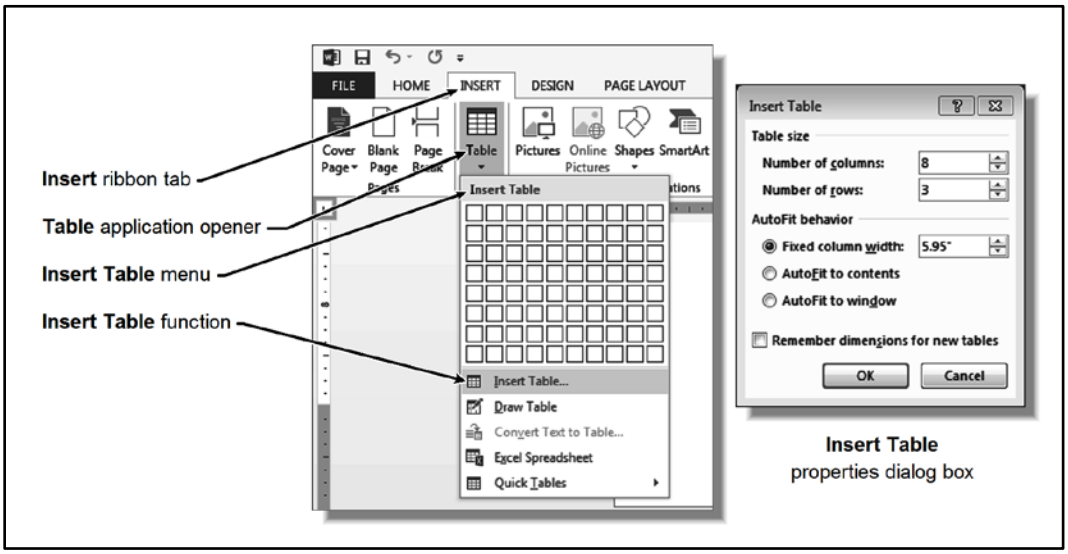

Figure 6-8. Insert table ribbon controls

SPLITTING A TABLE PROCEDURE

2-62. There are template limitations which distinguish the tables of doctrine from normal or style-guide developed tables. If the table extends across two pages, a manual break in the rows has to be used to replicate the appearance of an auto-split table, as show in figure 6-9.

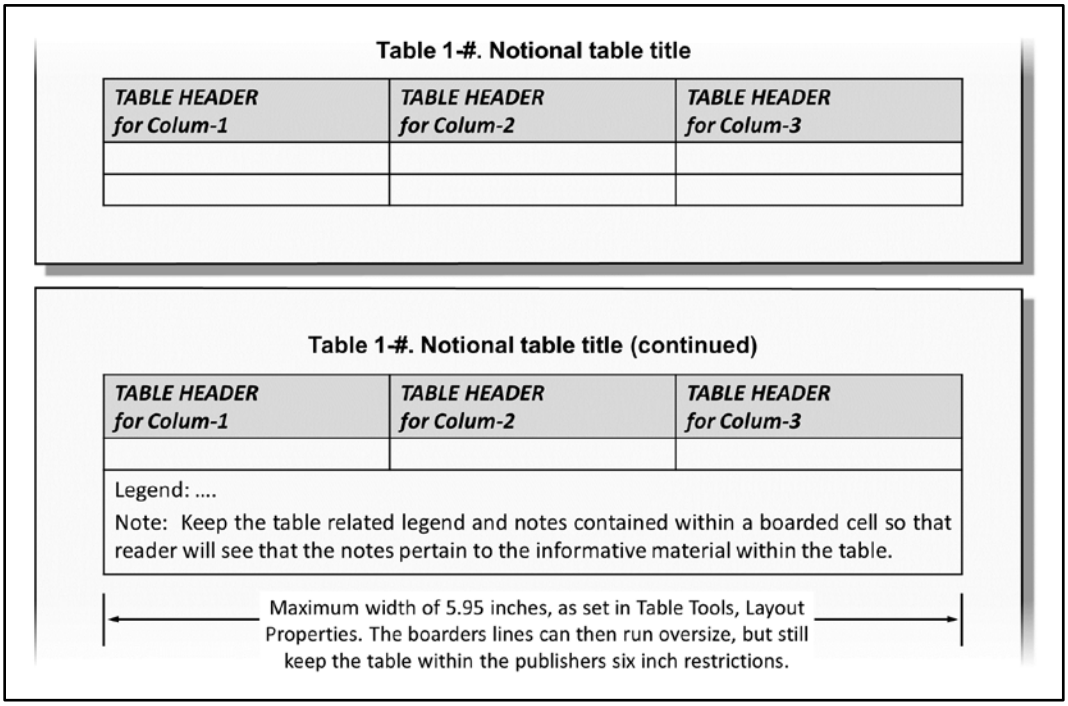

Figure 6-9. Formatting a table which breaks across pages

WARNING! Do not first save a document which allows a table to automatically break to the next page; doing this could corrupt the template.

