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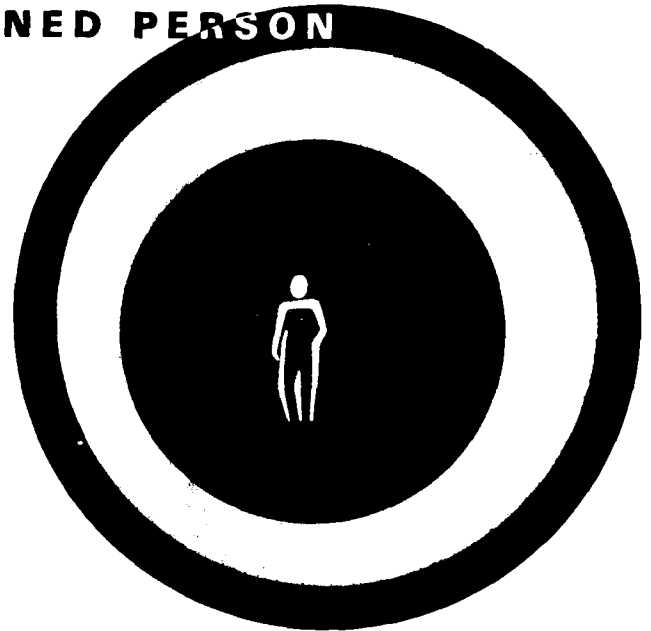
TECHNICAL REPORT NO. 83

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**DEVELOPMENT AND TEST
OF A COMPUTER READABILITY
EDITING SYSTEM (GRES)**

MARCH 1980

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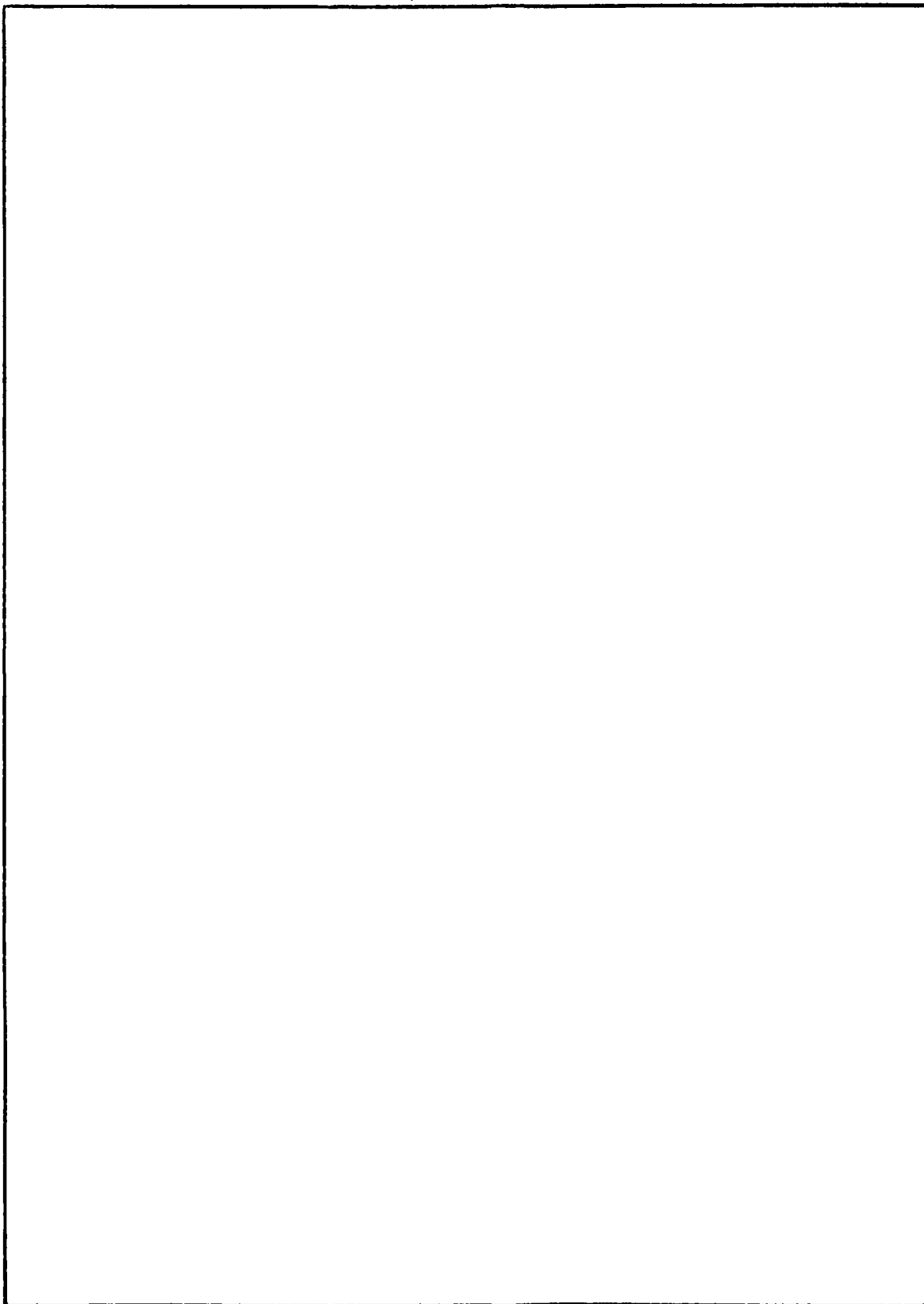
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SECTION I

