

CHAPTER 2

PUBLICATIONS

In chapter 1, you were given an overview of the maintenance system, maintenance administration, Visual Information Display System/Maintenance Action Form (VIDS/MAF), and Naval Aviation Logistics Command Information System (NALCOMIS). In this chapter, you will learn about some of the publications that you will use to perform your duties.

Good technical manuals are necessary to maintain modern weapons systems. The Navy's combat readiness depends upon the quality of these publications and the knowledge and skill of maintenance personnel using them.

Technical publications provide information and direction in your own technical language. They are prepared by the manufacturer of the specific aircraft model, engine, or equipment and by NAVAIRSYSCOM or its field activities, according to specifications issued by NAVAIRSYSCOM. The information contained in these manuals include the current, authoritative directions for material upkeep, check, test, repair, and operation. This provides for optimum product performance. All personnel responsible for the operation and maintenance of aircraft, engines, and associated equipment and systems must know how to use these publications. For more information concerning the technical manual program, refer to *Naval Air Systems Command Technical Manual Program*, NAVAIR 00-25-100, and *OPNAV Application Guide and Index for Navy Standard Technical Manual Identification Numbering System*, OPNAV N0000-00-IDX-000/TMINS.

NAVAIR TECHNICAL MANUAL PROGRAM

LEARNING OBJECTIVES: Define the purpose of technical publications. Identify the manual that outlines the management of the NAVAIR Technical Manual Program. Recognize the types, styles, and formats of NAVAIR technical publications. Recognize the systems used to identify technical manuals. Describe the means of updating technical manuals.

The primary purpose of technical publications is to help you perform your assigned maintenance tasks. If you are to maintain complex weapons systems, you must be able to get the required information from technical manuals. The Department of Defense (DOD), the Department of the Navy (DON), and the Naval Air Systems Command (NAVAIRSYSCOM) work together to maintain and improve the quality of aeronautic technical publications.

The NAVAIR 00-25-100 manual describes the NAVAIR Technical Manual Program and provides guidance on maintaining technical manuals. It covers such topics as audit/inventory, deficiency reporting, storage, establishing libraries, ordering, changes, and responsibilities for use within a command. It also covers the use of Army/Air Force publications in the NAVAIR system. All personnel in the aviation maintenance ratings use this manual to maintain and manage technical manuals.

- Q1. As a technician, if you are to maintain complex weapons systems, where must you obtain the required information?*
- Q2. What manual provides guidance on maintaining technical manuals?*

TECHNICAL PUBLICATIONS

Technical publications prepared for the NAVAIR technical publication system are presented in specific types, styles, and formats. You should be familiar with the basic types, styles, and formats, and their intended use.

Types of Technical Manuals

Technical manuals are divided into two major types, operational and maintenance. These manuals are the basic source of information for definition of operating instructions, tactical application, and the maintenance and upkeep of hardware. They are also the main support or reference for the training program.

Operational Manuals. Operational manuals contain descriptions of weapons systems with instructions for their effective use. These manuals, such as the Naval Air Training and Operating

Procedures Standardization (NATOPS), tactical manuals, and weapons loading manuals, contain descriptions of weapons systems, systems integration, operating instructions, operational applications, and safety and emergency procedures. They also contain other pertinent data exclusive of maintenance procedures.

Maintenance Manuals. Maintenance manuals contain a description of the weapons systems from the viewpoint of upkeep and repair. These manuals include information on maintenance operation, troubleshooting and testing, assembly, disassembly, repair, and supply support. Descriptions are in the form of an illustrated parts list or breakdown.

Technical Manual Styles

Technical manuals are available in two general styles, military specifications and commercial.

Military Specification Manuals. Military specification manuals are prepared for specific requirements to support defined maintenance concepts and predetermined maintenance level coverage. They are accompanied by an illustrated parts breakdown (IPB) that reflects Navy provisioning actions for spares and spare parts.

Commercial Manuals. In selected cases, commercial manuals are bought to support commercially available off-the-shelf equipment. These manuals support commercial practice techniques or specifications. The commercial manual

procurement policy permits the purchase of such manuals, provided there is no degradation in equipment operation, reliability, or support. Normally, these manuals are purchased on a onetime basis. They are not readily updated to reflect changes. NAVAIR publication numbers are assigned to these manuals to meet indexing, filing, stocking, and distribution requirements.

Technical Manual Arrangement

Technical manuals can be found in two specific format styles—the “conventional” or topic-sectionalized manual and the newer “work package” (WP) concept manual. The WP manuals are divided by functions and tasks. They are prepared to reflect distribution and destruction statements on their cover and title pages (fig. 2-1).

Conventional Manuals. The topic-sectionalized technical manual format is still being used for NAVAIR technical publications. This basic arrangement was effective and remained constant until sophisticated avionics and support equipment systems were purchased by the Navy. Principles of operation, troubleshooting, wiring diagrams, and schematic requirements were expanded in support of new design advancements. However, general organization of the data (fig. 2-1) has remained constant.

Many of the older manuals still reflect early weapons systems maintenance practices. However, as six levels of maintenance were consolidated to the

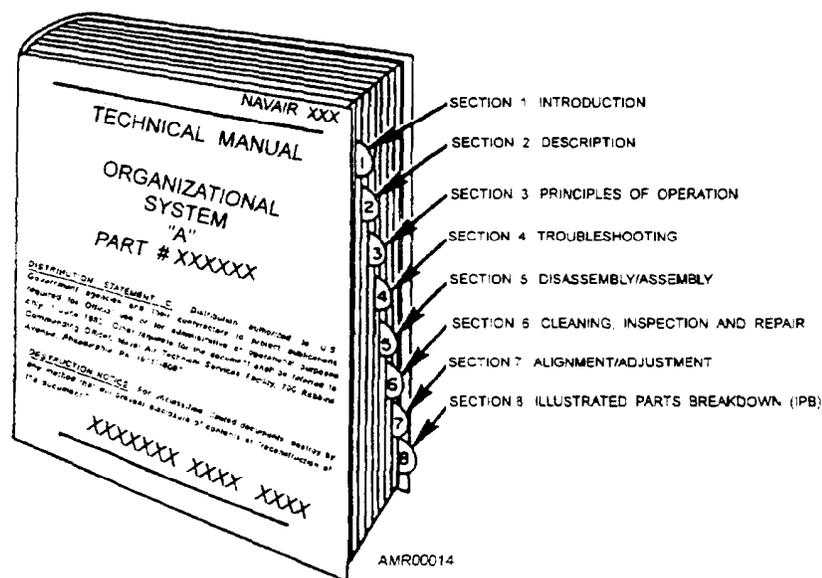


Figure 2-1.—Conventional technical manual content arrangement.

present three levels (organizational, intermediate, and depot), new maintenance techniques evolved. System testing and the use of hot benches started to disappear in favor of specialized test simulators for components and equipment. Unique fault isolation and rapid-fix techniques were developed at intermediate and depot levels. This was based on an “inspect and repair as necessary” unit concept. A reduction in maintenance costs and pipeline turnaround was the goal. Organizational flight deck/line troubleshooting remained on a system basis. The increases in installed systems and equipment complexity reduced flight-line maintenance to component-fault isolation and unit replacement. Technical manuals had to reflect these new practices to support aircraft turnaround-time limitations.

Conventional manuals have reached the limits of their expansion. This format that has served so well can no longer cope with new designs. Microminiaturization, computerization, integrated weapons systems design, and the introduction of microfilm media dictated the development and introduction of new formats and presentation methods. This resulted in the work package concept.

Work Package (WP) Technical Manual Arrangement. The complexity of weapons system design has made the technician more dependent on publications. To improve technical information, publications place emphasis on data accessibility, adequacy, accuracy, and overall documentation usability. The limited viewing range imposed by

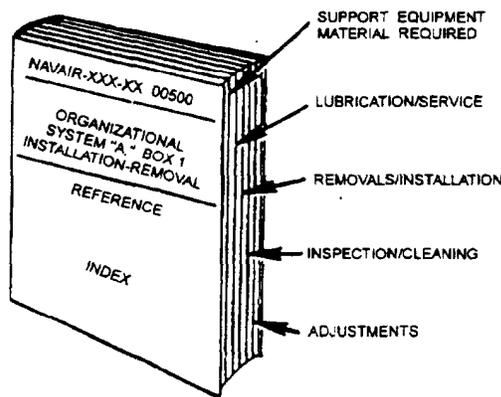
microfilmed manuals adds further demands for data presentation improvements. In addition, manuals must be compatible to both paper and film.

Investigation of publication requirements, primarily through fleet visits, confirms that usability is the key. The value of information is limited if it is difficult to use. The usability of a manual has three primary elements-visible lock-on format, logical arrangement structure, and quick understanding or comprehension.

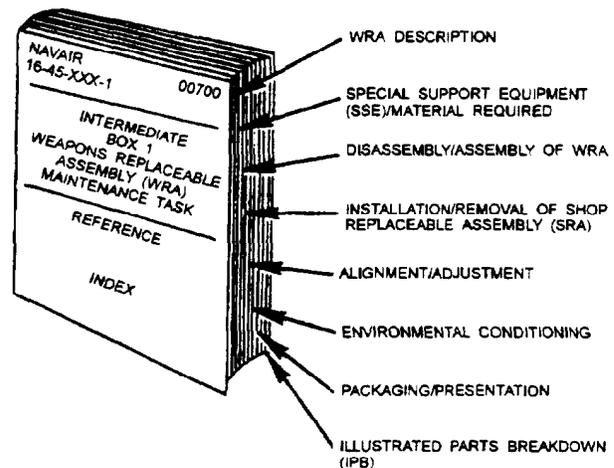
- Q3. What are the two general styles of technical manuals?
- Q4. Technical manuals are divided into how many major types and what are they?
- Q5. How are workpackage (WP) manuals divided?
- Q6. What are the three primary elements for usability in a manual?

Format Considerations. Text for microfilm emphasizes coordination between text and illustrations, line art instead of photographic art for illustration legibility, and a comprehensive index for many points of entry.

Logical Arrangement. Data is screened and consolidated to make it easier to find units of information within the manual. The units of information are arranged sequentially by functions and tasks. Each unit is also written to stand alone as an individual maintenance unit that contains all the data required for task performance. See figure 2-2.



TYPICAL ORGANIZATIONAL MAINTENANCE WORK PACKAGE



TYPICAL INTERMEDIATE MAINTENANCE WORK PACKAGE

AMR0015

Figure 2-2.—Work package (WP) arrangement data consolidation for organizational and intermediate maintenance.

Work Package Manual Arrangement. To provide quick comprehension for the user, information is broken down by major functional elements, and further subdivided by individually sequenced tasks. The division of functional elements include system/equipment description and principles of operation, testing and troubleshooting, system maintenance, wiring data/schematics and diagrams, and an IPB. Each of these elements is further broken down systematically into smaller units, depending upon the system complexity, integration, and logistic support analysis (fig. 2-3).

Work Package Technical Manual Definition. Consolidation of the criteria above results in a technical manual concept known as a "functionally assembled document." These documents are arranged in the general order of work flow and grouped into small units or work packages (WPs) covering individual tasks. The WPs are called *self-supporting units of information*, and contain all the information required for a technician to perform a specific task.

Work Package Numbering. The individual WP has a five-digit code number that appears in the upper right corner of the page. The WP number consists of two blocks of three and two digits, respectively. The first three digits identify the initial manual WPs (001

thru 999). The last two digits identify new WPs issued as changes (or revisions) that logically fit between existing WPs (fig. 2-4).

Work Package Format. Page identifiers, such as the technical manual code number, WP number,

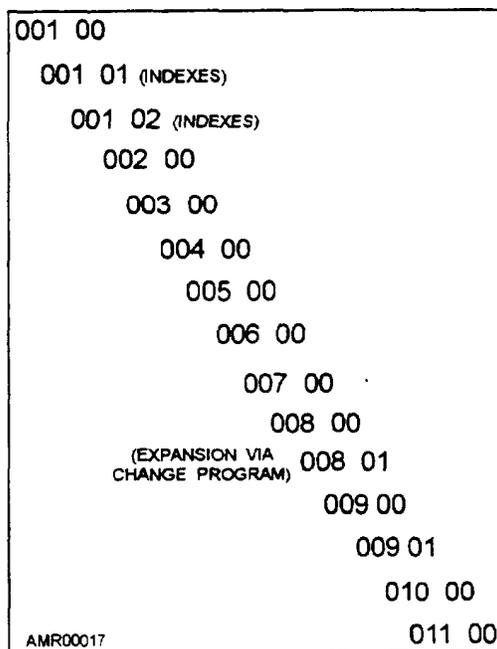


Figure 2-4.—Work package (WP) number identification.

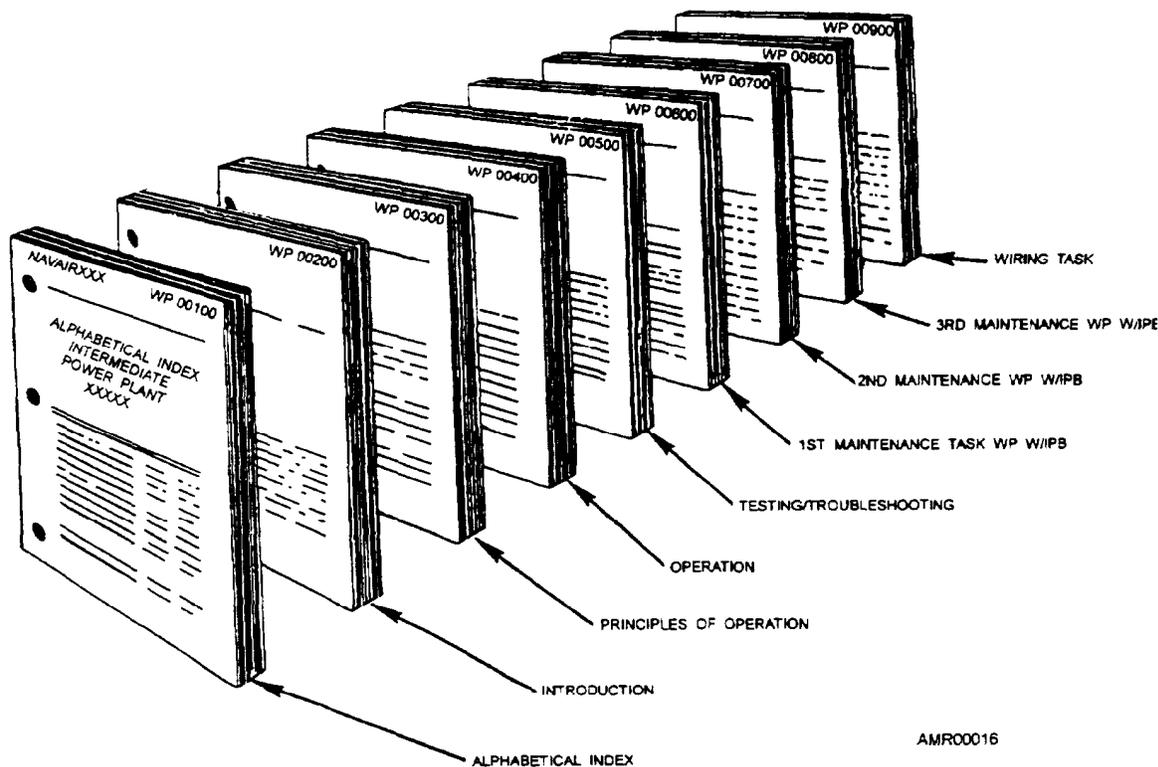


Figure 2-3.—Typical work package (WP) and manual arrangement.

change designation, and page number, are on the top left and right of the page. This is done to make the information usable and readable, particularly in the microfilm-scanning mode. Because of the ability to

print out WP units separately, each package has been developed with its own abbreviated title page (fig. 2-5). The title block identifies the function/task by title, WP number, level of maintenance, and the