1) Type the table number, followed by a period and one space. Next, type the table title without a terminal period.
2) Got to the ***Insert*** tab, click on the ***Table*** icon, and open the "Insert Table" control window.
3) Click on the "Table Tools" tab, and open the "Layout" ribbon.
4) Use the mouse to high light the first row that will be appearing on the next page.
5) Click on the "Split Table" button.
6) For the portion of the table that appears on the following page, a new table title has to be built that replicates the table title of the previous portion. At the paragraph marker, type the table number and title followed by the Word™ "continued" in parentheses.
7) High-light the first row of the table, got to "Table Tools" tab "Layout" subheading, and click the "Insert Above" icon. Use the new row to duplicate the table header row from the previous page.
8) High-light the first part's table title line, go to the "Add-Ins" tab, and click on "Table Title."
9) High-light the second part's table title line, go to the "Home" tab, open the "Styles" window, and click on "Body Text." Then use the Font and Paragraph controls from the Home tab to match the second title to the first. By doing this, the table will not appear twice in the table of contents.
10) High-light all the text in the table header row, and click on "Add-Ins" tab, "Table Headings."
11) High-light all the text in the table header row, and click on "Table Tools" tab, "Design" subtab, open the "Shading" icon, and select the 15% darker Gray to offset the header from the body of the table.

SAVING A WORD™ TEMPLATE AS A PDF DOCUMENT

6-40. Keeping the high resolution of images ready for publication requires adjusting the "Save As" control box settings! See figure 6-10 for settings needed to maintain image resolution in the new PDF Document.

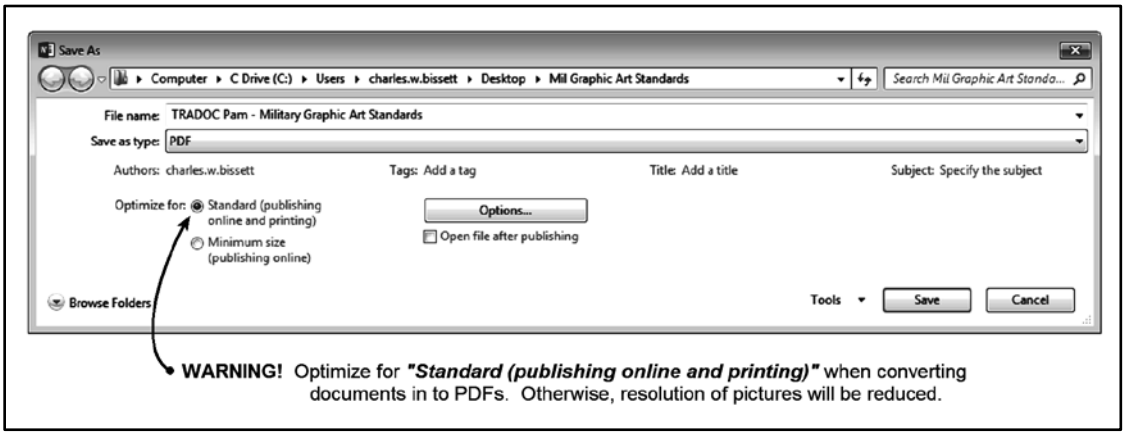

Figure 6-10. Saving a PDF for publication

Chapter 7

Managing Digital Images in a PDF

Army publications has shifted from lithograph and offset paper printing to digital desktop publishing and internet distribution. More than any other technology, this has been made posable by the Portable Document Format (or PDF file). It brings together the products of all the other software programs and presents then as a book that can be viewed on a monitor or paper printed on a photocopier.

ADOBE™ PDF

7-1. Portable Document Format (or PDF) is a "publication" file format developed by Adobe™ in 1993 that preserves the fonts, formatting, graphics, and color of a source document as separate components which are managed within its file structure as objects on layers. It is used to present and exchange documents reliably, independent of software, hardware, or operating system. A PDF is not an image file format (though some mistakenly think this). It is more of a vehicle that carries multiple files as object compressed into different storage points called layers. Along with the text of a word-processor, raster graphics and vector graphic still pictures, it also supports the imbedding of Flash animation, 3D information, and audio data information. PDF files do not encode information that is specific to the application software, hardware, or operating system used to create or view the document. The framework for the structure of objects in layers and the organization of these elements into a displayed or printed product is handled by PostScript program coding. These features ensure that a valid PDF will render exactly the same regardless of its origin or destination (but it is dependent on font availability of the receiver when fonts are not encapsulated in the file).

RESPONSIBILITY OF THE PUBLICATION AUTHOR

7-2. The author is responsible for configuring the PDF converter before saving a word-processor document as a PDF. The result of this configuration is to orient the PDF to being print-ready.