INTRODUCTION

BACKGROUND

The Navy relies heavily on technical documents for training and maintenance functions. According to figures tabulated by the Naval Technical Information Presentation Program¹ (NTIPP), the Navy's investment in technical manuals is tremendous:

- There are approximately 25 million pages of technical publications in the Navy's current inventory with a value of \$5 billion.
- About 3 million pages of technical publications are issued or reissued annually.
- A typical U.S. Navy ship carries 1,300 technical manuals totaling 325,000 pages.

Unfortunately, these expensive Navy technical materials are often too difficult for enlisted personnel to use. Two major aspects of the problem are articulated in recent studies by the General Accounting Office (GAO):

- A growing number of Navy enlisted personnel have reading deficiencies (GAO, 1977).
- Technical manuals for the U.S. military services are difficult to read and use. In addition, it will cost an estimated \$65 million for the Navy to rewrite them to a lower reading level to enable the recruits of the 1980s to understand them (GAO, 1979).

An additional aspect of the problem with technical manuals was identified in a recent survey conducted for NTIPP (Hughes-Fullerton, 1978). This survey found that technical manuals are used extensively in formal and informal training, but they usually have to be supplemented heavily to be usable as training documents.

The three military services have produced further evidence that technical manuals are written at a level too difficult for use by enlisted personnel. Recent summary publications include: Caylor, Sticht, Fox and Ford, 1973 (Army); Duffy, 1976 (Navy); and Kniffin, Stevenson, Klare, Entin, Slaughter and Hooke, 1979 (Air Force).

The Chief of Naval Education and Training (CNET), in recognition of these problems, tasked the Training Analysis and Evaluation Group (TAEG) to

¹ Personal communication, S. C. Rainey, Technical Manager, NTIPP.

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undertake the development of the Computer Readability Editing System (CRES)² and to develop remedial aids for enlisted personnel with deficient academic skills.³ These tasks are complementary in that both are designed to close the literacy gap.

TAEG Report No. 79 (Kincaid and Curry, 1979) describes the development and test of a remedial reading workbook currently in use for Navy recruits. A companion remedial numerical skills workbook is currently under development and will be described in a future TAEG report.

PURPOSE OF THE REPORT

This report describes the development of a CRES to assist in the improvement of the readability of Navy technical manuals and training materials.

ORGANIZATION OF THE REPORT

In addition to this introduction, the report contains three sections and seven appendices. Section II provides an overview of the CRES and describes each feature of the system, the rationale for its inclusion in the system, and its development. Section III summarizes the results of an evaluation of the effectiveness of the system in helping an editor or writer. Section IV contains conclusions and recommendations. Appendices A through E contain complete listings of the word lists developed for use with the system. Appendix F contains the test passages used to evaluate the system. Appendix G shows an example of the use of the system.

² CNET ltr of 29 June 1978.

³ CNET ltr of 20 December 1978.

SECTION II

DEVELOPMENT OF THE COMPUTER READABILITY EDITING SYSTEM (CRES)

This section contains an overview of the CRES and its operation. It also contains a description of each feature of the system, its development, and the rationale for including it.