<p>NAVAIR 03-75HP-5 15 December 1990</p>	<p>004 02 Page 1 of 4</p>																						
<p>DISASSEMBLY DEPOT MAINTENANCE WITH ILLUSTRATED PARTS BREAKDOWN VALVE AND ACTUATOR ASSEMBLY (WESTON/BORG-WARNER) P/N 40D980 AND 40D990</p>																							
<p>Alphabetical Index</p>																							
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black; padding: 2px;"><u>Subject</u></th> <th style="text-align: right; border-bottom: 1px solid black; padding: 2px;"><u>Page No.</u></th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">Actuator Disassembly</td> <td style="text-align: right; padding: 2px;">2</td> </tr> <tr> <td style="padding: 2px;"> Motor and Gearbox Assembly Removal</td> <td style="text-align: right; padding: 2px;">4</td> </tr> <tr> <td style="padding: 2px;"> Potentiometer Removal</td> <td style="text-align: right; padding: 2px;">2</td> </tr> <tr> <td style="padding: 2px;">Materials Required</td> <td style="text-align: right; padding: 2px;">1</td> </tr> <tr> <td style="padding: 2px;">Servo Valve and Butterfly Disassembly</td> <td style="text-align: right; padding: 2px;">1</td> </tr> <tr> <td style="padding: 2px;">Support Equipment Required</td> <td style="text-align: right; padding: 2px;">1</td> </tr> </tbody> </table>	<u>Subject</u>	<u>Page No.</u>	Actuator Disassembly	2	Motor and Gearbox Assembly Removal	4	Potentiometer Removal	2	Materials Required	1	Servo Valve and Butterfly Disassembly	1	Support Equipment Required	1	<p>1. <u>MATERIALS REQUIRED.</u></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black; padding: 2px;"><u>Specification or Part Number</u></th> <th style="text-align: left; border-bottom: 1px solid black; padding: 2px;"><u>Nomenclature</u></th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">MIL-A-46146</td> <td style="padding: 2px;">Adhesive/Sealant</td> </tr> </tbody> </table> <p>2. <u>SUPPORT EQUIPMENT REQUIRED.</u></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black; padding: 2px;"><u>Specification or Part Number</u></th> <th style="text-align: left; border-bottom: 1px solid black; padding: 2px;"><u>Nomenclature</u></th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">Commercial</td> <td style="padding: 2px;">5/32-inch Hex Key Wrench</td> </tr> </tbody> </table> <p>3. <u>SERVO VALVE AND BUTTERFLY DISASSEMBLY.</u></p> <p>4. Refer to figure 1, WP 009 02 for items in parenthesis "()" and to figure 2, WP 009 02 for items in brackets "[]".</p> <p style="text-align: center;">NOTE</p> <p style="padding-left: 20px;">Exercise care when breaking seal between mating edges of sealed joints to avoid damaging components</p>	<u>Specification or Part Number</u>	<u>Nomenclature</u>	MIL-A-46146	Adhesive/Sealant	<u>Specification or Part Number</u>	<u>Nomenclature</u>	Commercial	5/32-inch Hex Key Wrench
<u>Subject</u>	<u>Page No.</u>																						
Actuator Disassembly	2																						
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<u>Specification or Part Number</u>	<u>Nomenclature</u>																						
Commercial	5/32-inch Hex Key Wrench																						
<p>a. Remove three screws (1) and separate actuator (2) from valve body (41){50}.</p> <div style="text-align: center; margin: 10px 0;">  </div> <p>Methyl Ethyl Ketone TT-M-261</p> <p style="text-align: right;">1</p> <p>b. Use MEK to remove epoxy on two screws (3){8}. Remove two screws (3){8} and remove bearing mount assembly (4 through 11){3 through 11}.</p> <p>c. Remove locking (4){3}, washers (5 and 6){4 and 5}, pinion gear (10){11}, two washers (9){10} and washer (11){9}.</p> <p>d. Do not remove bearing (7){6} unless required after inspection. If required, remove needle bearing (7){6} as described by NAVAIR 01-1A-503.</p> <p>e. Remove lockring (12){12}.</p>	<p style="text-align: right;">AMR00018</p>																						

Figure 2-5.—Typical work package title page.

applicable aircraft or equipment serial number effected. Also, reference material that applies to the package is listed here. The title page also has a small index that outlines the WP coverage and an applicable technical directive listing. A listing of support equipment and material required to perform the task is in the front of the text. This information will give you an idea of the task before you begin the work. A typical WP title page is shown in figure 2-5.

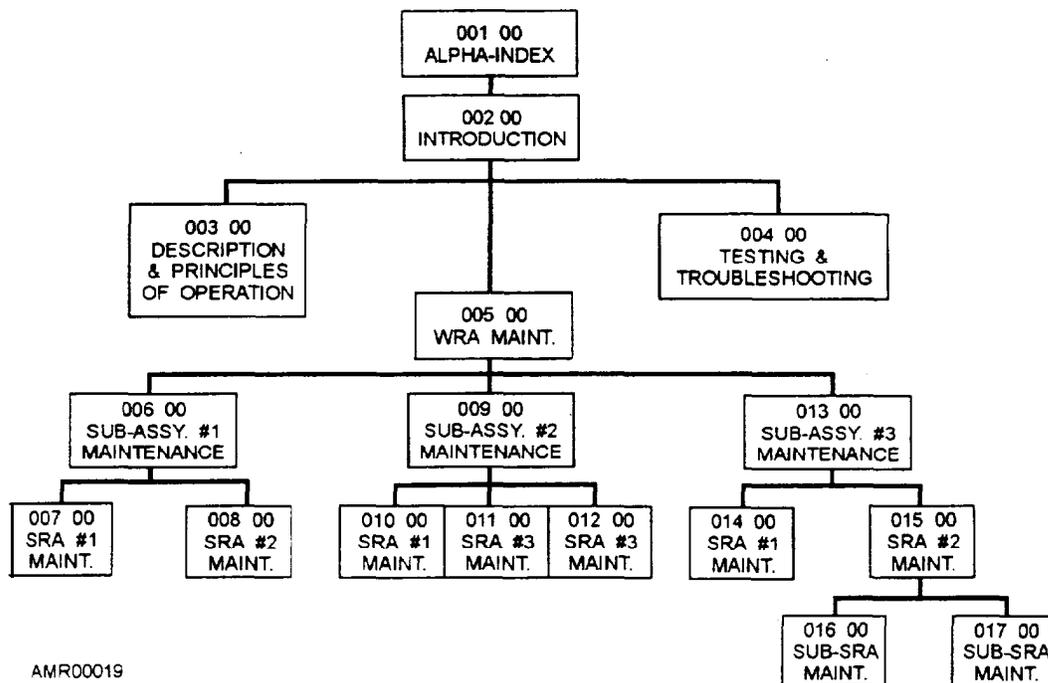
Content Format. Content format depends on the specific task to be performed, the authorized depth of information required and the sequence of performance. Work packaging provides the flexibility to arrange content to meet system or component design criteria, construction, and selected repair. Work packaging is tailored to fit the specific maintenance demands of the unit under repair.

Organizational data is system oriented. Organizational system maintenance covers installation, removal, alignment, and adjustment in task order. Descriptive information and principles of operation data are in the order of operational signal flow or mechanical operating sequence by component. Testing and troubleshooting are organized by functional block logic and by action sequence with consideration given to mode selection and failure

probability. Where possible, specific points of entry to the text are identified to preclude the necessity of running a complete end-to-end test after each corrective action. IPBs are in a format that is compatible with the other volumes by system and WP alignment.

Intermediate- and depot-level manuals are based on component rather than system breakdown. Most intermediate- and depot-level WPs are organized in a pyramid fashion based on standard top-down breakdown of the component, as shown in figure 2-6. Where the volume of data permits, end item description, principles of operation, and troubleshooting appear as a series of introductory WPs preceding the maintenance data. The first WP would then cover the removal/installation and IPB of components from/on the end item. Tasks then follow through the disassembly/assembly of the removed components. The type of information contained in each WP is shown in figure 2-7. Note that parts replacement IPB data is in the intermediate/depot WP. This data provides maximum information in support of the total package concept.

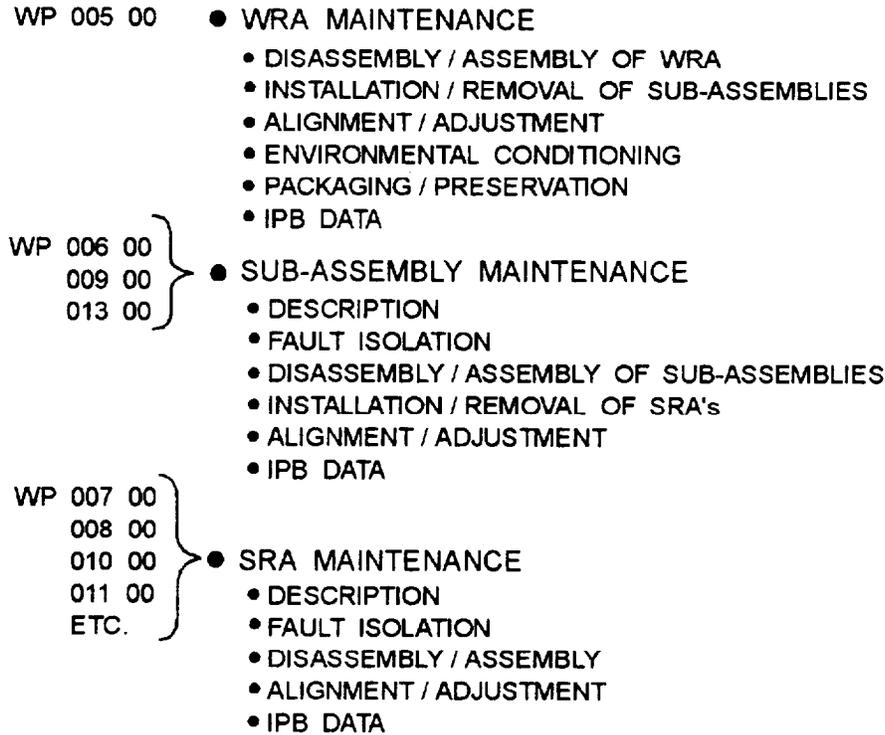
WORK PACKAGE BREAKDOWN- INTERMEDIATE / DEPOT



AMR00019

Figure 2-6.—Typical intermediate/depot technical manual assembly.

WORK PACKAGE BREAKDOWN- INTERMEDIATE / DEPOT



AMR00020

Figure 2-7.—Typical work package task information.

TECHNICAL PUBLICATION UPDATE METHODS

The usefulness of technical manuals directly relates to how effectively the information reflects the system or equipment configuration and the depth and scope of maintenance data. Changes to equipment occur to improve either mission or maintenance capabilities. Technical manuals must reflect these changes. Technical manuals are updated by two methods—changes and revisions.

A change to a technical manual is the official release of new or correction pages to a part or portion of an existing document. It consists of replacement change pages for the area of the manual affected by the change action. Upon issue, the recipient removes the superseded pages and inserts the new pages. This action is required for paper manuals only.

A revision is the complete reissue of a replacement manual the change information incorporated. A revision normally takes place when more than 60 percent of the pages are affected by a single change or

accumulated changes. A WP consisting of 10 pages or less will always be revised.

Types of Publication Changes

Changes are authorized and issued on an “as required” basis to periodically update equipment configuration, maintenance concepts, or procedural direction. Changes are also initiated to correct user-detected errors, improve verbiage, or incorporate a “better way.” These types of changes usually result from fleet input through the Technical Publication Deficiency Report (TPDR) System (explained later in this chapter). Changes are issued as either routine or rapid action changes (RACs).

A routine change is issued through normal update processes, and is released periodically.

A rapid action change is an expedited change action. It is programmed for short turnaround and release because of possible relationship to safety, equipment damage, or danger to personnel.

Changes to Conventional Manuals

The Naval Air Technical Services Facility (NAVAIRTECHSERVFAC) determines when there is a requirement to change a manual and authorizes that the change be made. Information gathered is combined to correct or update pages affected by the change requirement. A change to the "A" page

(Numerical Index of Effective Pages) is prepared to identify all pages that have been changed. See figure 2-8. The "A" page helps the user insert new pages and maintain a record of current pages.

When a change is issued, existing page numbers, paragraph numbers, figure numbers, and table numbers are not changed. Supplemental numbers are assigned to new pages, paragraphs, figures, and tables.

A1-H60FB-110-400		Page A		
RAC 1 - 4 December 1992				
<u>NUMERICAL INDEX OF EFFECTIVE PAGES/FIGURES</u>				
List of Current Changes				
Original	0	6 December 1990	Change 4	6 December 1991
Change	1	31 May 1991	Change 5	31 May 1992
Change	2	1 October 1991	Change 6	1 June 1992
Change	3	4 October 1991	RAC 1	4 December 1992

Only those pages/figures assigned to the manual are listed. If the numerical sequence is broken in the list, the missing page/figure numbers have not been assigned to this manual. Insert RAC 1 pages/figures, dated 4 December 1992. Dispose of superseded pages/figures. The portion of text and tabular listings affected is indicated by a change bar or the change symbol R in the outer margin of text pages and tabular data. Total number of pages in this manual is 998 consisting of the following:

<u>Figure Number</u>	<u>Page Number</u>	<u>Title</u>	<u>Change Number</u>
	Title		RAC 1
	Page A	Numerical Index of Effective Pages/Figures	RAC 1
	Page B	Numerical Index of Effective Pages/Figures	RAC 1
	Page C	Numerical Index of Effective Pages/Figures	RAC 1
	Page D	Numerical Index of Effective Pages/Figures	RAC 1
	Page E	Numerical Index of Effective Pages/Figures	RAC 1
	Page F	Numerical Index of Effective Pages/Figures	RAC 1
	Page G	Numerical Index of Effective Pages/Figures	RAC 1
	Page H	Numerical Index of Effective Pages/Figures	RAC 1
	Page J	Numerical Index of Effective Pages/Figures	RAC 1
	Page K	Numerical Index of Effective Pages/Figures	RAC 1
	Page L	Numerical Index of Effective Pages/Figures	RAC 1
	TPDR-1	List of Technical Publications Deficiency Reports Incorporated	RAC 1
	INDEX-1	Alphabetical Index	1
	INDEX-2	Alphabetical Index	6
	INDEX-3	Alphabetical Index	0
	INDEX-4	Alphabetical Index	6
	INDEX-5	Alphabetical Index	RAC 1
	INDEX-6	Alphabetical Index	6
	INDEX-7	Alphabetical Index	RAC 1
	INDEX-8	Alphabetical Index	6
	INDEX-9	Alphabetical Index	RAC 1
	INDEX-10	Alphabetical Index	6
	INDEX-11	Alphabetical Index	0
	INDEX-12	Alphabetical Index	RAC 1
	INDEX-13	Alphabetical Index	1
	INDEX-14	Alphabetical Index	RAC 1
	INDEX-15		
	INDEX-22	Alphabetical Index	6
	INDEX-23	Alphabetical Index	RAC 1
	INTRO-1	Introduction	4
	INTRO-2		
	INTRO-3	Introduction	6

AMR00021

Figure 2-8.—Numerical Index of Effective Pages/Figures.

Therefore, except when a number is added at the end of a sequence (in which case the next consecutive number is used), paragraphs, illustrations, tables, and pages are numbered by adding an alphabetical suffix. The same method is used for added pages, except that these pages are not added between a right-hand (odd numbered) and a left-hand (even numbered) page. When new material is added to a right-hand page, any overrun is carried to the left-hand page. Any overrun from this is placed on an added page. Therefore, added pages are always assigned even numbers, such as 2A, 2B, 4A, or 4B.

Each page with changed or added material bears the word "change..." placed at the bottom of the page (fig. 2-9). For foldout pages, the change number is placed in the lower, outer corner of the page beneath

the figure title. This change number requirement applies to all added pages, including those placed at the end of a manual.

Change Symbology. Usually, text and table changes, including new material on added pages, are identified by a vertical line or change symbol in the margin. This line or symbol extends the entire length of the affected material. The line is placed on the outer margin for double-columned material, and in the margin opposite the binding edge for single-columned material (fig. 2-10). There is one exception. Pages with emergency markings (black diagonal lines around three edges) may have the vertical line or change symbols along the inner margins.