RESPONSIBILITY OF THE ARTIST

7-3. A doctrine division's artist is responsible for checking that the image configuration settings of the PDF is printer ready, and that the individual images are correctly configured in the appropriate digital color format and resolution.

RESPONSIBILITY OF THE DOCUMENT EDITOR

7-4. A doctrine division's document editor is responsible for configuring the PDF converter before saving a word-processor document as a PDF. This means examining that all text used in the file are supported by embedded fonts. The result of this configuration is to orient the PDF to being print-ready.

INSTALLATION AND CONFIGURATION OF ACROBAT™ INTO WORD™

7-5. The goal of Adobe Acrobat™ configuration is for it to be imbed it into Word™ as an application on the Word™ ribbon. To do this, Adobe has a program called Application Manager™ which needs to be installed on the computer. Application Manager™ is a bridge between different Adobe™ products, and various Microsoft Office Suite™ programs. It is a core application required for downloading, deployment, security provisioning, and to update the functionality of Adobe products. It must be installed by a help desk technician who has administrative privileges. Though Application Manager™ appears to be sitting dormant

on the desktop, it is working backstage to keep Adobe™ products and programs working together with each other, and with the computer's operating system.

7-6. Once the technician has installed Microsoft Word™, Adobe Acrobat™, and Adobe's Application Manager™, the computer user (the wordsmith) is responsible for stitching these programs together:

1) Open **Word™**
2) Click on the **File** tab of the ribbon. This opens an ***information*** splash screen.
3) Click on **Options** at the bottom of the left menu. This opens the **Word Options** (figure 7-1) dialog box.

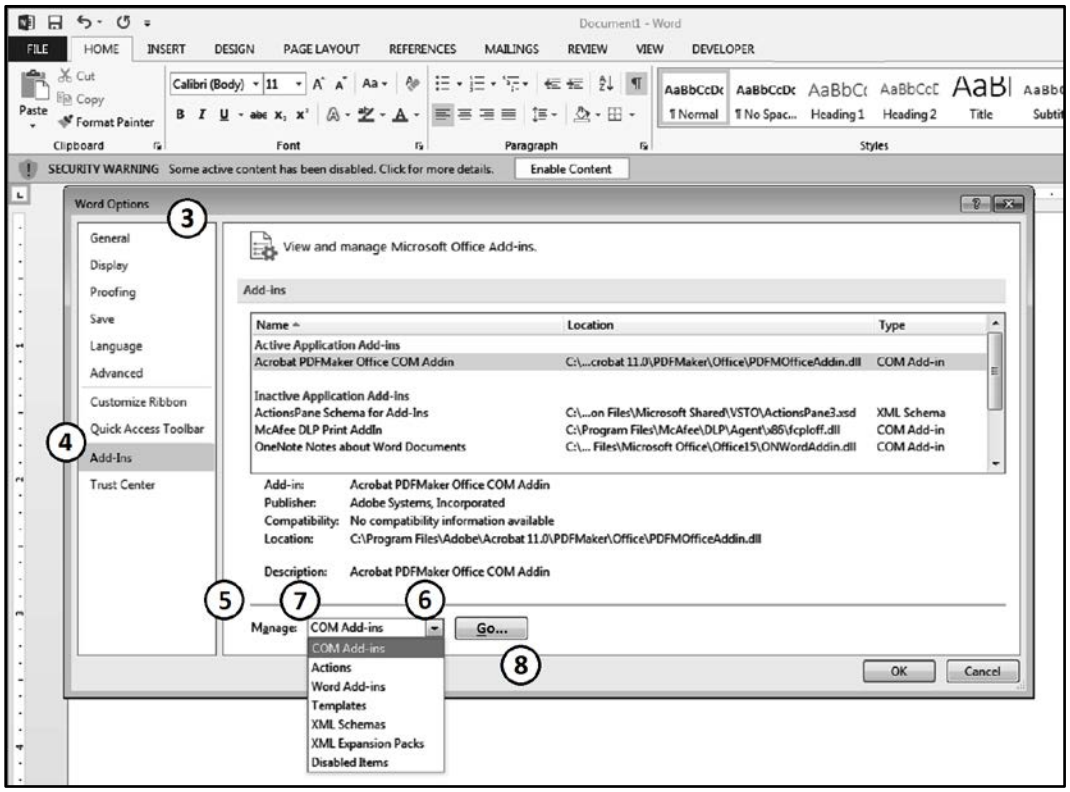

Figure 7-1. Word Options dialog box, steps 3 through 8

4) Click on **Add-ins** on the left menu. The **View and manage Microsoft Add-ins** box opens.
5) Observe if the **Manage** box-menu reads, **COM Add-ins**. If so, do step 8.
6) If not: click the down arrow on the right of the box to deploy the menu.
7) Click on **COM Add-ins**. The menu should close, and the **Manage** box should read, COM Add-ins.
8) Click the **Go…** button. This will open the **COM Add-ins** (figure 7-2) dialog box.