OVERVIEW

Figure 1 shows the major components of the CRES. These include the computer equipment and the data files which contain the various features of the system. The CRES was designed to contain features that:

- provide useful feedback for authors and editors to simplify training and technical manual materials
- are consistent with existing DOD and Navy directives governing the preparation of simplified manuals
- can reduce the cost of preparing and revising technical manuals and training materials.

Each of these features is discussed in detail in subsequent paragraphs.

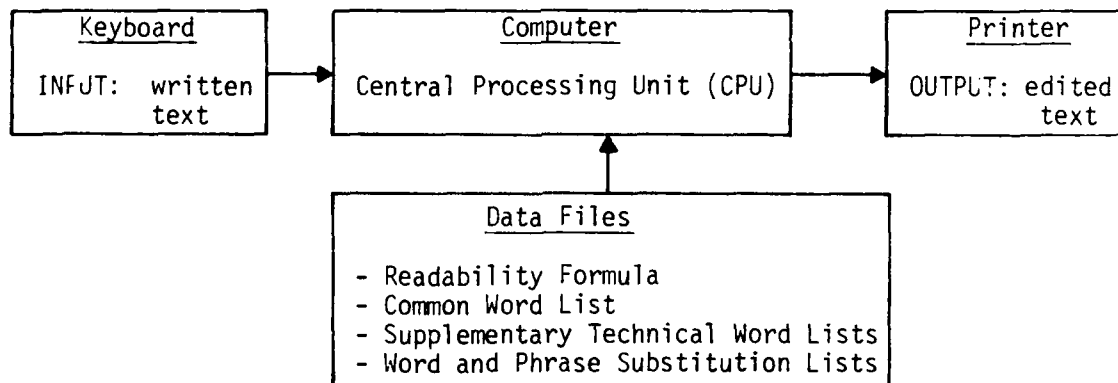


Figure 1. Elements of the Computer Readability Editing System

The basic purpose of CRES is to accept written narrative material, evaluate that material for readability, and suggest editorial changes in content (words) based on stored lists of words which have been developed to reduce the difficulty of reading material.

SYSTEM HARDWARE

The hardware components of CRES include an input device (keyboard), the central processing unit (CPU), mass storage devices (disks and tapes), and the output device (the printer). The specific hardware used in TAEs system includes:

- WANG 2216A or 2236D CRT for displaying and editing
- WANG 2200 VP or MVP CPU
- Flexible disk drive
- WANG 2200 compatible printer
- 15 megabyte platter and compatible 90 megabyte disk drive.

Current cost of this equipment is about \$40,000.

SOFTWARE FEATURES OF THE SYSTEM

READABILITY FORMULA. A readability formula provides a measure of the reading difficulty of a sample of text. The Flesch-Kincaid Readability Formula (Kincaid, Fishburne, Rogers, and Chissom, 1975) is used in the system because it is the DOD standard (MIL-M-38784A, Amendment 5, 24 July 1978). This formula provides a reading grade level of the sample text which refers to the "average" reading ability of those who should be able to understand the text. It is a recalculation of the Flesch Reading Ease Formula (Flesch, 1948).

The formula was developed by testing Navy enlisted personnel on their understanding of passages from rate training manuals. The Flesch-Kincaid Formula is:

$$\text{Grade Level} = .39 (\text{Avg. No. Words/Sentences}) + 11.8 (\text{Avg. No. Syllables/Word}) - 15.59$$

The computer program that calculates this formula is adapted from the General Motors STAR program which was originally designed to calculate the Flesch Reading Ease Formula. The program counts the number of syllables, words, and sentences in a passage of text, then computes the above formula. The grade level thus produced by the editing system serves as a general guide to the writer concerning the appropriateness of the material for the intended readers. If the grade level is too high, the text should be simplified.

Readability formulas provide only a general indication of the overall level of difficulty. The other components of the CRES provide more specific feedback to writers about particular words and sentences.

COMMON WORD LIST. The Common Word List was developed to identify uncommon words. If a word is not on the list, it is presumed to be uncommon. If a word is flagged as *uncommon*, a decision must be made whether to retain it, replace it with a simpler word, or define it. This decision is subjective

and must be made by the author or editor, not by the computer. Simplifying the words used in training and technical manual texts will result in instructional material that is more easily read and understood by the trainee and the technician. The Common Word List is a merged list made up of five published word lists plus one list specifically prepared to include Navy-specific words. The five published lists come from both military and non-military sources. Table 1 contains a short description of each list and gives its source.