When a page is changed, previous change symbols on a page are deleted. Symbols show current changes

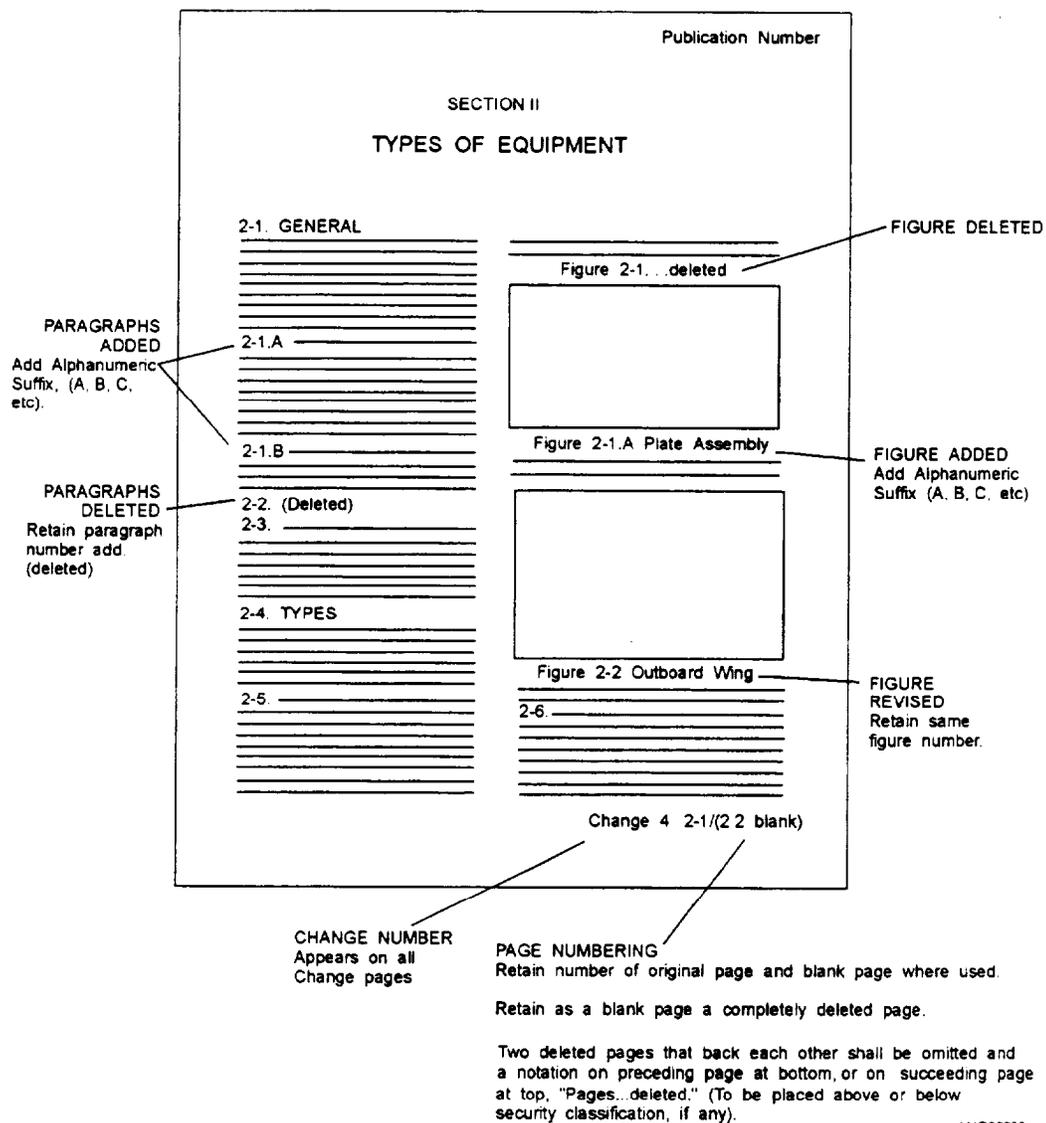


Figure 2-9.—Supplement format, conventional manual (paragraph illustration and page numbering).

only. Change symbols, such as a number sign (#), plus mark (+), black circle, black square, and the letters C, R, or X are explained in the introductory portion of the manual. Change symbols are not used for the following:

- Introductory material
- Indexes and tabular data where the change cannot be identified
- Blank space resulting from the deletion of text, an illustration, part of an illustration or a table
- Correction of minor inaccuracies, such as spelling, punctuation, relocation of material, renumbering of paragraphs, etc., unless such correction changes the meaning of instructive information or procedures
- Replacement or addition of a complete part, chapter, or section

Changes to illustrations, line drawings, and photographs are normally identified by a miniature pointing hand. This hand points to the general area of change information, as shown in figure 2-11. Changes confined to the same general area are indicated only once on the illustration. A vertical line next to changed material may be used on a chart or graph. In the

illustrated parts breakdown of technical manuals, the illustrations have no change symbols.

Shading and screening are used for diagrams and schematics to highlight the areas containing the changed information. Shading is put in the direct area of the change. Extensively changed information may be indicated by a screen border around the affected area (fig. 2-12). For microfilm, however, no screening is used.

Difference Data Sheets. Difference data sheets (fig. 2-13) allow data to be added to or changed without making a direct impact on the existing information. These sheets reflect minor changes in the basic design. A separate sheet is prepared and issued for each additional configuration or model covered.

The format of difference data sheets is as follows:

- Sheets are identified by the title DIFFERENCE DATA SHEET centered at the top of each page.
- The first page of each sheet (for a specific model) has a heading in uppercase type, which consists of the nomenclature and the model, type, or part number of the item covered. The heading is followed by a statement to this effect: THE INSTRUCTIONS CONTAINED IN THE PRECEDING SECTIONS OF THIS

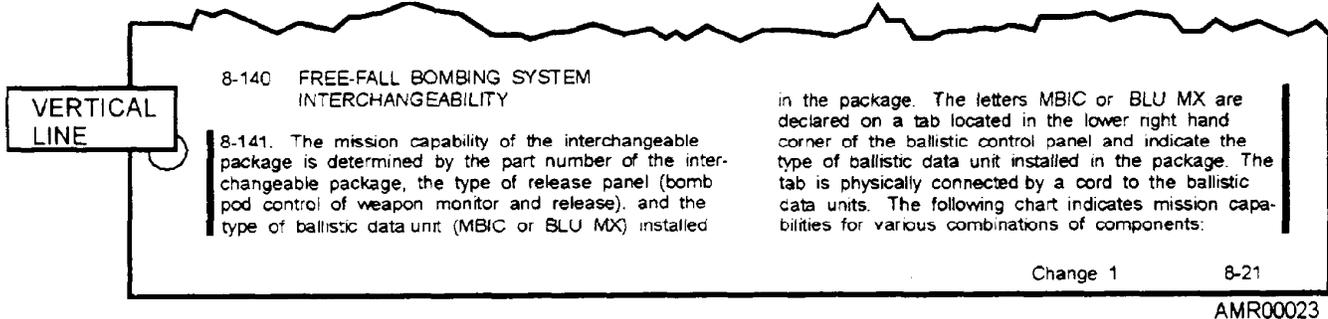


Figure 2-10.—Change symbol, vertical line.

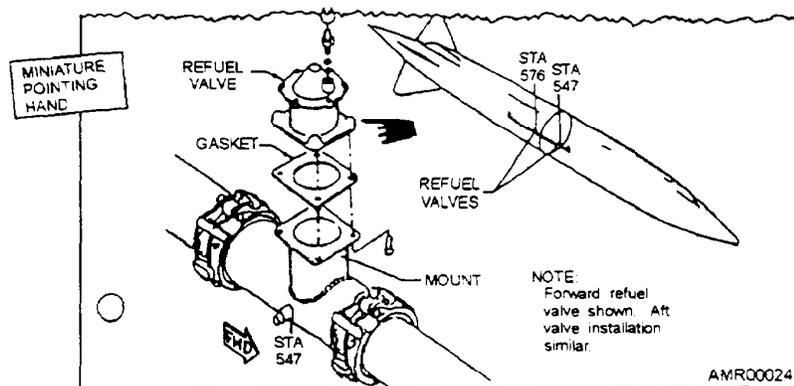


Figure 2-11.—Change symbol, miniature pointing hand.

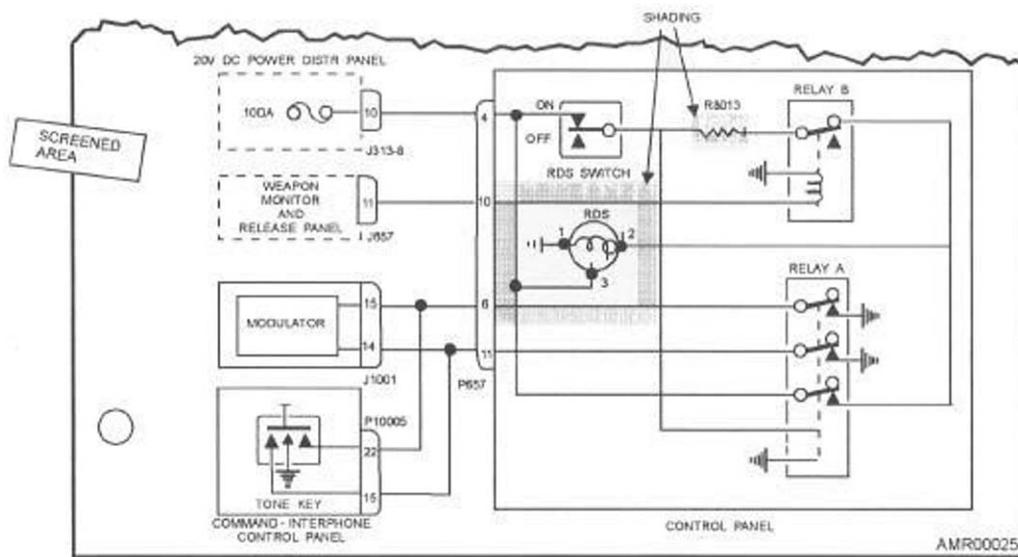


Figure 2-12.—Change symbol showing shaded area and screening.

DIFFERENCE DATA SHEET	
FUEL PUMP	MODEL 4X-2
THE INSTRUCTIONS CONTAINED IN THE PRECEDING CHAPTERS OF THIS TECHNICAL MANUAL ARE APPLICABLE TO THIS MODEL EXCEPT FOR THE DIFFERENCE CITED IN THIS DIFFERENCE DATA SHEET	
<p>1. INTRODUCTION AND GENERAL INFORMATION. Same as Model 4X-1, except the maximum output capacity is increased to 4.8 cubic feet per minute and the output pressure adjustment is increased to 22 pounds per square inch.</p> <p>2. SPECIAL TOOLS AND TEST EQUIPMENT. Same as for Model 4X-1, except seat replacing tool, Part No. 249Y is not required.</p> <p>3. PREPARATION FOR USE AND SHIPMENT. Same as Model 4X-1.</p> <p>4. OPERATION INSTRUCTIONS. Same as Model 4X-1.</p> <p>5. MAINTENANCE Model 4X-2 is equipped with a replaceable nylon seat in the by-pass valve (7, figure 5-2).</p>	<p>Inspection of the seat is the same as for Model 4X-1; however, if it is unserviceable, the nylon seat will be replaced rather than refaced. To remove the seat, use a 3/8 inch allen wrench and unscrew counter-clockwise. To install a new seat, apply a light film of lubricating oil to the threads and torque to 20 inch pounds.</p> <p>Test the same as Model 4X-1, except the output pressure shall be set at 22 pounds per square inch and the measured fuel flow must be between 4.3 and 4.8 cubic feet per minute.</p> <p>6. DIAGRAMS. Not applicable.</p> <p>7. ILLUSTRATED PARTS BREAKDOWN. Seat, Part No. 45462, is used in lieu of Part No. 28431 (9, Figure 7-1).</p>
AMR00026	

Figure 2-13.—Difference data sheet format.

TECHNICAL MANUAL ARE APPLICABLE TO THIS MODEL EXCEPT FOR THE DIFFERENCE CITED IN THIS DIFFERENCE DATA SHEET. (Refer to figure 2- 13.)

- Sheets for each model start on a right-hand page. Page numbers, figure numbers, and table numbers run consecutively throughout the section. Sheets are added as required. Paragraphs need not be numbered. If

numbering is used, single Arabic numerals beginning with "1" for each added model may be used.

Changes to Work Package (WP) Manuals

Manuals prepared in the WP format are compatible to microfilm and paper media. The selection of the approach used for a change is determined by the reproduction media (film, or paper).

A change action to an individual WP normally relates only to manuals in paper media format. A change to a WP manual could consist of both changed and revised WPs as well as the addition or deletion of WPs. The numerical index of effective WPs (fig. 2- 14) accounts for all changed, revised, added, or deleted work

packages affected by the change as well as previous changes to the manual.

Paragraphs, illustrations, tables, pages, and index numbering (on illustrations) added between existing items are assigned the preceding number plus

A1-F18AE-WPM-000				Page A			
Change 2 - 1 March 1							
NUMERICAL INDEX OF EFFECTIVE WORK PACKAGES/PAGES							
List of Current Changes							
Original	..... 0	..... 1 Mar 93	Change	..... 2	..... 1 Mar 94		
Change	..... 1	..... 1 Sep 93					
<p>Only those work packages/pages assigned to the manual are listed in this index. Insert Change 2, dated 1 March 1994. Dispose of superseded work packages/pages. Superseded classified work packages/pages shall be destroyed in accordance with applicable security regulations. If changed pages are issued to a work package, insert the changed pages in the applicable work package. The portion of text affected in a change or revision is indicated by change bars or the change symbol "R" in the outer margin of each column of text. Changes to illustrations are indicated by pointing hands, change bars, or MAJOR CHANGE symbols. Changes to diagrams may be indicated by shaded borders.</p>							
Total number of pages in this manual is 714 consisting of the following"							
WP/Page Number	Change Number	WP/Page Number	Change Number	WP/Page Number	Change Number	WP/Page Number	Change Number
Title	..... 2	15	..... 2	50	..... 2	85	..... 2
A	..... 2	16	..... 2	51	..... 2	86	..... 2
B	..... 2	17	..... 2	52	..... 2	87	..... 2
C	..... 2	18	..... 2	53	..... 2	88	..... 2
D	..... 2	19	..... 2	54	..... 2	89	..... 2
E blank	..... 2	20	..... 2	55	..... 2	90	..... 2
TPDR-1	..... 2	21	..... 2	56	..... 2	91	..... 2
TPDR-2 blank	..... 2	22	..... 2	57	..... 2	92	..... 2
001 00		23	..... 2	58	..... 2	93	..... 2
1	..... 2	24	..... 2	59	..... 2	94	..... 2
2	..... 2	25	..... 2	60	..... 2	95	..... 2
3	..... 2	26	..... 2	61	..... 2	96	..... 2
4	..... 2	27	..... 2	62	..... 2	001 03	
5	..... 2	28	..... 2	63	..... 2	1	..... 1
6	..... 2	29	..... 2	64	..... 2	2	..... 1
001 01		30	..... 2	65	..... 2	3	..... 1
1	..... 2	31	..... 2	66	..... 2	4	..... 1
2	..... 2	32	..... 2	67	..... 2	5	..... 1
3	..... 2	33	..... 2	68	..... 2	6	..... 1
4 blank	..... 2	34	..... 2	69	..... 2	7	..... 1
001 02		35	..... 2	70	..... 2	8	..... 1
1	..... 2	36	..... 2	71	..... 2	9	..... 1
2	..... 2	37	..... 2	72	..... 2	10	..... 1
3	..... 2	38	..... 2	73	..... 2	11	..... 1
4	..... 2	39	..... 2	74	..... 2	12	..... 1
5	..... 2	40	..... 2	75	..... 2	13	..... 1
6	..... 2	41	..... 2	76	..... 2	14	..... 1
7	..... 2	42	..... 2	77	..... 2	15	..... 1
8	..... 2	43	..... 2	78	..... 2	16	..... 1
9	..... 2	44	..... 2	79	..... 2	17	..... 1
10	..... 2	45	..... 2	80	..... 2	18	..... 1
11	..... 2	46	..... 2	81	..... 2	18	..... 1
12	..... 2	47	..... 2	82	..... 2	19	..... 1
13	..... 2	48	..... 2	83	..... 2	20 blank	..... 1
14	..... 2	49	..... 2	84	..... 2	002 00	

AMR00027

Figure 2-14.—Numerical index of effective work packages.

consecutive capital letter suffixes; for example, 1A and 1B would be assigned to items added between 1 and 2 (fig. 2- 15).