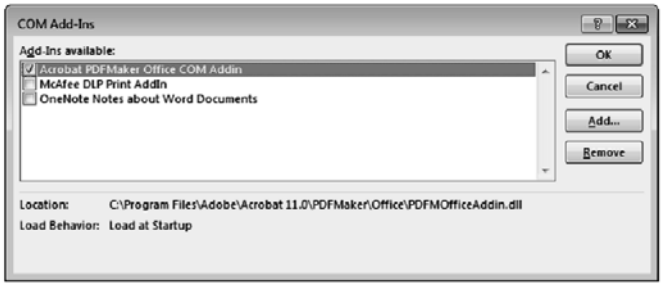

Figure 7-2. COM Add-ins dialog box, steps 8, 9, and 10

9) Check the box for **Acrobat PDFMaker Office COM Addin**.

10) Click the **OK** button.
11) At the, **SECURITY WARNING Some active content has been disabled,** shown just below the ribbon on figure 7-1. Click the **Enable Content** button. This opens a **Trusted Document** dialog box.
12) Click the **Yes** button at the **Do you want to make this a Trusted Document? [Yes] / [No]**
13) Close **Word™**
14) Restart the computer.

DIGITAL IMAGE RESOLUTION MANAGEMENT

7-7. For a PDF, Image pixel resolution only applies to image files within the PDF, not the text printed on the page. The text on the page is driven by the drivers of the printing or display device, with a ceiling constraint set by the PDF's "dots per inch" general setting. At the point of output, the PDF file queries the output device for its presentation and resolution characteristics. The file then displays its content in a way that fits the device's capabilities, before the output driver takes over file presentation. Image resolution by the PDF file is in part a byproduct of the output device, and a byproduct of the file

7-8. This is where anti-aliasing becomes an issue. Digital pixels are larger than ink printer dots. The PDF will attempt to adjust the stored digital image with the presentation resolution of the printer or display device. If configured correctly, the PDF file will attempt to smooth out lines and gradients. There are different strategies that Adobe™ Acrobat and other PDF generation software uses to upsample or downsample the information to create the final picture from the digital file. The dots per inch resolution setting in the PDF will establish a sample area within and between the pixels of the digital image. Then it performs a sampling to direct the printer or monitor driver about how to display the image. The artist is responsible for communicating with the Army Publication Directorate (APD) to find out what Advanced Setting configuration setup is needed. If the artist is a contractor, the department supervisor or contracting officer's technical representative (COTR) is responsible for providing the contract artist with the APD's PDF properties standards.

INITIAL SETUP OF ADOBE™ ACROBAT PDF

7-9. All authors and editors must verify the Acrobat settings at the time of a PDF file creation. By default, both Microsoft Office™ programs and Adobe™ Acrobat will optimize their PDFs for web viewing. These setting have to be reconfigured as shown in figure 7-3, when the document is initially created or risk having the resolution on all images inadvertently reconfigured to something below 150ppi.

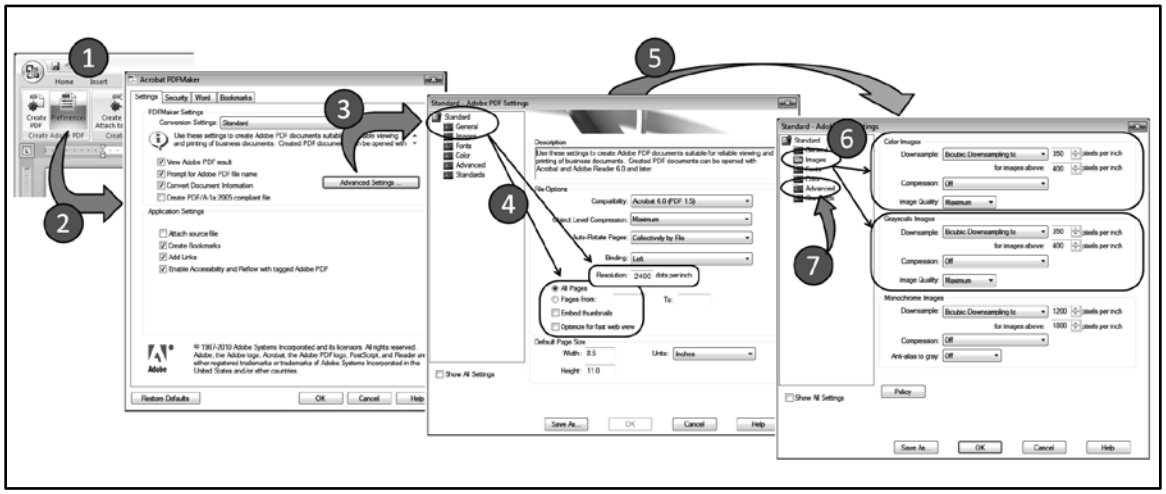

Figure 7-3. Configuration of Adobe™ Acrobat for document creation in Microsoft Word