TABLE 1. WORD LISTS USED IN THE COMMON WORD LIST

Military Lists	
•	Basic Navy Word List: 1,960 words that appeared 10 or more times in a 240,000 word sample taken from Navy recruit training texts.
•	American Institute for Research List: 1,570 words derived from frequency analysis taken from a 238,480 word sample of Army, Navy, and Air Force training courses.
•	Bureau of Naval Personnel Verb List: 270 verbs derived from recommendations of verbs to be used in occupational standards by the Occupational Standards Committees.
•	Army Familiar Word List: 2,170 words taken from the 2,980 words on the Dale list and modified by deleting uncommon Army words and adding common Army words to the original Dale list.
Nonmilitary Lists	
•	National Cash Register Fundamental (NCR) English Word List: 1,220 words derived by a frequency analysis of a sample of 97,000 words taken from NCR training materials. The published list is the result of two modifications by an NCR panel of users.
•	Basic English Word List: 850 words judged to be the essential words needed for communication developed by English scholar O. G. Ogden and associates over a 10 year period during the 1930s.

The Basic Navy Word List described in table 1 was derived from a computer frequency analysis of the two major documents used in the Navy's recruit training curriculum--Basic Military Requirements (1973) and the 20th edition of The Bluejackets' Manual (1978). The words from these two training manuals were entered into the computer. Only those pages of Basic Military Requirements that the recruits actually read in recruit training were keyed into the computer. All the text of The Bluejackets' Manual was available on machine-readable computer magnetic tape and was used for the frequency analysis. From these two documents almost 240,000 words were analyzed to obtain word frequency counts. Only those words which had a frequency of 10 or more were

included in the Basic Navy Word Lists; acronyms, numbers, and punctuation marks were not included. Also, the list was edited to include only "root words," that is, those words in the present tense and singular. The Basic Navy Word List is made up of two kinds of words: (1) common familiar words that a high school graduate should know and (2) terms that are unique to the Navy or general military environment.

An initial analysis showed that the Basic Navy Word List did not contain a number of obvious common words, such as "none" and "if." Therefore five published word lists, judged to contain a preponderance of words commonly used in Navy training and job reading materials, were added to the Basic Navy Word List. In addition, the Dale-Chall list (Dale and Chall, 1948) and the Harris-Jacobson list (Harris and Jacobson, 1972) were considered but not included because they were deemed inappropriate for Navy enlisted personnel.

Each of the lists described in table 1 was entered into computer memory then merged alphabetically resulting in a list of about 3,200 different root words. Nearly all of these were retained in the final Common Word List. A few of the words from the NCR list were dropped because they were specific to that company. Appendix A contains the Common Word List, including the Basic Navy Word List; appendix B contains the Basic Navy Word List alone.

In the Common Word List described above, each word has only one inflected form. These "root words," however, can have different inflected forms when they actually appear in text. The root words of the Common Word List were expanded by attaching various standard endings to each word. (See table 2 for the inflected endings attached to each word.) These inflected forms of the root words are based on rules developed by Harris and Jacobson (1975).

TABLE 2. RULES FOR INFLECTED ENDINGS

Root word plus	-s (plural), -y, -ly, -ily -s, es, 's (possessive) -d, -ed, -er, -est (comparative)
All words with double consonant before	-ing, -er (comparative), -est
All words dropping final -e before	-ed, -ing, -er (comparative), -est
All words changing y to i before adding	-ed, -es, -er (comparative), -est

An expanded list containing all possible endings for each root word resulted from processing the words by computer with a program designed to apply the rules of table 2. In addition, the expanded list had to be modified to add irregular verbs and a few other word forms. The algorithm of table 2 produced some "nonsense" words (e.g., the word "ship" is expanded by the algorithm to

include words like "shippiest"). The final word list containing the inflected endings is called the "expanded Common Word List." This was the form of the Common Word List actually used in the CRES. The expanded Common Word List is currently being edited to remove nonwords. This will reduce the total number of words in the list from about 37,000 words to about 14,000 words and thus allow faster operation of the system.

SUPPLEMENTARY TECHNICAL WORD LISTS. Although the Common Word List should contain most words in general Navy reading material, it does not contain many technical terms used in specialized reading material. Therefore, it was necessary to construct supplemental lists for use with certain kinds of specialized material.