The text and tabular data affected by the change to a WP manual is indicated by the letter *R* or a change bar in the left margin for material changed in the left column, and in the right margin for material changed in the right column. (Refer to figure 2-10.) Change symbols for illustrations are as follows:

- IPB illustrations do not require change symbols.
- On line drawings (other than diagrams), a miniature pointing hand highlights the area containing the changed information (fig. 2-11). When several changes are made at once in the same area of an illustration, a change bar may be used to indicate the general area. A vertical line next to the changed text and callouts on illustrations is used instead of a pointing hand. A change bar also may be used next to changed

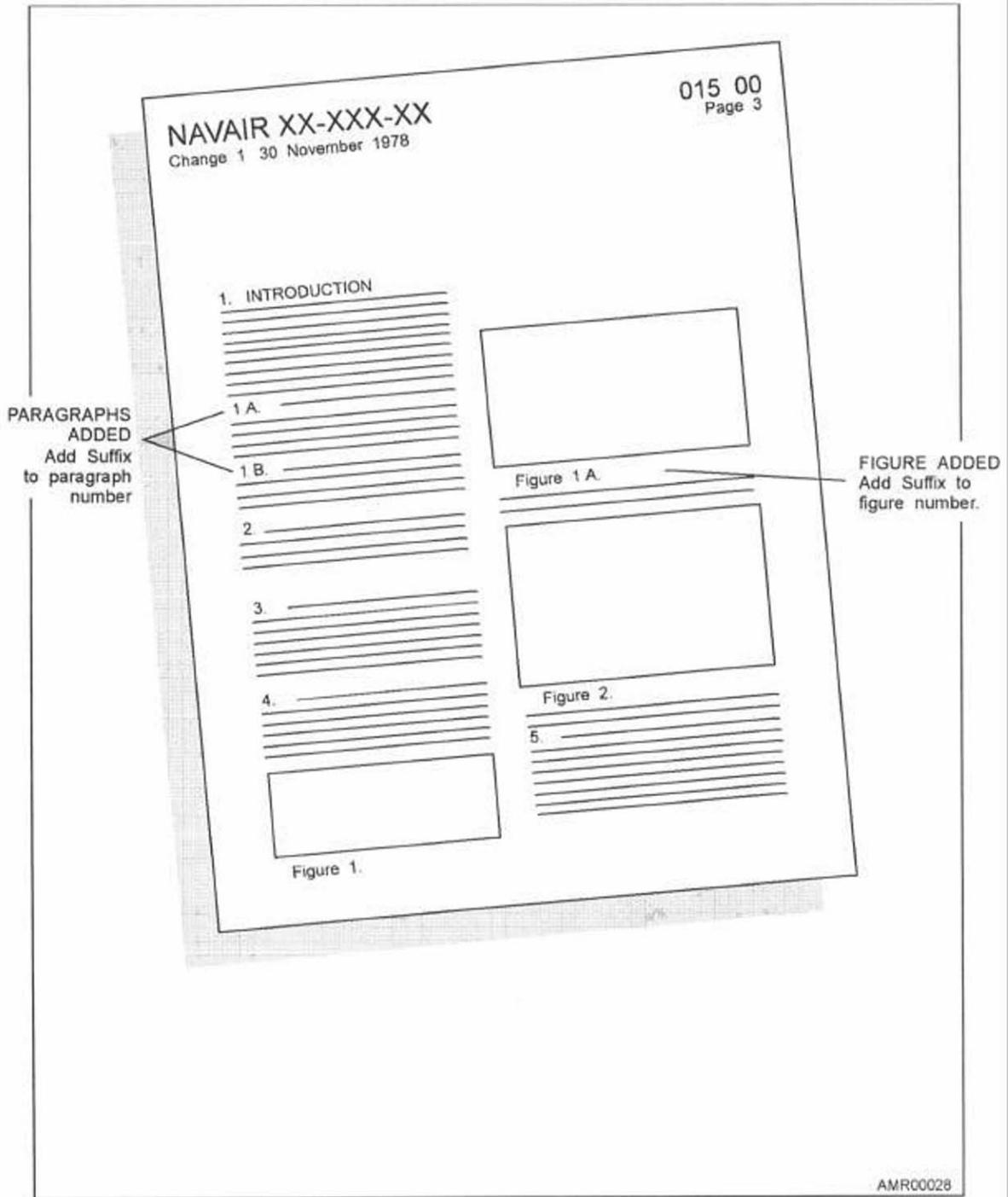


Figure 2-15.—Supplemental format, work package manual (paragraph and illustration numbering).

material on a graph. When an illustration is extensively changed, a change bar is placed across the top of the reproduction area (full page illustrations), or in the left or right margin, as applicable (partial page illustrations).

- On diagrams, bordering or pointing hands indicate the area containing the changed or added information (fig. 2-11). Extensively changed or added areas are indicated by a change bar around the affected presentation. or change bar across the top of the affected image area.

Rapid Action Changes (RACs)

The function of the RAC is to expedite the dissemination of urgent operation and maintenance change information. RACs are applicable to all In-Production and Out-of-Production NAVAIR weapons system maintenance instruction manuals, related component equipment manuals, maintenance requirements cards, illustrated parts breakdowns, support equipment, weapons handling and loading manuals, calibration manuals, and other related procedural manuals.

For more in-depth information, message format and incorporation procedures for RACs, refer to NAVAIR 00-25-100.

- Q7. *In a work package type manual, what is the information that appears in the upper right corner of each page?*
- Q8. *What is the difference between a change and a revision of a technical manual?*
- Q9. *What reporting system allows fleet input to technical manual changes?*
- Q10. *What are the two types of publication changes?*
- Q11. *What is the purpose of the "A" page in a manual?*
- Q12. *Difference data sheets are used for what purpose?*
- Q13. *In a WP manual, where can you find information for all changed revised, added or deleted work packages?*
- Q14. *How are illustrations and tables added between existing items and how are they numbered?*
- Q15. *What is the function of the Rapid Action Change (RAC)?*

TECHNICAL MANUAL NUMBERING SYSTEM

LEARNING OBJECTIVE: Identify the categories used in numbering technical manuals.

The numerical and alphabetical combination used for a NAVAIR technical manual number identifies the basic equipment category, main groups within the category, specific item of equipment, type of usage, type or model designation, and specific type of manual.

There are two numbering systems presently in use by NAVAIR: the older NAVAIR publication numbering system and the newer Technical Manual Identification Numbering System (TMINS). You must be able to use both numbering systems.

NAVAIR Publication Numbering System

The NAVAIR manual publication number consists of a prefix (NAVAIR or NA for NAVAIRSYSCOM) that designates the command responsible for developing or maintaining the manual. The manual number is divided into three parts, separated by a dash (-). Additional numbers may be added to show multiple volumes of a manual. The three parts that make up the NAVAIR manual number are discussed in the following paragraphs.

Part I of the publication number is the category. Normally it is a two-digit number (in some cases two digits and a letter). It designates the major category of the manual; for example, 00 tells you that this is a general manual; 01 is for airframes, 02 is for power plants. Refer to NAVAIR 00-25-100 for a complete breakdown of publication numbering categories.

Part II of the publication number is made up of numbers or numbers and letters. They identify either a basic aircraft model, the manufacturer, or the specific class, group, or subcategory of the manual. For example, in figure 2-16, the number F14AAA in view A identifies the aircraft model. In view D, 75PAC identifies Lockheed as the manufacturer of the P-3C airframe.

Part III of the publication number usually identifies a particular type of manual. For example, -1 identifies the NATOPS flight manual, -2 the maintenance instruction manual, -3 the structural repair manual, and -4 the illustrated parts breakdown.

Additional numbers may be added to show system grouping breakout by volume or subsystem grouping by subvolume. For example, in the number -2-2, the second -2 indicates the second volume of a maintenance manual. In the number -2-2.1, the .1 indicates a subvolume within the grouping.

Figure 2-16 shows examples of technical manual number assignments.

Technical Manual Identification Numbering System (TMINS)

The TMINS numbering system is part of the effort to standardize technical manual numbers for all ships, aircraft, and equipment. *Navy Standard Technical Manual Identification Numbering System*, NAVAIRINST 4160.1, establishes the TMINS for aeronautic publications. The TMINS provides a single

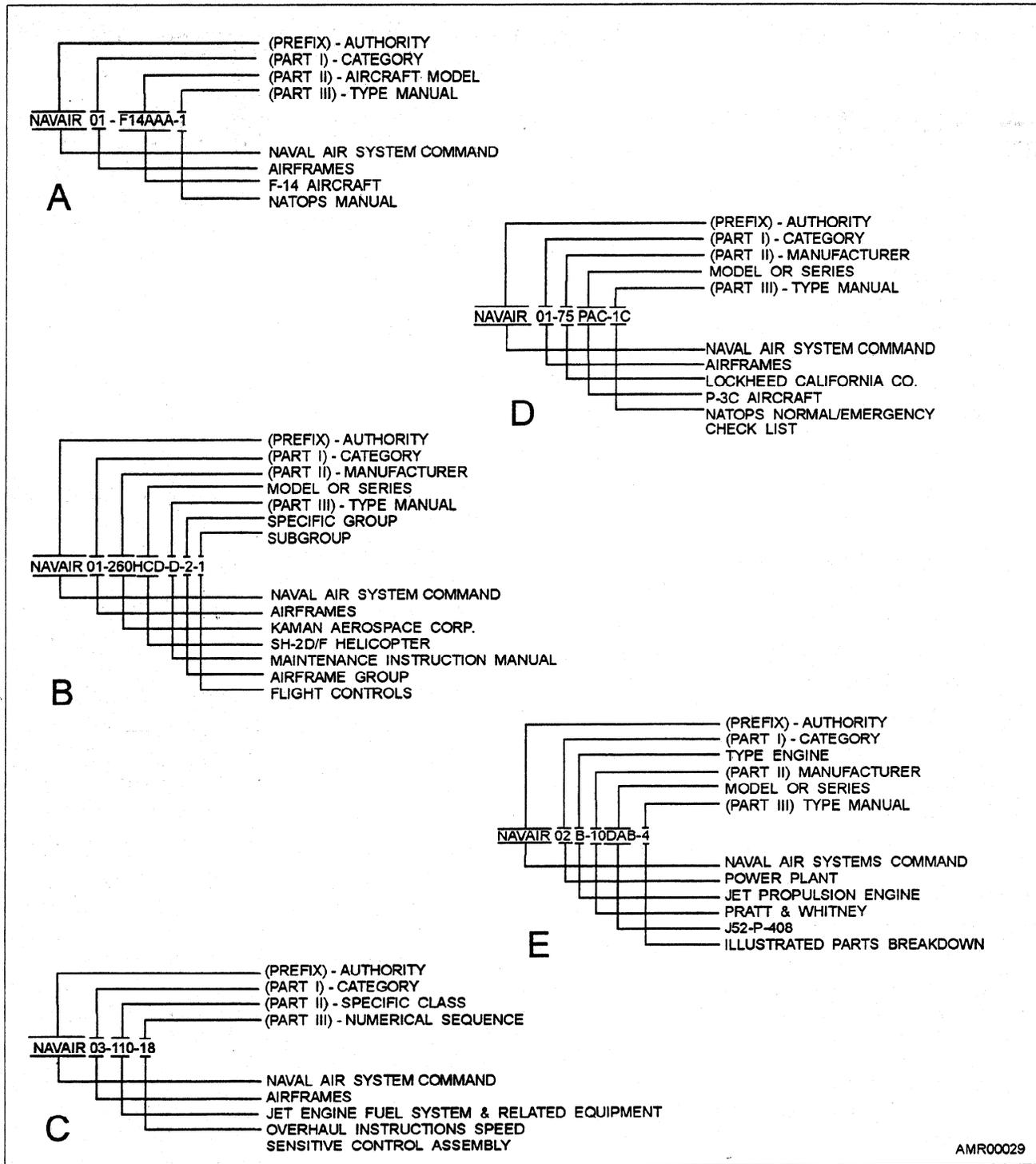


Figure 2-16.—Specific examples of technical manual number assignments.

user-oriented numbering and indexing system. It meets the requirements of all systems commands for identifying, referencing, and requisitioning technical manuals and changes. The system also makes it easier to identify and order manuals for the operating forces and other users. It is compatible with automatic data processing (ADP) procedures. The *Application Guide and Index*. OPNAV N0000-00-IDX-000/TMINS, should be available in your technical library. By using this guide and index, you will be able to understand and use the TMINS.

The TMINS assigns each technical manual a unique identifying alphanumeric designation patterned after the 13-digit National Stock Number (NSN); for example, A1-F18AA-NFM-500. It serves as the technical manual identification number. Additionally, TMINS contains a provision for adding a suffix to give the security classification and other information considered important.

TMINS NUMBER COMPOSITION.—The standard TMINS number (fig. 2-17) is made up of two distinct parts separated by a slash (/). The first part of the TMINS is called the publication identifier (PI). It is the essential root of the number. The PI is always used, and it always has exactly 13 characters.

The second part of the TMINS is called the suffix. It is an added field of up to 17 characters (including the slash). When used, it gives user-oriented information. The suffix is always used for classified manuals and separately bound unclassified portions of classified technical manuals. The suffix for both classified and unclassified TMINS may also supply the user with equipment designation, nomenclature, or model number.

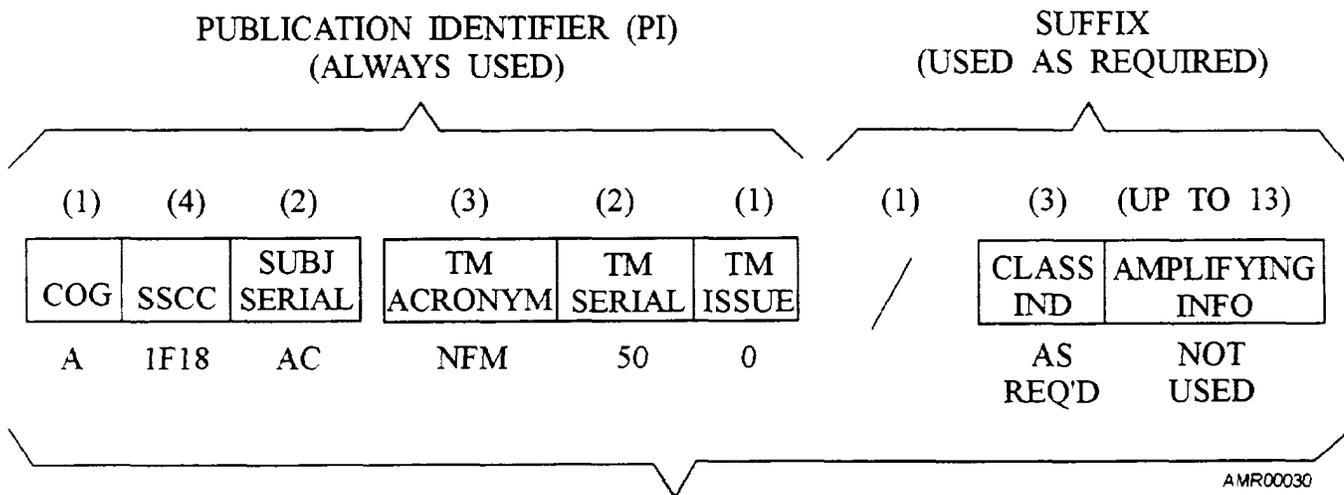
PUBLICATION IDENTIFIER (PI) COMPOSITION.—The publication identifier (PI) is made up of two major components: the hardware/subject identifier and the technical manual (TM) identifier. The first seven characters of the PI make up the hardware/subject identifier. These characters identify the specific hardware (such as an aircraft) or subject (such as an airborne weapons system) to which the technical manual applies. Once assigned, the project serial number (for example, SA-AN/APS-39A radar set) will represent the item throughout its life cycle. The first seven characters of the PI (fig. 2-17) are divided into three groups.

- The first group, cognizant (COG), of the PI is a single letter that tells what command publishes and updates the publication. For example, the COG is A for NAVAIRSYSCOM.

- The second group, standard subject classification code (SSCC), is a four-digit alphanumeric code that identifies the commodity or subject matter; for example, in figure 2-17, the 1 in 1F18 indicates aircraft or aviation. The F18 stands for the F/A-18 aircraft.

- The third group, subject serial number (SUBJ SERIAL), is a two-digit code (either numbers, letters, or both) that is assigned by the Naval Air Technical Services Facility (NAVAIRTECHSERVFAC) for aeronautic manuals. It differentiates between items assigned to a given SSCC series or subseries. In figure 2-17, the subject serial number AC stands for F/A-18 aircraft federal labs.

The remaining six characters of the PI are called the technical manual (TM) identifier. The six



A1-F18AA-NFM-500

Figure 2-17.—TMINS example (NAVAIR).

characters identify a particular TM and are divided into three groups.