7-10. For “General” settings, File Options” within the “Standard Adobe™ PDF Settings” dialog box:

- Set the Resolution box to ***2400*** dots per inch to accommodate modern photocopiers.
- Uncheck, “***Rely on system fonts***” to prevent text from being reimaged.
- Uncheck, “***Embedded thumbnails***” to save bit size when transmitting.
- Uncheck, “***Optimize for web***,” or “Optimize for fast web view” to preserve high resolution images.

7-11. For “Images” within the “Standard Adobe™ PDF Settings” dialog box:

7-12. Color Images:

- Bicubic Downsampling to: ***350ppi***, for images above 400ppi
- Compression: ***Off***
- Image Quality: ***Maximum***

7-13. Grayscale Images:

- Bicubic Downsampling to: ***350ppi,*** for images above 400ppi
- Compression: ***Off***
- Image Quality: ***Maximum***

7-14. Acrobat offers two compression methods: JPEG and ZIP. The JPEG setting is best for most picture images with color and grayscale. It sacrifices some image data, costing a small reduction in image quality to significantly reducing file size. The ZIP method is ideal for images with large areas of one color or repeating patterns. The ZIP method is considered lossless because it does not remove any image data. As a result, image quality is not affected through ZIP compression. However, with ZIP compression, only a minor degree of file size reduction occurs. For a doctrine document, the preferred compression setting is “***ZIP***” or “***Off***” unless specified otherwise by Army Publications Directorate.

7-15. For “Fonts” within the “Standard Adobe™ PDF Settings” dialog box: Adjustments to this setting are performed by the doctrine division’s artist or editor. The artist or editor coordinates with Army Publications Directorate about the settings policy for the embedding of fonts.

7-16. For “Color” within the “Standard Adobe™ PDF Settings” dialog box: Adjustments to this setting are performed by the doctrine division’s artist or editor. The artist coordinates with Army Publications Directorate about the settings policy for the embedding of fonts.

7-17. 7th Step: For “Advanced” settings within the “Standard Adobe™ PDF Settings” dialog box: Put a check in the following check boxes and leave the rest empty:

7-18. Options:

1) Allow ***PostScript*** file to override Adobe™ PDF settings.
2) Allow ***PostScript XObjects.***
3) Convert ***gradients*** to ***smooth shades.***
4) Convert ***smooth lines*** to ***curves***.
5) Preserve ***overprint*** settings.
6) Overprinting default is ***nonzero*** overprinting.
7) Save original JPEG images in PNG if possible.

7-19. Document Structuring Conventions (DSC):

1) Process ***DSC*** comments.
2) Preserve ***EPS*** information from DCS.
3) Preserve ***OPI*** comments.
4) Preserve ***document information*** from DSC.
5) ***Resize page and center artwork*** for EPS files.

7-20. Having the reconfiguration of the settings completed, a Word™ template (or document) is ready for export to into being a PDF. After confirming your compression settings:

1) Click ***OK*** to close the PDF Settings dialog box.

2) Click ***OK*** again to close the Properties dialog box and return to the Print menu.
3) Click ***OK*** a final time to export your document in compressed PDF format

EXTRACTING IMAGES FROM A PDF

7-21. There are instances where an image needs to be pulled from a PDF; either for reuse or examination of its quality. Images taken as snapshots from a PDF and pasted into an Office program may transfer as JPG files or as PNG files, depending on the vendor and version of PDF creation software that was originally used to make the file. These snapshots are usually transferred at a resolution used for web or low resolution computer monitors of 72dpi to 150dpi. Using the initial setup process above to check the files default settings. In particular, check that the compression setting is set to "Off" or "ZIP." The discovery of any other compression setting implies that the original resolution was lost.

7-22. By using Adobe™ Acrobat Pro (2010 or newer versions) an image can be extracted from a PDF, as demonstrated in the following steps, and shown in figure 7-4:

1) Go to the PDF file, and open it in ***Adobe™ Acrobat Pro*** (item #1). An Adobe™ Reader will not work.

NOTE: Raster images can be exported, but not vector objects.