The technical supplementary lists contain technical terms which are frequently used and commonly known by technical specialists but not by a non-specialist. For example, an electronics technician would certainly know the meaning of "capacitance" whereas a nonspecialist might not. These supplemental lists are a necessary part of the CRES for the editing of text dealing with technical specialties, otherwise the system would flag words like "capacitance" appearing in electronics training materials. Word list categories were chosen to coincide with clusters of ratings within the Navy that use a common core of technical terms. Three Navy occupational groupings were suggested by the Job Oriented Basic Skills (JOBS) Program. The JOBS program is designed to improve the basic skills of sailors with aptitude scores too low to allow them to enter "A" schools. Categories for the lists include: propulsion engineering, electronics, and administrative-clerical. Table 3 shows the three occupational categories and sample ratings within each category.

TABLE 3. OCCUPATIONAL GROUPINGS SUGGESTED BY JOB ORIENTED BASIC SKILLS (JOBS)

Three Occupational Categories and Ratings Within Each Category		
<u>Propulsion Engineering</u>	<u>Electronics</u>	<u>Administrative-Clerical</u>
Boiler Technician Engineman Machinist's Mate	Gunner's Mate Electronics Technician	Yeoman Personnelman Storekeeper

The words which were combined into the final three supplementary lists were taken from three sources: (1) chapters from the Naval Sea Systems Command Manual NAVSEA S9086, (2) glossaries taken from relevant rate training manuals and Navy training courses, and (3) technical word lists taken from manuals published by the Defense Language Institute. After merging words from the three sources for each of the specialty areas, the combined lists were each judged for appropriateness by subject matter experts. References for each of the sources, and the lists to which each contributed, are contained in appendix C along with the lists.

The first source of supplementary words, NAVSEA manual, was chosen because it is a reference source carried aboard many Navy ships and because it contains text generally representative of Navy technical manuals and training materials. A computer frequency analysis was used to identify the most frequently occurring technical words. Words on the Common Word List were excluded from this frequency count. Chapters dealing with lighting and basic electronics contributed to the electronics list. Chapters dealing with damage control and disposal of hazardous materials contributed to the propulsion engineering list. Chapters dealing with administering funds and records and reports contributed to the administrative-clerical list. The text of the six chapters was available on magnetic tape. Words that appeared at least twice were included on the initial list that was subjected to editing by appropriate subject matter experts.

The second source of technical words for the supplementary lists were appropriate rate training manual glossaries. Five rate training manual glossaries were used to obtain technical words for the electronics list, two were used to obtain words for the propulsion engineering list, and one was used to obtain words for the administrative-clerical list. In addition to the rate training manuals cited at the end of appendix C, two glossaries from Navy training courses contributed to the lists: (1) a handout used in Basic Electronics and Electricity "A" School at Orlando, Florida (electronics list) and (2) a handout used in the propulsion strand of JOBS taught at San Diego, California (propulsion engineering list).

The third source of words for the supplementary technical word lists were glossaries contained in manuals published by the Defense Language Institute (DLI). The subject matter for the DLI training courses corresponds to the three specialty lists. The titles of the DLI manuals and the specialty list to which each contributed are Basic Electronics (electronics list), Maintenance and Mechanics (propulsion engineering list), and Clerical and Administrative, (clerical-administrative list).

Words from each of the sources were combined to form a single list for each of the specialties. Subject matter experts (noncommissioned officers and petty officers with appropriate ratings) identified the most important terms in their specialty in a two part process. Initially, a single expert checked those words which "A" School graduates (as listed in table 3) should know. Then a new computer printout was prepared containing only the terms checked. Three subject matter experts then independently rated words on the reduced list using the same criterion. Words in the final supplementary lists, as contained in appendix C, are those that at least two of three subject matter experts identified as necessary to perform the particular specialty.

WORD SUBSTITUTION LISTS. A word substitution dictionary is a feature of the system because a good way to improve the readability of a manual is to replace awkward words with simpler or more specific words. A word substitution list can help an editor to do this. The words to be replaced are unnecessarily long, unfamiliar, or perhaps imprecise. The recommended substitute (or substitutes) is shorter, more familiar, or more precise. Once undesirable words are identified and substitutes offered, the writer makes a decision as to whether or not to replace the word with one of its

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proposed substitutes. A word substitution list and the Common Word List can help a writer with word control.