- The first group (TM acronym) consists of three letters or numbers that identify the type of manual; for example, in figure 2-17, the TM acronym NFM identifies the manual as a NATOPS flight manual supplement. Numerically, they can identify the first three digits of a particular Work Unit Code; for example, 520 is an autopilot. In some instances of Work Unit Codes, such as support equipment (SE), a combination of a letter and two numbers are used for the TM acronym; for example, S14 is an air compressor.

- The second group of the TM identifier (TM serial number) is made up of two numbers. It is used to identify different volumes, parts, and changes to specific TMs. For NAVAIR TMs, these numbers range from 00 through 99. In the example shown in figure 2-17, the TM serial number is 50. This stands for a *Pilots Pocket Checklist*.

- The third group of the TM identifier is the TM issue, and is either a number (0 to 9) or a single letter. The number 0 indicates the TM is a basic issue or superseding revision. The letters A through Z (except I and O) designate (in alphabetical sequence) permanent changes or rapid action changes (RACs).

PI SUFFIX COMPOSITION.—The PI suffix has a variable composition, depending upon whether or not the TM has a security classification. For classified TMs, the PI suffix is always used, and the security classification indicator forms the first component of the suffix. The security classification indicator is always three characters (a letter enclosed in parentheses). The entire suffix can contain up to 17 characters, if required.

In figure 2-17, you can see that the PI suffix is not required. Therefore, the TMINS number A1-F18AC-NFM-500 stands for the initial or revised edition of a *Pilots Pocket Checklist* supplement to the NATOPS manual of an F/A-18 aircraft. In-depth information can be found in the OPNAV N0000-00-IDX-000/TMINS publication.

Q16. How many numbering systems are currently in use by NAVAIR and what are they?

Q17. What part of the NAVAIR numbering system can the category of the publication be found?

Q18. The standard TMINS number is made up of how many distinct parts and what are they?

Q19. The two-digit subject serial number is what group of the PI?

Q20. What are the last six positions in the publication identifier (PI) called?

USING TECHNICAL MANUALS

LEARNING OBJECTIVE: Recognize the procedures for using maintenance instruction manuals (MIMs) and illustrated parts breakdowns (IPBs).

Technical manuals help ensure proper maintenance. In today's Navy, the equipment is complex and you must use technical manuals at all levels of servicing and repair. The purpose of this section is to introduce you, the worker, to the content of technical manuals.

MAINTENANCE INSTRUCTION MANUAL (MIM)

As discussed earlier, the Maintenance Instruction Manual (MIM) is identified by the number 2 in part III of the NAVAIR publication number. For example, the first numeral 2 in NAVAIR 01-75PAA-2-2.3 identifies the MIM for the P-3A aircraft. The MIM is made up from a number of individual publications. Each publication deals with some portion of the maintenance for the applicable model aircraft. It contains essential information that aircraft maintenance personnel require to service and maintain the complete aircraft. Before you attempt any task on an aircraft, consult the MIM for that particular model of aircraft. By using the MIM properly, you may prevent possible aircraft damage and save time. The recommended maintenance methods provide procedures that can be accomplished by the appropriate maintenance level activity.

NOTE: Different aircraft manufacturers may group the material in the various volumes of the MIMs under different titles. For example, the "Survival and Environmental Systems" volume for the older aircraft covers the ejection seat, canopy, liquid oxygen, heating, air conditioning, ventilation, and anti-g systems. Two volumes titled "Personnel Environmental Systems" and "Canopy and Survival Systems" are prepared to cover the same subjects for newer aircraft.

The "General Information and Servicing" volume is designed primarily for the plane captain. This

volume contains a general description of the aircraft, information that is not contained in other specialized manuals, and all information about servicing the aircraft.

Each of the specialized system volumes of the MIM is further divided into four sections. These sections are described briefly in the following paragraphs.

Section I is the same in all volumes for a particular aircraft MIM. It introduces the manual and usually supplies a list of the changes that apply to the particular volume.

Section II describes the system and its components, as well as their operation.

Section III covers such maintenance as the removal and installation procedures and troubleshooting charts for organizational-level maintenance.

Section IV covers component repair procedures for intermediate-level maintenance.

Figure 2-18 is an example of a page from section III of a MIM. This page shows the basic layout of the maintenance-coverage sections of the specialized-type manuals. To make it easier for you to locate the material on the page, each component maintenance procedure is identified by a boldface heading (fig. 2-18, A). All removal and installation procedures provide a recommended manpower requirement (B) for the supervisors to use in assigning personnel to perform the job. All tools and equipment, other than standard tools, are noted (C) before the maintenance procedure. This allows these items to be drawn from the toolroom before starting the operation.

When consumable materials, such as lubricants, lockwire, and cotter pins, are required during an installation procedure, a listing of these items (D) is made before the procedural steps. Miscellaneous small parts (other than standard Air Force/Navy [AN] specification and Military Specification [MS] hardware), necessary for removal and installation, also appear in the materials list. As an aid to quality assurance representatives (QARs), those steps in a procedure that require an inspection are in italics (E).

NOTE: In some MIMs, the steps in a procedure that require a quality assurance (QA) inspection are underlined. The italicized steps are a very important

feature and are summarized (callout F) at the end of each procedure.

The separate sections of these manuals are issued as separate publications under individual identifying numbers. This is done to make it easier for maintenance personnel to procure, store, file, and use specific parts of the manual.

A new format for MIMs was developed with the introduction of manuals for late model aircraft, such as the F-14 and S-3. You should understand this newer format as well as the old because you will use both, depending upon the aircraft on which you are working. Both formats are discussed separately in the following paragraphs.

Under the older format, a volume contains several sections. The number of sections in each volume may differ from one model aircraft to another and from one volume to another. In some cases, organizational maintenance is covered in one section and intermediate maintenance in another. In other cases, two separate volumes cover the two levels of maintenance.

In the newer format, sections I and II of all volumes are usually similar in format. Section I is an introduction to the volume. It provides a general description of the manual, including the scope of coverage, format, and arrangement of the included information. Also, it contains a list of the applicable publications and technical directives required by maintenance activities.

Section II contains a physical description of the equipment or systems covered in the volume. For example, in the volume "Powerplant and Related Systems of the F-14 Aircraft," section II contains descriptions and operating instructions for the power plant and its related systems.

In some volumes, a section is devoted to any support and special equipment required for the maintenance of the system covered. In other volumes, this information is covered in the section that pertains to the specific system. As stated previously, the remaining number of sections may differ; however, in all cases these sections contain the maintenance information for the included systems.

Under the newer format, the MIM is subject-identified in part IV of the manual number code. For example, the manual number codes for the F-14 organizational-level MIM are shown in figure

Section III
Paragraph 3-328 to 3-331

NAVAIR 01-XXXXX-X-X

Removal Procedure

- a. Remove elevators (refer to paragraph 3-331).
- b. Remove three screws from each bracket assembly and remove damper.
- c. Remove bolts, nuts and washers which retain connecting rod assemblies to damper arms.
- d. Remove nut, washer and spacers from top and bottom brackets and remove brackets, leaving damper assembly.

Note

The viscous damper assembly must be stored with the top side up. If stored with the top side upside down for more than four hours, it is possible that air may be entrapped in the fluid between the disc and the housing, thus reducing damping rate. This condition can be corrected by storing the damper in its normal position at room temperature, approximately 21.1° C (70°F) for one week.

3-328. REPAIR AND PARTS REPLACEMENT

Spares and Repair Parts Data

Forward to next higher maintenance level.

3-329. INSTALLATION.

Material List

D	Cotter Pin (2)	MS24665-300
	Spacer (top)	923033-1
	Spacer (bottom)	923033-3

Manpower Requirement

One man is required.

Quality Assurance Requirement

An inspection is required when steps appear in *italics*.

Installation Procedure

- a. Install upper bracket using one 923033-1 spacer, AN320-5 nut and MS24665-300 cotter pin.
- b. Install lower bracket using one 923033-3 spacer, AN320-5 nut and MS2466-300 cotter pin.

E *c. Inspect installation of upper and lower bearing brackets in check nut and cotter pin installation.*

d. Install upper rod assembly using an NAS1104.17 bolt and NAS679A4W nut with an AN960D416 washer under the bolt head and under the nut. Bolt head is up.

e. Install lower rod assembly using an AN174H13 bolt and NAS679A4W nut with an AN960D416 washer under the bolt head and under the nut. Bolt head is down. Lock-wire bolt head to lower lever.

E *f. Inspect installation of upper and lower rod assemblies for tightness of attachments and lock-wiring of lower bolt head.*

g. Attach brackets to structure using NAS623-3-7 screws and AN960D10 washers in the two upper and two lower holes. Use NAS623-3-6 screws and AN960D10 washers in the two middle holes.

h. *Inspect attachment of brackets to structure. Damper must rotate freely and there must be a minimum of 0.12 inch clearance to structure.*

i. Reinstall elevators. (Refer to paragraph 3-332.)

Quality Assurance Summary

a. *Inspect installation of upper and lower brackets to damper assembly to check nut and cotter pin installation.*

b. *Inspect installation of upper and lower rod assemblies for tightness of attachments and lock-wiring of lower bolt head.*

c. *Inspect attachment of brackets to structure. Damper must rotate freely and there must be a minimum of 0.12 inch clearance to structure.*

3-330. ELEVATOR MAINTENANCE PROCEDURES.

3-331. REMOVAL (See figure 3-105.)

Tools and Equipment List

Truck, Fork Lift	TC-200
Hoist	HSKS-1531B
Elevator Sling Assembly	551241-1

Manpower Requirements

Two men are required.

Removal Procedure

- a. Placard control column.
- b. Open six aft radome latches and roll radome back on track.
- c. Support the elevator with elevator sling assembly, LCC 551241-1 or equivalent and move the elevator to the up position.
- d. Remove the lock-wire and two holes attaching the inboard end of the elevator to the end fitting of the elevator torque tube.
- e. Move the elevator to the down position and remove one bolt attaching the elevator to the torque tube.
- f. Open the four hinged bolt access panels located across the underside of the horizontal stabilizer trailing edge, and panel E207 L/R on top trailing edge of the horizontal stabilizer.
- g. Disconnect the two viscous damper push rods located at horizontal stabilizer station 95.84.
- h. Disconnect, roll, tape and mow elevator trim tab tables for removal with the elevator. Turnbuckles for the right elevator trim tab are disconnected in the fuselage tail cone area. Turnbuckles for the left elevator trim tab are disconnected by gaining access through E206 L access panel on the trailing edge of the lower left horizontal stabilizer.

Figure 2-18.—Typical page of a maintenance instruction manual.

2-19. With the possible exception of maintenance, the subjects are self-explanatory. The maintenance volumes contain step-by-step procedures for the removal and installation of components within the system covered by the particular volume.

Part V of the manual number code is a subvolume number of the subject designated in part IV. In the case of F-14 manuals, -1 in part V is used for landing system; for example, NAVAIR 01-F14AAA-2-2-1 is *Landing Systems, Principles of Operation*; NAVAIR 01-F14AAA-2-3-1 is *Landing Systems, Testing and Troubleshooting*; and NAVAIR 01-F14AAA-2-4-1 is *Landing Systems Maintenance*.

To provide smaller information units, the MIMs are sectionalized into work packages (WPs) and, if necessary, into subordinate work packages (SWPs). WPs and SWPs are identified by a five-digit number. The first three digits represent the WP number, and the last two digits represent the SWP number.

NOTE: The two digits that identify the SWP are usually printed in smaller size type than the three digits that identify the WP.

Figure 2-20 is an example of page A of a testing and troubleshooting MIM. It contains the numerical index of the effective WPs and SWPs in the volume. WP 00 1 00 contains an alphabetical listing of all WPs and SWPs in the volume.

ILLUSTRATED PARTS BREAKDOWN (IPB)

Normally, the IPB consists of several individual volumes; one for each functional element of the

aircraft and one volume that is the Master Parts Index. Each volume pertaining to the different functional elements is identified by a dash and number in part IV of the publications number. For example, the Master Parts Index for the F-14A aircraft is NAVAIR 01-F14AAA-4, and the IPB volume for the landing systems is NAVAIR 01-F14AAA-4-1.

The IPB is useful in identifying and ordering parts. You can determine the exact part or item required for replacement in a repair situation. Figure 2-21 is a typical IPB diagram. It can be used to identify failed or worn parts. To do this, identify the part by locating it on the diagram (i.e., you decide number 6 is the failed component). You can take this number, called the index number, and locate it (a launch bar) on the part list (fig. 2-22). This information in the part list is vital in ordering the part.

The IPB contains a list of weapons systems component parts keyed to simple illustrations. The manual serves a dual function to assist maintenance and supply. Material is illustrated by an exploded view and identified to material availability through source code listings. It is prepared as an associate manual to the related maintenance manual or incorporated in the basic book as a separate section.

NAVAL AERONAUTIC PUBLICATIONS INDEX (NAPI)

All aeronautic publications, changes, technical directives, and forms issued by NAVAIRSYSCOM are cataloged in the Naval Aeronautic Publications Index (NAPI). The NAPI consists of six sections,

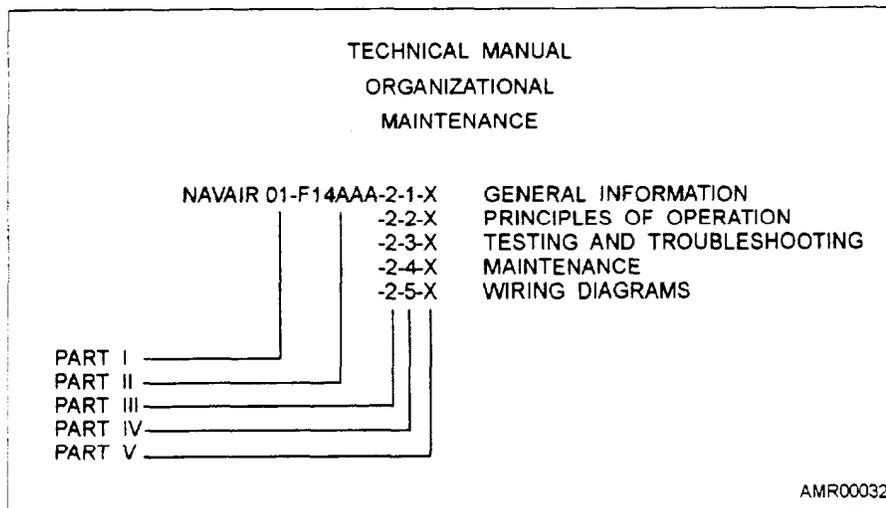


Figure 2-19.—Example of F-14 MIM number codes.

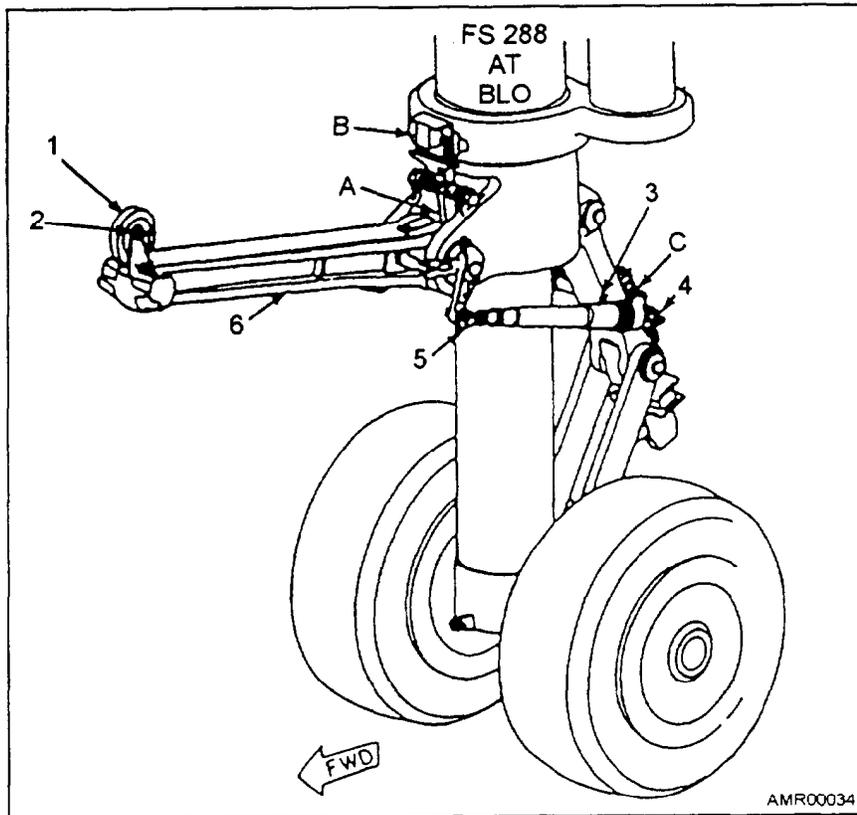


Figure 2-21.—Typical diagram page of IPB (launch bar abort mechanism).