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2) Click on, ***Tools*** (item #2) to make the selection pane appear. If the "***Document Processing***" tab (item #5) appears, go to step 5.
3) If the Document Processing tab doesn't appear, click the ***pane control*** icon (item #3).
4) Check mark ***Document Processing*** (item #4) to add this tab to the pane.
5) Click on the ***Document Processing*** tab (item #5) to open the option functions menu
6) Click on ***Export All Images*** (item #6) which opens a ***Save as*** dialog window.
7) By default, exported image files use the source filename. This can be changed, but leaving it as it is makes it easier to keep track of the source of the image files, later.
8) Choose a file format for the images under the ***Save as type*** box. PNG is the preferred format.
9) If the document has numerous little image icons that are not desired, there is the option to open settings and set it to exclude them. Otherwise, selecting ***No Limit*** will extract all images.

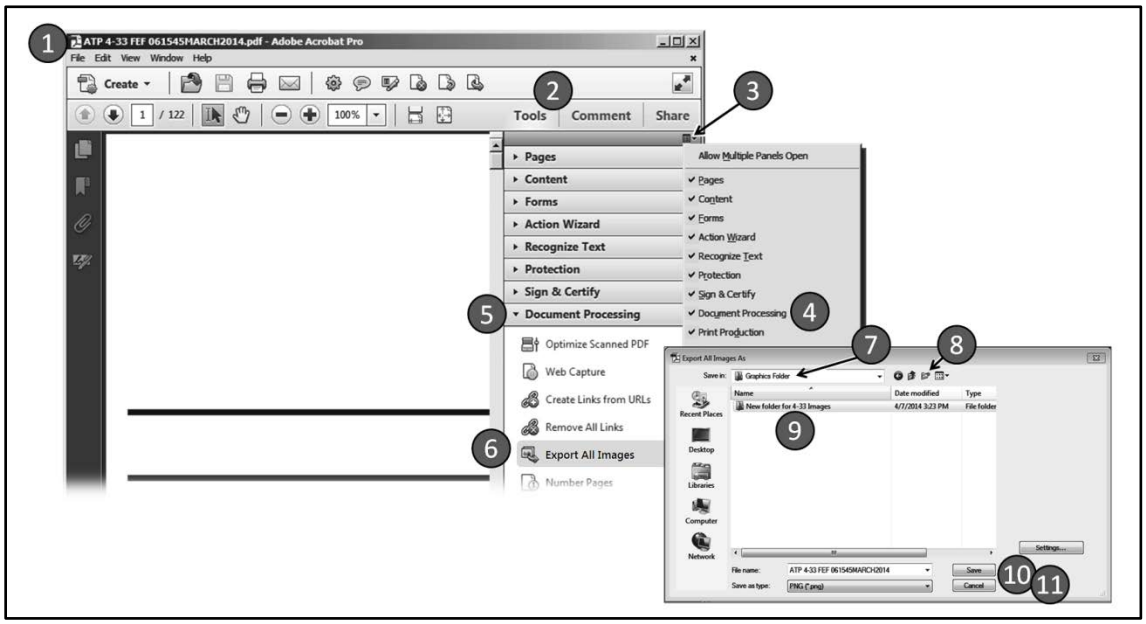

Figure 7-4. Steps for extracting images from a PDF

7-23. At the Save in dialog box, browse to the location (item #7) where the resulting image fills are to be deposited, and click the ***Open*** button at the lower right side of the window.

1) For purposes of file management, it is advisable to create a sub-folder (item #8) for depositing the resulting images into.
2) Name the folder in the ***File name*** box.
3) Click on the ***Open*** button (item #10).
4) Click on the ***Save*** button (item #11).

7-24. Next, browse to the storage folder to double check after doing a PDF export in Acrobat. Examine the images to determine the print or web quality of the image resolutions. It is possible that on exporting to PNG downsampling could have kicked in, bring an original 300ppi image down to 150ppi, or less.

Chapter 8

Archiving Graphics

> "I THINK IN PICTURES. Words are like a second language to me. I translate both spoken and written words into full-color movies, complete sound, which run like a VCR tape in my head. When somebody speaks to me, his words are instantly translated into pictures. Language-based thinkers often find this phenomenon difficult to understand, but in my job as an equipment designer for the livestock industry, visual thinking is a tremendous advantage. Visual thinking has enabled me to build entire system in my imagination."
>
> Temple Grandin
> *"Thinking in Pictures, Expanded Edition: My Life with Autism,"*
> Vintage, 26 January 2010

Military publications are living documents that evolve to stay current with changes in government law, strategic doctrine, evolving technology, and the global situation. Many manuals are revised every three to four years to stay current. It is not uncommon for military manuals to have a legacy that dates back over fifty years. Authors and artists share responsibility for maintaining an institutional memory system that supports the continuity of these living documents.

There is not a defined format for saving graphics production files. However, production files are critical for continuity. There proper organizing and archiving in a file system is subject to quality control and inspection.