Two existing word substitution lists were adapted for use in the system. They were the Army Word Substitution List (Cir 310-9, 15 December 1978, Headquarters Department of the Army) and the Navy Verb List (DOD-STD-1685(SH)). Each list consisted of words needing replacement with at least one, sometimes two or more, recommended substitutes. A few of the substitutes were phrases, but most were words. Only two substitutes were retained. The Army word Substitution List (excluding phrases, which were put on a special phrase list) contained 183 words paired with recommended substitutes. The Navy Verb List contained 108 verbs with recommended substitutes. The Navy Verb List also included a number of verbs designated "Use more specific verb" and a number of verbs which were "recommended verbs"; these were not included in the word-substitution list adopted for TAEGs system from the Navy Verb List. Some overlap was noted among the Army List, the Navy Verb List, and the TAEG Common Word List. The purpose of this approach was to test the lists as separate units.

Both of the above lists had been compiled using expert judgment. The major criterion for the inclusion of words in the Army List was that substitutes should be short and often one syllable; thus, its recommended substitutes are the common words of the language. Selection of words for the Navy Verb List followed several guidelines contained in DOD-STD-1685(SH). "The simplest, most familiar, and most concrete words---shall be used. Short words, words typically learned early in life,---shall be preferred." "Concrete and specific language shall be used---", and "nonspecific verbs shall be avoided in favor of verbs designating specific user actions."

To summarize, two strategies were used in compiling the substitution lists: the use of simple, common words and the use of specific verbs. Example 1, table 4, shows substitutes that are common verbs; example 2, table 4, shows substitutes that are more specific verbs than the ones replaced.

TABLE 4. EXAMPLES OF DIFFERENT SUBSTITUTION STRATEGIES

Example No. and Type of Strategy	Word	Substitute	Form
1. Substitutes that are more common verbs than the ones replaced (From the Army List)	affix	put	verb
	constitutes	is	verb
2. Substitutes that are more specific verbs than the ones replaced (From the Navy Verb List)	mate	attach	verb
	stop	shut-down	verb

In the original substitution lists each word appeared with its recommended substitute(s) in only one form. Since a word can appear in a variety of inflected forms in text, each word and its substitute(s) was transformed into several inflected forms for use in computer editing, thus expanding the word substitution lists. Only transformations that maintained like meanings for words and their substitutes were used in the expanded lists.

Table 5 contains a listing and examples of the master guidelines by which transformations of words were achieved. The only transformations used on the Navy Verb List were those which produced verb forms, thus retaining the original nature of the list. The three verb transformations plus the original verb form are shown in example 2 of table 5. Irregular verbs departed from these rules somewhat, usually requiring a past participle form in addition to the four forms shown in example 2, table 5. An irregular verb and its transformations are shown in example 3 of table 5.

All inflected forms of a word were considered to be variations on one root word if they were all of the same part of speech. The root word would be the form originally appearing in the list, and in the case of nouns or verbs would usually be the singular noun form or the plain verb form (see examples 2, 3, and 4 of table 5). When evaluation was of the words themselves, root words were the unit of evaluation.

The expanded Army List contained 725 different word forms, and the expanded Navy Verb List contained 431 different word forms. The number of root words was 261 for the Army List and 108 for the Navy Verb List. The expanded Army List is contained in appendix D and the expanded Navy Verb List in appendix E.

EDITING PROCESS

The operation of the system is illustrated in figure 2. The first step is to select those features of the system which are to be included. Then text is entered either by keying or through the use of magnetic tapes or some other machine-readable medium. After text is entered, each word, except proper names, is compared against the words in a series of lists: the Common Word List, any of several supplemental word lists, and the word and phrase substitution list. If a word is not found on the Common Word List and any supplemental word list which might be in use, it is flagged. If a word or phrase contained in the substitution list is encountered, it is flagged and one or two generally better substitutes are provided.

⁴ A few of the inflected forms of the Army List had been excluded prior to this count. These exclusions were due to the word and its substitute being inappropriately matched for this particular form. The total number of such exclusions was 22.

TABLE 5. EXAMPLES OF WORD TRANSFORMATION

Example No. and Type of Transformation	Original Word		Transformed Word	
	Word	Substitute Form	Word	Substitute Form
1. A transformation that leads to nonequivalent meanings	employ	use verb	employer	user noun
2. Three transformations for regular verbs	activate	start verb, plain	activated activating activates	started starting starts verb, past verb, present participle verb, singular
3. Four transformations for irregular verbs	elect	choose verb, plain	elected elector electing elects	chose chosen choosing chooses verb, past verb, past participle verb, present participle verb, singular
4. Three transformations for nouns	location	place noun, singular	locations location's locations'	places place's places' noun, plural noun, possessive noun, plural possessive

NOTE: Additional grammatical variations are possible but these are by far the most common.