- Q24. *The Naval Aeronautic Publications Index (NAPI) has how many sections?*
- Q25. *Where are all NAVAIR aeronautical publications changes, technical directives, and forms cataloged?*
- Q26. *What division maintains a complete Naval Aeronautic Publications Index (NAPI) in its library?*

MAJOR CATEGORIES OF NAVAIR TECHNICAL MANUALS

LEARNING OBJECTIVE: Identify the major categories of technical manuals.

NAVAIR technical manuals are grouped in categories according to type and peculiarities of the requirement. Based on intended use, publications are tailored to improve usability. Manuals that you will use the most are discussed in the following paragraphs.

GENERAL SERIES MANUALS (00 SERIES)

As indicated by its title, the technical manuals within this series contain information of interest to a major portion of the aviation community. Part of this series is the technical manual indexes, which will be discussed later in this chapter. Also included are standard aircraft characteristics manuals, Deputy Chief of Naval Operations (DCNO) (Air Warfare) training literature, documentation management and procedures manuals, and other miscellaneous publications.

The general series (00 series) contains the aviation training literature (00-80 series). These publications are issued by the authority of the DCNO (Air Warfare). Included are various air safety manuals and general aviation manuals prepared on subject material related to military skills, ratings, or operational maintenance procedures. These manuals are available through normal supply channels.

An additional volume has been added to the new technical manual system for late model aircraft. This is the “zero” volume. For the S-3A aircraft, the NAVAIR publication number is NAVAIR

INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNIT	USE	SMCR
			PER ASSY CODE	ON CODE	CODE
	A51G10001-3	• MECHANISM, LAUNCH BAR ABORT /SEE ... FIGURE 060-00 FOR NHA/	REF	APL	UU
	A51G10001-5	• MECHANISM, LAUNCH BAR ABORT /SEE ... FIGURE 060-00 FOR NHA/	REF	APK	UU
1	550-209	• ROLLER, LAUNCH BAR /05262/ /GRUMMAN SCD A51G9008-1/ /ATTACHING PARTS/	1		
2	NAS5676V150	• BOLT	1		P10Z0
	AN960-616	• WASHER	1		P10Z0
	GB1006-8	• BUSHING, PLAIN	1		P10Z0
	MS17825-6	• NUT	1		P10Z0
	MS24665-155	• PIN	1		P10Z0
3	A51G10006-1	• BUNGEE, NLG LAUNCH BAR /SEE NAVAIR 03-25GA-31 FOR DETAIL BREAKDOWN/ /ATTACHING PARTS/	2		P10GD
4	MS17B26-5	• NUT	1		P10Z0
	GW10A5	• WASHER, LAMINATED	1		P10Z0
5	MS24665-153	• PIN	1		P10Z0
	VEPS132121-4F 8	• BOLT, SHEAR /06710/ /GRUMMAN SCD.	1*		P10Z0
	EW5B224018	GB11B4D18/ BOLT, SHEAR /56878/ /GRUMMAN SCD ...	1*		P10Z0
	BM17020-4-18	GB511B401B/ • BOLT, SHEAR /85495/ /GRUMMAN SCD. ...	1*		P10Z0
	VS3071-4F18	GB511B401B/ BOLT, SHEAR /92215/ /GRUMMAN SCD	1*		P10Z0
	GW10A2	GB511BG018/ • WASHER, LAMINATED	1		P10Z0
	AN960-416	• WASHER	1		P10Z0
	MS17825-4	• NUT	1		P10Z0
	MS24665-153	• PIN	1		P10Z0
6	A51G10500-3	• LAUNCH BAR /SEE NAVAIR 03-25GR-28 ... FOR DETAIL BREAKDOWN/	1	VU	P10GD
	A51G10500-1	• LAUNCH BAR /SEE NAVAIR 03-25GR-28 ... FOR DETAIL BREAKDOWN/	1	VT	P10GD
7	G104-575	• SPRING, TORSION	1	APK	
8	A51G10145-13	• BRACKET, LAUNCH BAR SWITCH	1	APK	
9	A51G10502-1	• ROLLER ASSEMBLY	1	APK	
		/ATTACHING PARTS/			
10	NAS674V160	• BOLT	1	APK	
	AN960-416	• WASHER	2	APK	
	MS27183-10	• WASHER	1	APK	
	GB1004-8	• BUSHING, PLAIN	1	APK	
	MS17825-4	• NUT	1	APK	
	MS24665-153	• PIN	1	APK	

AMR00035

Figure 2-22.—Typical part list of IPB (launch bar abort mechanism).

01-S3AAA-0. Its title is the *Technical Documentation List*. The purpose of this volume is to provide information concerning the availability and applicability of technical manuals for the maintenance of the particular aircraft model. The listings are presented in three basic formats:

- Numerically by assigned technical manual number.
- By system, subsystem, and component part number or type designator to technical manual number.
- By support equipment part number or type designator to technical manual number.

As you can see, the -0 volume is very important. The alphanumeric listings help you determine if

publication information is required for an aircraft component or item of SE. The associated manuals are listed for each level of maintenance.

PRIMARY WEAPONS SYSTEMS TECHNICAL MANUALS (01 SERIES)

Technical manuals issued within this series are a combination of operation and maintenance publications. These manuals specifically apply to major weapons systems, such as aircraft, missiles, and unmanned drones or targets. The manuals are broken down by subject material and appear in a variety of formats. Short descriptions of some of these manuals are contained in the following paragraphs.

Operational Manuals

Three types of manuals are discussed here. One is the NATOPS flight manual. The other two are checklists, the Pilot's Pocket Checklist/Flight Crew Checklist and the Functional Check Flight Checklist.

Natops Flight Manual. The Naval Air Training and Operating Procedures Standardization (NATOPS) flight manual contains the complete operating instructions for a specific aircraft and its operational equipment. It is identified by the number 1 in part III of the publication number and is generally called a dash 1 (-1) manual. It contains emergency as well as normal operating instructions.

NATOPS manuals enhance operational safety through standardization of ground and flight procedures. The manuals are issued by the direction of NAVAIR under a Chief of Naval Operations (CNO) letter of promulgation. This letter stipulates that the procedures are mandatory. NATOPS flight manuals are issued primarily for the use of the pilots and aircrew. Maintenance personnel should become familiar with the contents of the flight manual for their specific aircraft.

NATOPS flight manuals are kept up-to-date by two types of changes: routine changes and interim changes. Routine changes are generally issued every 90 days. Interim changes cover vital operating instructions, and are issued when immediate action is necessary. Interim changes are issued either in printed or message form and are later incorporated as routine changes.

Pilot's Pocket Checklists/Flight Crew Checklists. These items are an abbreviated extension to the NATOPS data released in a special "knee pad" checklist format. They contain performance and reference data and emergency procedures, as well as normal and special procedures. They are step-by-step abbreviations of the amplified NATOPS procedures prepared for direct cockpit application.

Functional Check Flight Checklist. These checklists are used during a functional check flight. They are used to determine whether the airframe, power plant, accessories, and other items of equipment are functioning in accordance with predetermined standards while subjected to the intended operating environment. These flights are conducted when it is not possible to determine proper operation by ground checks. The data is provided in an abbreviated checklist format. The checklist is applied by the pilot

or crew members for recording the results of the flight test.

Tactical Manuals

The tactical manual supplements the flight manual; it provides information to the pilot and crew on how to "fight" the aircraft. It provides information on tactics, weaponry, and air combat maneuvering, with procedures and techniques based on tactical situations and mission assignments. These manuals are being made part of the Naval Warfare Publications program. Refer to *Tactical Warfare Publications Guide*, NWP-0.

Airborne Weapons/Stores Loading Manuals (Conventional and Nuclear)

These publications provide information required to convert aircraft armament systems to respond to various mission assignments, perform functional checkout of aircraft weapons control and release systems, and describe the loading or unloading of airborne weapons or stores. The conventional portion of the manual explains standard loading criteria and procedures predicted on tactical doctrine. The nuclear portion standardizes loading procedures and includes in-flight weapons procedures. These publications are also released by letter from CNO, specifying that the procedures stipulated are mandatory.

Weapons Loading Checklists. These checklists are abbreviated step-by-step procedures taken from the amplified procedures displayed in the weapons or stores loading manuals. These are normally used for training as well as for direct loading support.

Stores Reliability Cards (SRCs). SRCs contain abbreviated procedures for use in high-tempo operational areas. They may be used by trained and certified personnel instead of conventional weapons loading checklists. SRC's are pocket-size, laminated cards that contain information to ensure the aircraft is ready to receive the weapon, the weapon is ready to be loaded, the weapon was properly loaded, and to show the final steps to prepare the weapon for flight and intended use.

Nuclear Weapons Cargo Loading Manuals. These manuals provide information for transporting nuclear weapons. The instructions cover loading, securing, transporting, and unloading in cargo or transport aircraft and helicopters.

Cargo Loading Manuals. These manuals have been prepared for selected cargo-type aircraft. They provide instructions on authorized procedures for loading, securing, and unloading. All typical loads (ground equipment, troops, engines, etc.) and other assigned transport missions are covered and illustrated. Most cargo loading manuals are subject to controls identical to NATOPS. In fact, for aircraft that do not have separate cargo loading manuals, the information can normally be found in the applicable NATOPS flight manual.

MAINTENANCE MANUALS

Maintenance manuals contain instructions for the effective use and support of weapons systems or equipment. These instructions include, but are not limited to, troubleshooting, installation, removal, and repair of system components.

General Engineering Series Manuals (01-1A Series)

The general engineering series manuals cover standard aviation maintenance practices that apply to all aircraft rather than to a particular aircraft. These publications serve as useful training tools, and they prevent duplication of standard practices within other manuals.

Aircraft Maintenance Instruction Manuals (MIMs)

Aircraft MIMs are prepared on a systems maintenance concept. They appear in two basic formats, conventional and work package. The older conventional manual specification required that the coverage reflect both organizational and selected intermediate maintenance for contractor-furnished equipment (CFE). The more recent, task-oriented work package manuals cover organizational-level maintenance only. (Both conventional and work package formats for technical manuals were covered earlier in this chapter.)

Work Unit Code (WUC) Manual

WUC manuals are provided for each model of aircraft. They are identified by a -8 in part III of the NAVAIR publication number. For example, NAVAIR 01-F14AAA-8 is the *WUC Manual for the F-14 Aircraft*. There are WUC manuals provided for every type of aircraft and support equipment.

The WUC manual is used as a maintenance aid and recording guide in conjunction with the Maintenance Data Systems. It identifies assigned system-related equipment codes pertaining to various servicing and maintenance functions. These codes are used to record maintenance information into an automated data base. The information is processed to produce management reports that are used to determine material failure analysis and supply statistics, as well as maintenance and equipment design improvements.

Weight and Balance Data Manual, NAVAIR 01-IB-40

The weight and balance data manuals are used jointly with the U.S. Air Force. They provide a standard system for recording field weight and balance of certain aircraft. The initial forms, charts, and records contained in the manual are prepared by the original manufacturer before delivery of the aircraft to the Navy. The manual remains with the aircraft during its entire service life. It provides a means of maintaining a continuous, current record of the aircraft's basic weight, balance, and loading data. The records are maintained by the aircraft reporting custodian and overhaul activities. It must be brought up-to-date before transfer of aircraft. The procedures for maintaining this manual are contained in the USN *Aircraft Weight And Balance Control Manual*, NAVAIR 01-IB-50.

Crew Station Manuals and In-Flight Maintenance Manuals

Crew station and in-flight maintenance manuals are designed for large, high-density avionics aircraft with sophisticated, computer-controlled, integrated weapons systems. They provide the operators of the individual stations the capability of monitoring logic analysis and signal flow data. They aid in maintaining mission capability and assist in rapid fault detection, and possible corrective action, while still airborne.

Airborne Missiles-Guided Weapons and Target and Drone Manuals

Because of the similarity of missiles and drones to aircraft, these manuals are prepared to the same general specifications as aircraft manuals. However, they are tailored to missile and drone specific functional application. These manuals cover basic description, theory and troubleshooting, checkout,

assembly, disassembly, maintenance, servicing and handling.

Airborne Missile Weapons Assembly Checklists

Airborne missile and weapons assembly checklists are an abbreviated, unclassified procedural reference. These checklists can be used as a guide for step-by-step assembly of missiles and weapons. They are provided as a convenient “line maintenance” reference document. The checklist manual is used as a backup in the event of difficulty.

Structural Repair Manual (SRM)

The SRM is used as a guide in making structural repairs to the airframe. It contains general information on airframe sealing, control surface rebalancing, general shop practices, damage evaluation and support of structure, and a description of the structure. Descriptions of structures are made by using indexed illustrations and repair drawings.

SRMs contain specialized repair information required by maintenance personnel to determine the extent of aircraft structural damage. It also contains instructions for performing a permanent or onetime flight repair.

Basic structural repair data, common to all aircraft, is released in a general engineering series manual, *General Manual for Structural Repair*, NAVAIR 01-1A-1. Aircraft structural repair manuals are prepared by the original design manufacturer. They contain aircraft specific information and are considered a supplement to the general series (01-1A) manuals discussed earlier.

The SRM for most new aircraft is published in two volumes because the volumes are used by different activities. Volume I is used by all levels of maintenance. Volume II supplements volume I, and contains information for use at intermediate- and depot-level facilities.

You can identify the SRM by a -3 in the manual code. The two volumes are further identified by an additional dash number; for example, NAVAIR-01-75PAA-3-1. This is the code for volume I of the SRM for the P-3A.

Each volume of the SRM is divided into sections. Section I contains general information. Each of the other sections contains more specific information. These sections cover portions of the aircraft, such as

wings, tail, fuselage, landing gear, and engines. There is also a section that covers typical repairs.

The scope of SRMs is being revised to expand and complement their application. The manuals are to be published as four volumes: (1) structural repair, (2) corrosion control, (3) nondestructive inspection, and (4) an illustrated parts breakdown (IPB).

Before you attempt to use the SRM, you should read the introduction in volume I. It includes information on how to use the manual.

NOTE: Since the formats of SRMs differ, the instructions on how to use a particular manual also may differ from other SRMs.

POWER PLANT MANUALS (02 SERIES)

Power plants are reciprocating engines, jet propulsion engines, jet propulsion/turboshaft engines, rocket-type jet engines and Auxiliary Power Units (APU). Organizational (installed) maintenance is covered in the power plants volume of the MIM that is prepared by the aircraft designer. However, intermediate and depot (uninstalled) information is defined in specialized engine publications prepared by the engine manufacturer. These manuals include information on intermediate servicing and repair, complete engine repair (CER), overhaul, and an IPB. In some cases, CER is supported by a deck of Complete Engine Repair Requirements Cards (CERRCs).

Unique to engine systems is a Three-degree, Gas Turbine Engine Repair Program at the intermediate maintenance level. Under this program, each engine intermediate maintenance manual defines specific engine maintenance actions as either first-, second-, or third-degree functions. Specific guidelines and responsibility information are provided in OPNAVINST 4790.2.

In most power plant manuals, the maintenance and service instructions manual is identified by a -2 or a -502 in part III of the NAVAIR publication number. These manuals contain all the information necessary for you to routinely service and maintain the engine models covered. They also include instructions for troubleshooting, dismantling, reassembling, and testing.

Under the NAVAIR publication numbering system, the overhaul instructions manual is identified by a -3 or a -503 in part III of the publication number. This manual

contains the instructions necessary for a complete overhaul of the engine (overhaul as performed by naval aviation depots). It is used by organizational and intermediate maintenance activities.

Under the NAVAIR publication numbering system, the IPB manual is identified by a -4 or a -504 in part III of the publication number. The IPB is divided into three sections—an introduction, a group assembly parts list, and a numerical index. The IPB illustrates, lists, and describes all parts and special SE necessary to maintain the particular engine model.