GRAPHICS FILE ORGANIZATION

8-1. To begin the figure development process, authors and artists have to set up a file system to manage the development process. Any image going into a Word™ template document needs to also be saved in a file in a folder, with an individual graphics file name See figure 7 1. Such files should next be opened in Microsoft Windows Paint and inspected to confirm that their file properties and resolution conform to standards before insertion. Doing this helps avoid poor resolution quality, and the risk of corrupting the template.

8-2. At the time that authors submit drafts for their manuals for editing, must submit all graphics to the editor as separate files. Final electronic files are to not contain color images converted from PowerPoint briefing slides.

8-3. Make sure that a "Graphics" folder is inside the "Initial Draft" "Archives" folders. The proper arraignment of folders is critical for tracking work flow and for storage of data for future endeavors.

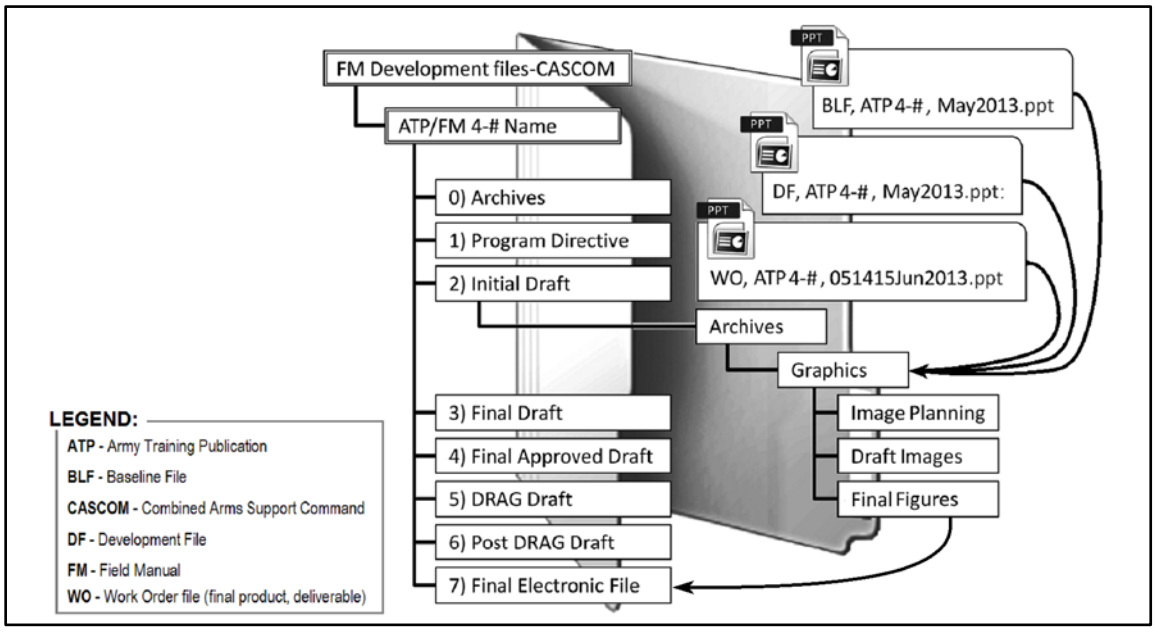

Figure 8-1. Folder Arraignment in the Development Files

IMAGE PLANNING FOLDER:

8-4. The image planning folder is the residence of three primary PowerPoint development files.

8-5. First is the "Baseline File." The author should first pull all the images out of the old .PDF version of the document, and paste them into a PowerPoint file; one picture per slide. This file is to be titled: BLF for Baseline Figures, comma space, the document number such as ATP 4 97, comma space, and then the three letter month and four number year. The BLF file is to be used only for historical reference. The CADD Editor Guide prohibits the use of an image derived directly from a .PDF from being pasted into a subsequent manual. Otherwise, doing this would result in a degradation of the picture's clarity. (I'll talk more about image clarity in a few moments.)

8-6. Second, make a copy of the BLF file and rename it "DF" for, Development File.

8-7. The most important question is whether the image represents current doctrine? If not, can it be modified to represent current doctrine? You must go through the "DF" file, slide by slide.

- Delete the slides with images that will not be kept. If in doubt, keep the image and plan to us it.
- Identify the relevant images which need to be up dated to reflect current doctrine. Then in the "Notes" box at the bottom of the PowerPoint window, you must assess the utility of this image in your book.
- Add and define any new images needed to convey the manual's objectives.

WARNING! Here is the only time writers can use an image taken from the internet or a copyright source. Let's say that an image of a new piece of equipment for is needed for a manual. It is legal for a writer to snag a reference copy of the image, and request that one of the schools which has this item photograph it ***using a flash on the camera***.

The intent is not to use somebody else's intellectual property in the published document, but to provide the photographer or artist with an example that approximates the desired finished product. The resulting original picture or photograph is then Army property. Otherwise, the reference copy is considered pirated material, if it is published publicly.