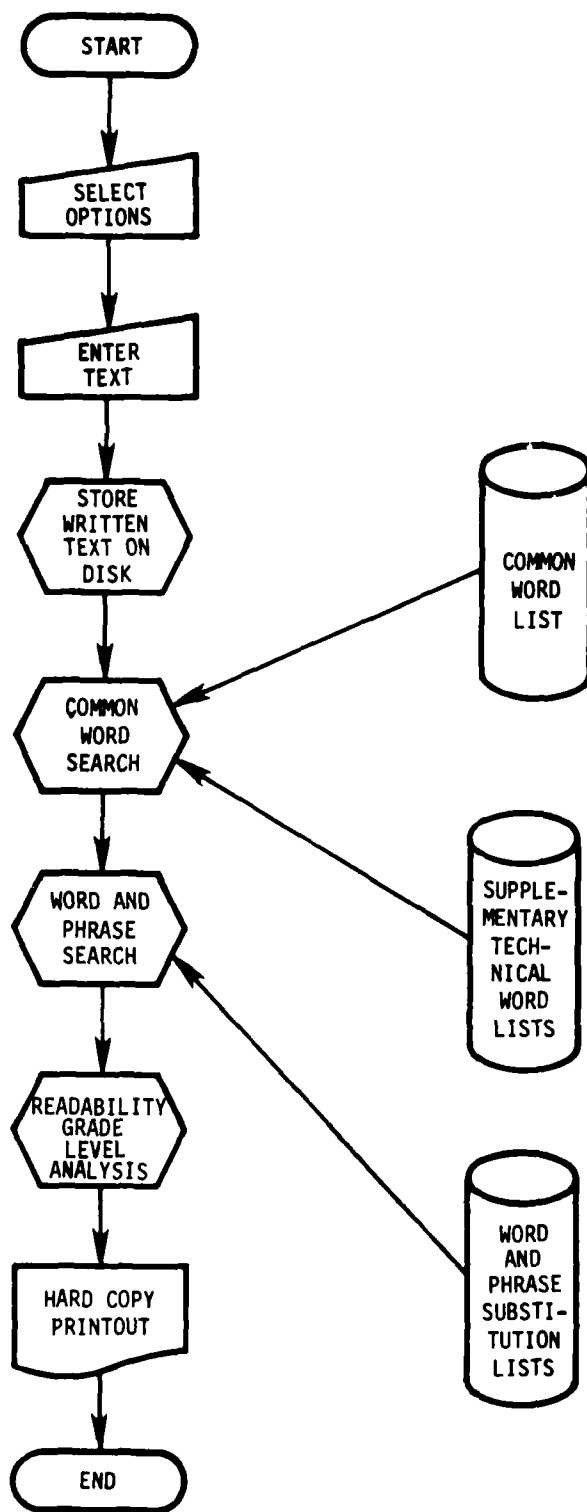


Figure 2. Flowchart Showing Phases of Editing by the Computer Readability Editing System

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The printout in figure 3 contains this text along with computer-generated editing notes. Changes and corrections are done by the author or editor using his judgment as well as the computer-generated suggestions.

The printout illustrates features of the editing system which:

- flag uncommon words--those not on the Common Word List or supplementary technical word lists being used
- flag long sentences--those over 22 words
- suggest replacements for awkward words and phrases
- provide the grade level of difficulty according to the DOD readability standard--the Flesch-Kincaid Formula.

In addition, the system flags misspelled words if they are not on the Common Word List.

The printout in figure 4 shows the revised text. All changes made were suggested by the CRES. Note that the reading grade level of the revised text is 8.0, a considerable improvement over the 17.1 grade level of the original text.

An additional, more detailed example of the evaluated and revised text using the CRES is shown in appendix G.