Under the TMINS numbering system, there are three basic types of engine manuals—one each for intermediate maintenance, depot maintenance, and an IPB. Several other special manuals are available for some engine models, but they usually apply to intermediate or depot maintenance.

AERONAUTICAL COMPONENT AND EQUIPMENT MANUALS

Aeronautical component and equipment manuals cover all types of aircraft accessory and related equipment. Some of the most common types are listed below:

- Accessory (03 series)
- Instrument (05 series)
- Armament/Ordnance (11 series)
- Electronics/Avionics (16 series)
- Machinery, Tools and Test Equipment (17 series)
- Ground Servicing and Mobile Equipment (19 series)

General component and equipment manuals can be prepared as individual intermediate or depot volumes, or as a combination. Occasionally, these manuals include general or specialized organizational data not included in the weapons systems series. However, organizational data appears in the prime weapons system manual whenever feasible. Design complexity, data volume, and the maintenance plan or engineering analysis determine the selection of content coverage and volume assembly.

If the equipment is of a highly complex design with variations in maintenance capability and support materials at different levels, the manuals are normally coded for separate intermediate- and depot-level coverage. However, when logistic support

requirements, workload procedures, and basic support equipment are similar at the intermediate- and depot-level, the manuals are coded for a combined intermediate- and depot-level publication.

SPECIAL APPLICATION TECHNICAL MANUAL SERIES

Technical manuals within this category contain operation and maintenance and/or procedures that apply to a variety of equipments associated with aircraft maintenance. Short descriptions of these types of manuals are contained in the following paragraphs.

Aircraft Hardware and Rubber Material (04 Series)

The 04 series manuals provide descriptive maintenance information on maintenance consumables, such as aircraft wheels and tires.

Electronics, Airfield Lighting and Related Accessories (08 Series)

These manuals provide information and instructions covering the installation, adjustment, operation, maintenance, and IPB of airfield lighting facilities for night operation at temporary or advanced air bases. The 08 series is being combined with the 16 series for electronics equipment. The 08 entry in the NAVSUP 2002 will refer you to the 16 entry.

Aviation Life Support Systems (ALSS) Manuals (13 Series)

The 13 series manuals provide information and instructions for operation and maintenance of all personal survival equipment. These manuals include instructions for ejection seats, parachutes, survival equipment, portable oxygen equipment, and anti-G and exposure suits. Manuals are provided for each item covering description, special tools, preparation for use, storage or shipment, operation instructions, inspection, maintenance, lubrication, troubleshooting, and an IPB. Each manual contains only those portions applicable to that item of equipment.

Standard Preservation and Packaging Information (15 Series)

The 15 series manuals provide instructions for the initial preservation treatment, procedures for maintaining preservation, procedures for depreserving

aircraft, uninstalled aircraft engines, and dangerous materials. They also contain instructions for long-term, extended shipment, short-term (fly away), and water damage or fire-fighting chemical damage types of preservation. Included in these manuals are required material and equipment and individual detailed preservation procedures for each component.

Electronics (16 Series)

Manuals in the 16 series are identified by a numbering system like the one used with aircraft manuals. It consists of a three-part designation that follows a prefix. The subdivisions of some of the 16 series manuals are discussed in the following paragraphs.

General. The general (NAVAIR 16-1 series) manuals publications of many types. The contents do not fit any other subseries. They include manuals that pertain to general maintenance practices, training manuals, design guidance data, etc. A complete list is available in the current index of each publication.

Radio and Radar. Manuals in the 16-5Q and 16-5S subseries pertain to older equipment. As such, they do not conform to present standardization formats. They include miscellaneous operation and maintenance data for radio and radar equipment.

Joint Nomenclature Electronic Test Equipment. Manuals found in this subseries normally appear in the standard format. One example of a manual in this subseries is the *Handbook Service Instructions for the Radio Sets AN/ARC-94, AN/ARC-102, AN/ARC-119, and AN/ARC-120*, NAVAIR 16-30ARC-94-1.

Support Equipment Manuals (17 and 19 Series)

Although Aviation Support Equipment Technicians (ASs) perform maintenance on support equipment, personnel in the other aviation maintenance ratings must operate the equipment. Therefore, operating instructions should be available.

The 17 series (machinery, tools, and test equipment) and 19 series (ground servicing and mobile equipment) of aeronautic technical publications cover most types of support equipment (SE). The manufacturer of each item of SE must furnish instructions for operating and maintaining the equipment throughout its service life. Like aircraft MIMs, these publications are prepared by the

manufacturer and issued under the authority of NAVAIRSY SCOM. SE manuals are stocked and listed the same as technical manuals.

DEPARTMENT OF DEFENSE PUBLICATIONS

Navy technical manuals, because of multiple application, are used jointly between other elements of the Navy, such as the Naval Sea Systems Command (NAVSEA), Space and Naval Warfare Systems Command (SPAWARSSCOM), and other services (U.S. Army and U.S. Air Force). These manuals normally carry the identification number of each using service. They are under the management control of the primary executive service, which can be easily identified because their publication code number will be the first listed on the cover. However, to simplify their identification and index listing, they are indexed in the NAVSUP 2002 by their NAVAIR or TMINS number.

AUTOMATION-TYPE TECHNICAL MANUALS

Automation-type technical manuals do not follow normal documentation practices and standards. They appear on paper or mylar punch tape, magnetic tape, molded templates, or film. Often, they are used with programmed automatic or semiautomatic test equipment. They are used to monitor the operation of the equipment. Policy for the management of these manuals is contained in NAVAIRINST 13630.1.

PLANNED MAINTENANCE SYSTEM PUBLICATIONS

Planned Maintenance System (PMS) publications consist of maintenance requirements cards (MRCs), periodic maintenance information cards (PMICs), checklists, and sequence control charts and cards (SCCs). These publications provide a basis for planning, scheduling, and complying with scheduled maintenance requirements. The requirements are scheduled with intervals, such as calendar time, flight or operating hours, or number of cycles or events based on the predominant failure mode. In instances where conflict exists among PMS publications and other directives, the PMS publication takes precedence. PMS publications are discussed in the following paragraphs.

Q27. What is the purpose of the "Technical Documentation List"?

- Q28. What information does the NATOPS Flight Manual contain?
- Q29. What type of manual describes how to “fight” an aircraft?
- Q30. Which manuals prevent the need for duplication of standard practices in other manuals?
- Q31. What does the “-3” in the publication number 01-75PR4-3-1 indicate?
- Q32. Aeronautical component and equipment manuals, 03 series, cover information on what type of equipment?
- Q33. MRCs, PMCs, and SSCs provide a basis for planning, scheduling, and complying with scheduled maintenance requirements under what system?

Phase/Daily/Special/Preservation/Conditional Maintenance Requirements Cards (MRCs)

Phase MRCs divide the total scheduled maintenance tasks into small packages (phases) of approximately the same work content, which are accomplished sequentially at specific intervals.

The remaining cards cover the minimum daily inspection requirements, as well as servicing and preservation, special inspections, and, if applicable, conditional inspections. Aircraft service period adjustment (ASPA) evaluations are conditional maintenance actions that are depot-level evaluations of an aircraft’s general material condition.

Periodic Maintenance Information Cards (PMICs)

PMICs identify scheduled or forced removal items and their replacement intervals. They also contain a record of applicable technical directives, a maintenance requirements index, by system, and a conditional inspection listing.

Checklists

The checklist format for inspections provides maintenance personnel with abbreviated requirements for turnaround and preoperational inspections. The requirements cover those items necessary to determine obvious defects that may have occurred during each flight. Inspection requirements are consecutively numbered and sequentially arranged in logical working order.

Sequence Control Charts/Cards (SCCs)

SCCs aid the planning and accomplishment of scheduled and unscheduled maintenance tasks during inspections. SCCs, as an integral part of the maintenance program, provide a means of controlling the assignment of work and personnel. These SCCs indicate which MRCs are to be complied with, numbers and specialties of personnel required, times during which the separate jobs are scheduled for completion, POWER/AIR OFF or ON condition required during the work, and the area where the work is to be performed.

MANUFACTURERS’ SERVICE BULLETINS AND MAINTENANCE DIGESTS

Service bulletins and other publications, such as maintenance digests, prepared by weapons systems and equipment manufacturers are neither authorized nor approved for distribution to naval personnel. Information of a technical nature furnished by weapons systems and equipment manufacturers, or their representatives, should not be used to perform maintenance on NAVAIR cognizant equipment. **Technical manuals or publications issued through the NAVAIR distribution system are the only documents authorized for operational or maintenance performance on naval aircraft and related equipment.**

AERONAUTICAL PERIODICALS

Naval activities and commands publish periodicals of interest to the aviation maintenance technician. Some of the most important publications (*Naval Aviation News*, *Approach*, and *Mech*) are discussed in the following paragraphs. These magazines are intended for the worker and contain excellent information. They should be available in the work center.

Naval Aviation News

The *Naval Aviation News* is published bimonthly for the Chief of Naval Operations (CNO) by NAVAIRSYSCOM and the Naval Historical Center. It provides information about aircraft training and operations, space technology, missiles, rockets, aviation ordnance developments, aeronautical safety,

aircraft design, power plants, aircraft recognition, technical maintenance, and overhaul procedures.

As its name implies, this publication is a news magazine. By reading it, you can keep up with the latest unclassified developments in naval aviation. In addition, the coverage of fleet operations, the human interest articles, and accomplishments of individuals (both officer and enlisted) make the *Naval Aviation News* an entertaining as well as an informative periodical.

Approach

Approach, the *Naval Aviation Safety Review*, is published monthly by the U.S. Naval Aviation Safety Center. It is distributed to all naval aeronautic organizations. *Approach* gives the most accurate information currently available on the subject of aviation accident prevention.

A large number of aviation accidents are maintenance induced; that is, they occur during the preparation for, performance of, and securing from maintenance. They may be the result of sloppy or improper maintenance.

Approach reports the results of accident investigations. For those accidents that are maintenance-induced, it describes what was done wrong and how it should have been done; suggests corrective measures to prevent future accidents resulting from these causes; and, when appropriate, cites aeronautic technical publications that provide authority for changes in techniques or materials to improve the maintenance product. In short, if you read and heed the messages in *Approach*, you will benefit from other mechanics' experience. Put *Approach* on your required reading list, and look for it every month.

Mech

Mech is published bimonthly by the U.S. Naval Safety Center. It is distributed to naval aeronautic organizations on the basis of one copy per 10 persons. It presents the most accurate information from aircraft accident reports, incident reports, medical officers' reports, and reports of special investigations of aircraft mishaps. The content is information, and it should not be considered as regulatory, as orders, or as directives. Any reference to commercial products does not imply Navy endorsement of those products. Currently, *Crossfeed* is an insert of *Mech*.

Q34. *Periodic Maintenance Information Cards (PMICs) identify what information?*

Q35. *What are the only documents authorized for operational or maintenance performance on naval aircraft and related equipment?*

SAFETY PUBLICATIONS

LEARNING OBJECTIVE: Identify safety-related publications that relate primarily to naval aviation.

Safety is always the responsibility of every Navy man and woman. A discussion of safety publications follows.

THE NAVAL AVIATION SAFETY PROGRAM, OPNAVINST 3750.6

The purpose of OPNAVINST 3750.6 is to preserve human and material resources. The first few chapters contain instructions regarding command aviation safety programs, pre-mishap planning, and reporting of hazards. The remaining chapters describe actions to be taken in case of an aircraft mishap, mishap classification, initial required reports, investigations, endorsements, and the monitoring of corrective actions to eliminate hazards. All naval aviation personnel should be familiar with this instruction.

NAVY OCCUPATIONAL SAFETY AND HEALTH (NAVOSH) PROGRAM MANUAL, OPNAVINST 5100.23

This program provides policies and guidelines for administration of the NAVOSH program Navywide. The total program encompasses all safety disciplines, such as systems safety, aviation safety, weapons or explosives safety, off-duty safety, as well as occupational safety and health. The provisions of this manual apply to all Navy civilian and military personnel and operations ashore and afloat worldwide.

NAVY OCCUPATIONAL SAFETY AND HEALTH (NAVOSH) PROGRAM MANUAL FOR FORCES AFLOAT, OPNAVINST 5100.19

As the title implies, OPNAVINST 5100.19, also referred to as the *Safety Manual Afloat*, contains safety precautions applicable to forces afloat. It contains information on aviation safety, and covers precautions

applicable to aircraft carrier flight and hangar deck operations. It is a valuable reference for planning a predeployment training program to qualify maintenance personnel for carrier operations.

NAVAIROSH REQUIREMENTS FOR THE SHORE ESTABLISHMENT, NAVAIR A1-NAOSH-SAF-000/P5100-1

The purpose of this manual is to provide, in one document, guidance on acceptable work place safety and health standards ashore that are to be implemented within the Naval Air Systems Command. You should study all safety instructions and make them a permanent part of your training syllabus.

- Q36. *What is the purpose of the Naval Aviation Safety Program, OPNAVINST 3750.6?*
- Q37. *What safety-related publication provides guidance on the administration of the NAVOSH program Navywide?*
- Q38. *What information is contained in OPNAVINST 5100.19?*
- Q39. *What is the purpose of the manual NAVAIROSH Requirements for the Shore Establishment, NAVAIRA1-NAOSH-SAF-00/P5100-1?*

TECHNICAL DIRECTIVE SYSTEM

LEARNING OBJECTIVE: Identify the Technical Directive System and how technical directives are updated, numbered, and categorized.

The Technical Directive (TD) System controls and issues all technical directives. This system standardizes the method of issuance for such directives. It is the only authorized means for directing the accomplishment and recording of modifications and onetime inspections of NAVAIR accepted equipment. The TD system is an important element designed to maintain equipment in a configuration that provides the optimum conditions of safety, operational, and material readiness. This system encompasses two styles of technical directives differentiated by their method of issue. The two styles are formal TDs (letter) and interim TDs (message). In general terms, they are both handled as letter technical directives. These directives contain instructions or information of a technical nature that cannot be satisfactorily distributed as revisions or changes to technical manuals. This information (instructions) is

distributed and classified into four TD types: changes, interim changes, bulletins, or rapid action minor engineering changes (RAMECs).

A change is a document containing instructions and information that directs the accomplishment and recording of a material change, a repositioning, a modification, or an alteration in the characteristics of the equipment to which it applies. A change directs that parts be added, removed, or changed from the existing configuration, or that parts or material be altered, relocated, or repositioned.

Normally, a change is issued as a formal (hard copy) document identified as a Power Plants Change (PPC), Airframe Change (AFC), Support Equipment Change (SEC), etc.

An interim change is a technical directive issued by message or message format letter that dictates urgent dissemination.

A bulletin is an interim document comprised of instructions and information that directs a onetime inspection to determine whether a given condition exists. It specifies what action is to be taken if a given condition is found or not found.

A rapid action minor engineering change (RAMEC) is a message TD, which provides for quick action on minor changes that offer significant advantages to the operating forces. NAVAIRINST 5215.10 contains complete information on the RAMEC program. Management and procedure functions of the NAVAIR RAMEC TD system are described in *NAVAIRSYSCOM Technical Directives System*, NAVAIR-00-25-300.

- Q40. *What is the purpose of the Technical Directive System?*
- Q41. *What are the two styles of Technical Directives (TDs)?*
- Q42. *What are the four types of instructions to be distributed under the Technical Directive System?*
- Q43. *A technical directive issued by message or message format letter that dictates urgent dissemination is known as what type of change?*
- Q44. *An interim document that directs a onetime inspection to determine if a given condition exists is known as what type of technical directive?*
- Q45. *What is a rapid action minor engineering change (RAMEC)?*

TECHNICAL DIRECTIVE UPDATING METHODS

Sometimes, a change or bulletin is not the complete answer to a problem, and it is necessary to amend or revise a current directive.

An amendment clarifies, adds to, deletes from, makes minor changes to, or cancels an existing technical directive. It only supplements the existing directive and not a complete directive in itself. A maximum of three amendments may be applied to a TD, each remaining in effect until rescinded or superseded. A requirement for further amendment action requires the issuance of a revision.

A revision is a completely new edition of the existing directive. It supersedes the original directive or revision and all existing amendments.

TECHNICAL DIRECTIVES (RESCISSION/SUPERSEDURE/ CANCELLATION/AMENDMENT)

In this section, rescissions, supersedures, cancellations, and amendments are discussed.