8-8. Third step is to create work orders of the images that are needed. Put all the slides going to one school in a PowerPoint file, and e mail it to the school department that has the item, and ask them to provide you with a photograph. Once the photographs are done, send all the photos and images needing rework to the division's supporting graphics artist, or the G-3 Training Support as a job order.

8-9. The image planning folder is also the location for saving all original photographs which are not fit for use in the draft or final copies of the doctrine publication. Here is where reference images are stored that are of poor quality or are impacted by intellectual property constraints.

DRAFT IMAGES FOLDER:

8-10. Often times, authors will generate their own illustrations. Draft images are usually individual elements which can be inserted into larger illustrations. An example of this might be an M88 Hercules recovery vehicle, or a M1078 standard cargo truck in a manual on vehicle recovery. Such images might be used repeatedly in several figures, and otherwise is not used as a standalone image in the publication. Or, maybe it is also a standalone image in a figure. The draft image folder is the workbench where component elements and unused illustrations are stored for later use. It is a sub folder under the greater graphics folder

8-11. The Draft Image folder can also be a place where PowerPoint™ files and other non-raster developmental files are stored.

8-12. A subfolder of backup files, "FullRez Figure Archive", should also be stored in the Draft Images folder. This folder is the place where full resolution images are stored, just in case a default downsampling program corrupts an image. Such backup images should be stored at above 1800 ppi. Then, if the image needs reworking, it helps reduce the aliasing. The file name needs three elements: the index type and number of the manual, figure number within the manual, and the date this version was completed.

READY TO POST FIGURES:

8-13. Once the author has concluded that a particular image is of sufficient quality and expresses the intended message, the image becomes a verified illustration. This image is assigned a file name that identifies its figure number and version date/time group.

8-14. Any illustration that is later determined to be unusable in the publication will be removed and stored in a draft images folder.

Glossary (Chapter Title)

SECTION I – ACRONYMS AND ABBREVIATIONS

2D	two dimensional
3D	three dimensional
ADP	Army doctrine publication
ADRP	Army doctrine reference publications
AMRDEC	Aviation and Missile Research, Development, and Engineering Center
APD	Army Publication Directorate
AR	Army regulation
ATP	Army techniques publications
ATTP	Army tactics, techniques and procedures
BSB	brigade support battalion
CADD	Combined Arms Doctrine Directorate
CMYK	cyan, magenta, yellow, and key
CRT	cathode ray tube
CSSB	combat sustainment support battalion
DA	Department of the Army
DD	Department of Defense
dpi	dots per inch
ESC	expeditionary sustainment command
FM	field manual
GWG	Ghent Workgroup
GIF	graphics interchange format
HHC	headquarters and headquarters company
JP	joint publication
JPG or JPEG	joint photographic experts group
MS	Microsoft
NCO	noncommissioned officer
Pam	pamphlet
PDF	portable document format
Ph.D	philosophiae doctor
PII	personally identifiable information
PNG	portable network graphics
ppi	pixels per linier inch
PS	post script
RAM	random access memory
RBG	red, blue, green
Reg	regulation
ROC-drill	rehearsal of concept drill
SPT	support

SWOT	strengths, weaknesses, opportunities, and threats
TB	technical bulletin
TIF	tagged image file
TM	technical manuals
TO&E	table of organization and equipment
™	trademark
TR	TRADOC Regulation
TRADOC	Training and Doctrine Command
UCMJ	uniform code of military justice
XML	extensible markup language
ZIP	TIF, PNG, GIF, or JPG

SECTION II – TERMS

abstraction

a conceptual process by which general rules and concepts are derived from the usage and classification of specific examples, literal ("real" or "concrete") signifiers, first principles, or other methods.

Abstract art

an image where extraneous elements have been removed.

aesthetic

the study of beauty and taste that are in part based on feelings of pleasure and pain related to a universal human responses to certain stimuli, and in part related to that constructed out of social mores and practices.

digital bandwidth

the amount of data that can be transmitted through an electronic medium having a limited or fixed range of carring capacity.

desktop publication

creation of documents using page layout skills on a personal computer.

doctrine

fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives. It is authoritative but requires judgment in application.

(from Latin: doctrina) is a codification of beliefs or a body of teachings or instructions, taught principles or positions, as the essence of teachings in a given branch of knowledge or belief system.

emotive

communication that is arousing or able to arouse intense feelings rather than being neutrally or objectively descriptive.

graphic art

the art or profession of visual communication using design elements (as typography and images) to convey information.

illustration

an abstraction that expresses an idea, tells an aligorical story, or is informative.

miltary symbol

Those images fomally proscribed by MIL-PRF-2525 used to depict military or civilian elements and their activity.

visual illustration

a mod of communication using pictures, graphics, and other images to express ideas.

term

Definition.

visual literacy

the ability to interpret images as well as to generate images for communicating ideas and concepts.

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