A rescission is the process by which TDs are removed from active files after requirements have been incorporated. Final rescission action is directed in NAVSUP 2002. Activities maintaining active technical libraries should maintain the TDs on file until they are deleted from the NAVSUP 2002 index.

A supersedure is the process by which interim changes are removed from active files after a formal TD has been issued.

A cancellation is the process by which a TD is removed from the active files. A TD is canceled if it is determined that a previously issued TD is not to be incorporated. TDs are canceled by an amendment to the TD. The cancellation explicitly states the required configuration of each article initially specified for modification; for example, whether installed modifications are to remain installed or whether they are to be removed.

TD TITLES AND NUMBERING

There are many title subjects of changes and bulletins. A few example titles are as follows:

- Power Plant (PPC, PPB)—The last letter identifies the TD as a change (C) or bulletin (B)
- Avionics (AVC, AVB)

- Aviation armament (AAC, AAB)
- Support equipment (SEC, SEB)
- Airborne weapon (AWC, AWB)
- Accessory (AYC, AYB)

The following are examples of the numbering system:

- Aviation Armament Change No. 537
- Support Equipment Change No. 1299
- F- 14 Interim Airframe Change No. 261
- F- 14 Interim Airframe Bulletin No. 111

The numbering system is a consecutive numerical application. For example, Avionics Change 204 would be the 204th avionics change issued.

The numbers assigned to changes and bulletins are provided by the Technical Directive Control Center, which is located at the Naval Air Technical Services Facility (NATSF). Changes or bulletins that have been amended will have their basic number followed by the words "Amendment 1," "Amendment 2," etc. A revised directive will have the basic directive number followed with the words "Rev. A." "Rev. B," as appropriate, to denote the first or second revision to that basic directive.

The changes and bulletins are automatically distributed to the concerned activities. All TDs are issued by NAVAIR or NATSF, except in cases where the time delay in obtaining approval is unacceptable. In such cases, the controlling custodians are authorized to issue interim TDs to prevent unacceptable risks to personnel or equipment. The changes or bulletins are generally based on contractor service bulletins, other letters of recommendations, or proposed modifications from field service activities.

TECHNICAL DIRECTIVE CATEGORIES

Technical directives are assigned a category according to the importance and urgency of accomplishing the work involved. A category of immediate, urgent, routine, or record purpose is assigned to each technical directive.

Immediate action TDs are issued when an uncorrected, unsafe condition exists that could result in fatal or serious injury to personnel, or extensive damage to or destruction of valuable property. These unacceptable risks require immediate action to either ground aircraft, prevent launch of missiles, or deny use of related support equipment or munitions.

Urgent action TDs are issued under the governing factors of combat necessity or hazardous conditions that could result in injury to personnel, damage to valuable property, or unacceptable reductions in operational efficiency. These safety and material risks are acceptable only within definite time limits. When compliance is not accomplished within these time limits, urgent action TDs require that affected aircraft be grounded, and that the use of any missiles, munitions, equipments, or materials involved be discontinued.

Routine action TDs are used to authorize, accomplish, or modify only. They are issued when conditions embody risks acceptable within broad time limits. If uncorrected, these conditions could constitute a hazard through prolonged use, have a negative effect on operational efficiency, reduce tactical or support utility, or reduce operational life or general service use of systems or equipment. Routine action is not assigned to bulletins.

Record Purpose is used to confirm a modification that has been completely incorporated by the contractor or in-house activity in all accepted equipment (before issuance of the TD). This category is not used to formalize interim changes, assign message TDs, or to assign bulletins.

- Q46. *What are the two methods of updating a technical directive?*
- Q37. *Define a rescission.*
- Q38. *How long should an activity maintain a TD on file?*
- Q49. *How are TDs cancelled?*
- Q50. *What activity assigns the numbers for changes and bulletins?*
- Q51. *When an uncorrected, unsafe condition exists that could result in serious injury to personnel or damage or destruction of property, what category of TD is issued?*
- Q52. *What category of technical directive is issued to complete an action that, if uncorrected, could constitute a hazard through prolonged use?*
- Q53. *What category of TD is used to confirm that a modification has been completely incorporated by the contractor or in-house activity in all accepted equipment?*

TECHNICAL PUBLICATIONS LIBRARY PROCEDURES

LEARNING OBJECTIVE: Recognize the procedures followed by central and dispersed technical libraries.

The aeronautical technical publications library (TPL) serves two important functions. First, it serves as a centralized source of up-to-date information for all mechanics and technicians. Second, it gives all personnel an excellent source of reference material to help with personal training and individual improvement. To do the job, the TPL contains copies of all technical manuals that apply to an activity's assigned aircraft, its related systems and equipment, and the level of maintenance involved.

Each aviation maintenance activity operates TPL services to support local operations and maintenance. A central TPL (CTPL), once established, controls technical publication activities within the command. This includes the setting up and operation of dispersed libraries. The QA division has overall management responsibility for the technical library. The paragraphs that follow discuss the functions of the central and dispersed libraries.

CENTRAL TECHNICAL PUBLICATIONS LIBRARY (CTPL)

When an activity needs more than one library, it sets up a CTPL. This CTPL manages the technical publications in the activity. The CTPL is responsible for determining the activity's publication needs. The CTPL also procures and distributes publications and provides for the security, maintenance, and updating of all the technical publications. The CTPL is the activity's point of contact with NATSF and Naval Aviation Supply Office (ASO).

DISPERSED LIBRARY

When an activity with a central library has other technical libraries within the command, these other libraries are called dispersed technical publications libraries (DTPL). The CTPL manages these dispersed libraries. The CTPL also provides initial outfitting and issues updated material to DTPLs. The CTPL holds the DTPLs responsible for the storage and availability of publications that it issues to them. If a DTPL needs additional information on a subject or technical

manual, the library requests the information or manual through the CTPL.

INITIAL OUTFITTING

Initial outfitting is a onetime supply action for the technical manuals of a weapons system. ASO, Naval Publications and Forms Directorate, provides the basic publication and all the changes.

For mission-essential publications, the central library submits the automatic distribution requirements listing (ADRL). The ADRL is a tool of the NATSF Technical Publications Library (TPL) Program.

There are two types of publications initial outfitting allowance lists. They are the General Aeronautical Publications List and the Aeronautical Publications By Weapons System List.

The General Aeronautical Publications List includes publications and directives of a general nature that have no application to a specific weapons system.

The Aeronautical Publications by Weapons System List includes publications and directives that apply to a specific weapons system or equipment. This list can be further divided by level of maintenance; for example, organizational, intermediate, or depot.

PUBLICATIONS MANAGEMENT

NOTE: Commands functioning with minimal publications (10 or less) and no automatic data processing (ADP) support may use the older Naval Warfare Publication Library (NWPL) system for publication management rather than the Technical Publications Library Program.

CTPL personnel manage all libraries aboard a particular activity. The central and dispersed libraries work as a team.

Central Technical Publications Library Stamp

All publications and changes, including TDs received by the CTPL, are marked with an identifying stamp for inventory control. The stamp identifies and numbers all controlled publications. As a minimum, the stamp includes the name of the activity, the publication copy number, and location of the publication. On basic and revised publications, this information is stamped on the title page where the date

of publication appears. On changes and technical directives, the information is stamped on the first page of the publication.

Change Entry Certification Record (CECR)

The Change Entry Certification Record (CECR), OPNAV Form 5070/12, (fig. 2-23) ensures that changes and revisions to technical publications have been issued and incorporated in a timely manner. Library personnel distribute the change data. Change or revision material must reach all dispersed librarians who hold a copy of the affected publication or directive. The holder incorporates change pages in the affected publication.

The CTPL librarian prepares a CECR form. Dispersed librarians regularly pick up CECR forms and the change materials. The dispersed librarian acknowledges receipt for the materials by signing part 1 of each CECR. The central librarian then dates and files part 1 of the CECR in a 2- to 5-day tickler file. When the dispersed librarian completes the change, he or she signs part 2 of the CECR form and returns it to the central librarian. He or she also returns the pages that were removed from the affected publication with the completed CECR. Appropriate security measures are followed when classified material is returned. The central librarian receives the completed part 2 of the CECR and annotates it with the date received, and then files it for use in the next audit of the dispersed library. The central librarian then updates the NWPL catalog card. After completion of the next quarterly audit of the dispersed library, the central librarian disposes of all part 2 copies of the CECRs that were issued.

TECHNICAL LIBRARY AUDIT

The QA division audits the CTPL at least annually. QA does additional audits when any change in mission of aircraft assignment occurs, when a CTPL clerk is replaced, or when directed by higher authority. The librarian for the CTPL (as a minimum) inventories all CTPL publications by using TPL Program inventory list as the primary inventory tool.

Discrepancies to the inventory list must be corrected as they are detected. Other audit responsibilities are performed at this time. This means each publication must be stamped, arranged alphanumerically, and have its binder annotated. The verified NWPL catalog cards of the inventory list should be compared with the latest copy of NAVSUP

* G. P. O.: 1982-805-7-34

SHORT TITLE (1)	COPY NO. (2)	CHANGE OR CORRECTION (3)
REMARKS: (4)		
<p><i>I acknowledge receipt of the above change or correction and certify that this change or correction will be entered within five (5) working days and that the superseded pages will be returned in the Naval Warfare Publications Library.</i></p>		
SIGNATURE (5)	DATE (6)	
PART 1 S/N 0107-LF-050 7062		
<p><i>I certify that the above change or correction has been entered and the list of effective pages was checked against the contents of the basic publication, and the superseded pages and residue of the change were returned to the Naval Warfare Publications Library.</i></p>		
NOTE: Missing pages or other defects should be reported in the REMARKS space above.		
SIGNATURE (7)	ENTRY DATE (8)	
PART 2 S/N 0107-LF-050-7062		
CHANGE ENTRY CERTIFICATION OPNAV 5070/12 (REV. 1-79)		RETURN TO NAVAL WARFARE PUBLICATIONS LIBRARY

AMR00036

Figure 2-23.—Change Entry Certification record.

2002 for currency, and a requisition must be prepared for any changes needed to update the CTPL. Complete verification and audit requirements are contained in NAVAIR 00-25-100. The central library audits dispersed libraries at least quarterly to ensure that their publications are current and in good material condition.

- Q54. What division has overall management responsibility for the technical library?*
- Q55. In an activity with more than one publications library, who is responsible for determining the activity's publication needs?*
- Q56. When a central library has other technical libraries within the command, these libraries are known as what type of libraries?*
- Q57. What list includes publications and directives of a general nature that have no application to a specific weapons system?*

- Q58. What list includes publications and directives that apply to a specific weapons system or equipment?*
- Q59. What is the purpose of the central technical publications library stamp?*
- Q60. What form does the CTPL use to ensure that changes and revisions to publications are incorporated in a timely manner when issued to a dispersed library?*
- Q61. How long are part 2 copies of the CECR maintained by the central librarian?*
- Q62. To ensure their publications are current and in good material condition, the central library audits dispersed libraries at least how often?*

**TECHNICAL PUBLICATION
DEFICIENCY REPORT (TPDR)**

LEARNING OBJECTIVE: Identify the procedures used in reporting technical publication deficiencies.

invalid, and provides a follow-up on each deficiency report to ensure the appropriate action is taken.

All technical publication deficiencies that meet the criteria for safety messages must be submitted in the prescribed message format. You should refer to the *Naval Aviation Maintenance Program*, OPNAVINST 4790.2, for the format and content of the message and the procedures for filling out OPNAV 4790/66.

Discrepancies or change recommendations of a routine nature concerning the technical content of a NATOPS or tactical type of manual deficiency are submitted on a NATOPS/Tactical Change Recommendation, OPNAV Form 3500/22, and submitted to the cognizant NATOPS and/or tactical model manager. Changes of an urgent nature should be submitted directly to the NATOPS advisory group member, through the chain of command, by priority message.

Q63. What report is used to improve the quality and accuracy of technical publications?

Q64. What manual provides format and content of the information required in a technical publications deficiency report?

SUMMARY

This chapter discussed the different types of publications and manuals as well as the methods used in updating them. However, it is beyond the scope of this manual to cover each type of Navy publication. We have attempted to cover the main manuals, directives, and indexes that will aid you in your daily tasks. You are not expected to be an expert in all areas of your job. With the correct use of publications, however, you can be knowledgeable. When in doubt, look it up. It goes without saying that the most updated information and resources must be maintained by you, the technician. If you're working from memory, then you're in doubt. Things change rapidly, and you can only be sure by looking it up. You, the technician, should be aware of the changed materials and methods. Be a good example, not a statistic of ignorance. Use your publications.

ANSWERS TO REVIEW QUESTIONS

- A1. *Technical publications.*
- A2. *NAVAIR 00-25-100, Naval Air Systems Command, Technical Manual Program.*
- A3. *Military Specifications and commercial.*
- A4. *Two major types-operational and maintenance.*
- A5. *By function and task.*
- A6. *Visible lock-on format, logical arrangement structure, and quick understanding.*
- A7. *The 7-digit WP number and the page within the work package.*
- A8. *A change issues correction pages for an existing technical manual, and a revision is the complete reissue of the entire technical manual with the changes incorporated.*
- A9. *Technical publication deficiency reporting program.*
- A10. *Routine and Rapid Action Changes.*
- A11. *To help the user insert new pages and maintain a record of current pages.*
- A12. *To allow data to be added or changed without making a direct impact on existing information.*
- A13. *The numerical index of effective work packages.*
- A14. *Capital letter suffixes are added to the number of the preceding illustration or table.*
- A15. *To expedite the dissemination of urgent operation and maintenance change information.*
- A16. *Two. The NAVAIR (NA) numbering system and the newer Technical Manual Identification Numbering System (TMINS).*
- A17. *Part I.*
- A18. *Two. The publication identifier (PI) and the suffix.*
- A19. *The third group.*
- A20. *The technical manual (TM) identifier.*
- A21. *That this publication is a maintenance instruction manual.*
- A22. *In most cases the QA required inspections are shown in italics; in some cases those requirements are underlined.*
- A23. *Illustrated Parts Breakdown (IPB).*
- A24. *Six.*
- A25. *Naval Aeronautical Publication Index (NAPI).*
- A26. *Quality assurance division.*
- A27. *To provide information concerning the availability and applicability of technical manuals for maintenance of a particular aircraft model.*

- A28. *Complete operating instructions for a specific aircraft and its operational equipment.*
- A29. *Tactical manual.*
- A30. *General engineering series manuals (01-1A).*
- A31. *Part III is the "type manual. "A "-3" in this position indicates a structural repair manual.*
- A32. *Accessories.*
- A33. *Planned Maintenance System (PMS).*
- A34. *Scheduled or forced removal items and their replacement intervals.*
- A35. *Technical manuals or publications issued through the NAVAIR distribution system.*
- A36. *To preserve human and material resources,*
- A37. *Navy Occupational Safety and Health (NAVOSH) Program, OPNAVINST 5100.23.*
- A38. *Safety precautions applicable to forces afloat.*
- A39. *To provide guidance on acceptable workplace safety and health standards ashore within the Naval Air Systems Command.*
- A40. *It controls and issues all technical directives.*
- A41. *Formal TDs (letter) and interim TDs (message).*
- A42. *Change, interim change, bulletin, and rapid action minor engineering change (RAMEC).*
- A43. *Interim change.*
- A44. *A bulletin.*
- A45. *A message TD, which provides for quick action on minor changes that offer significant advantages to the operating forces.*
- A46. *An amendment and a revision.*
- A47. *The process by which TDs are removed from active files after requirements have been incorporated.*
- A48. *Until it is deleted from the NAVSUP 2002 index.*
- A49. *By an amendment to the TD.*
- A50. *The Technical Directive Control Center at the Naval Air Technical Services Facility.*
- A51. *Immediate action TD.*
- A52. *Routine action TD.*
- A53. *Record purpose.*
- A54. *The quality assurance division.*
- A55. *The central technical publications library (CTPL).*
- A56. *Dispersed technical publications libraries (DTPL).*

- A57. *General Aeronautical Publications List.*
- A58. *The Aeronautical Publication by Weapons System List.*
- A59. *The stamp identifies and numbers all controlled publications.*
- A60. *The Change Entry Certification Record (CECR).*
- A61. *Until completion of the next quarterly audit.*
- A62. *Quarterly.*
- A63. *Technical Publications Deficiency Report (TPDR).*
- A64. *Naval Aviation Maintenance Program, OPNAVINST 4790.2.*