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~~Under no circumstances should any person reach within or enter the~~
~~(enclosure) for the purpose of servicing or adjusting the equipment~~
~~by yourself. Make sure~~
~~without presence or assistance of another person~~
~~able to help is with you~~
~~responsible of~~ 1/ Do not depend
 upon door switches or interlocks for protection. ~~but~~ always shut
 down motor generators or other equipment. ~~Under no circumstances~~
~~should~~ any access gate, door, or other safety interlock switches
~~removed, (short circuited, or, tampered) with in any way, by~~
~~other than~~ authorized maintenance personnel, ~~nor should~~ ^{can do this.} ~~(reliance)~~
~~be~~ ^{Do not depend on} ~~(placed)~~ ~~(PUT)~~ upon the interlock switches for removing
 voltages from the equipment. /2/

----- READABILITY RESULTS -----

Number of Sentences	Number of Words	Number of Syllables
3	95	164
Avg. Number of Words per Sentence	Avg. Number of Syllables per Word	
31.66	1.72	
GRADE LEVEL (Based on DOD Readability Standard)		
17.1		

----- WORDS NOT ON BASIC LIST -----

WORD	FREQ	WORD	FREQ
enclosure	1	reliance	1
short-circuited	1	tampered	1

----- NOTES -----

- / 1/ This sentence contains 32 words - consider shortening it.
- / 2/ This sentence contains 44 words - consider shortening it.

Figure 3. Warnings About Electrical Equipment;
 Computer Analysis of Original Text
 with Hand Editing Notes (Grade Level 17.1)

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Do not reach within or enter the [enclosure] to service or adjust the equipment by yourself. Make sure another person able to help is with you. Do not depend upon door switches or interlocks for protection; always shut down motor generators or other equipment. Do not remove, or short circuit any access gate, door, or other safety interlock switch. Only authorized maintenance personnel can do this. Do not depend on the interlock switches for removing voltages from the equipment.

----- READABILITY RESULTS -----			
Number of Sentences	Number of Words	Number of Syllables	
7	79	129	
Avg. Number of Words per Sentence	Avg. Number of Syllables per Word		
11.28	1.63		
GRADE LEVEL	(Based on DOD Readability Standard)		
8.0			
----- WORDS NOT ON BASIC LIST -----			
WORD	FREQ	WORD	FREQ
enclosure	1		

Figure 4. Warnings About Electrical Equipment;
Computer Analysis of Revised Text
(Grade Level 8.0)

SECTION III

TEST OF THE COMPUTER READABILITY EDITING SYSTEM

Each feature of the CRES was tested using carefully chosen samples of text representative of a wide variety of Navy training materials and technical manuals. Altogether more than 10,000 words of text (described below) constituted the test passages.

The following paragraphs describe the test materials, specific procedures used to evaluate the CRES, and the results of this evaluation.

TEST PASSAGES

The passages used to test the Common Word List and the word substitution lists included: (1) FORCAST (Caylor, Sticht, Fox, and Ford, 1973) and Kincaid (Kincaid, Fishburne, Rogers, and Chissom, 1975) passages, (2) Naval Sea Systems Command (NAVSEA) passages, and (3) instructional and procedural passages. The test passages, except for the Kincaid and the FORCAST passages, are contained in appendix F. This appendix also contains a listing of source documents from which the passages were taken.

The FORCAST and the Kincaid passages are general test passages taken from a variety of military texts. These test passages were used originally to develop readability formulas specifically for military use and were considered appropriate to test the CRES as well. The overall reading grade level of these passages covered a range of readability levels from the seventh grade to college graduate.

The NAVSEA passages were used to test both the Common Word List and the word substitution lists. These were selected because they are frequently used aboard ship to describe various common operating and maintenance tasks. These are technical manual chapters that cover a wide variety of occupational specialties such as damage control, electronics, lighting, and hazardous materials. The overall reading grade level of these NAVSEA passages is relatively high; the approximate grade levels were from the 12th grade to well above college graduate level.

The procedural and instructional test passages were also used to test both the Common Word List and the word substitution lists. The instructional passages were taken from manuals on such topics as aircraft radar maintenance, uniform regulations, Army equipment operations, and damage control. The procedural passages were taken from missile maintenance instructions and tactical computer maintenance instructions. The readability grade levels for these passages are in the low range; grade levels ranged from the 8th to the 12th grade.

In summary, the test passages cover a wide variety of material that Navy enlisted personnel would have to read. They have been taken from procedural and instructional texts as well as training manuals and were written at a wide range of readability grade levels.

EVALUATION OF CRES FEATURES

READABILITY FORMULA. The readability formula was the first feature of the system to be programmed for the computer and tested. The Flesch-Kincaid Formula is based on the number of sentences, number of words, and number of syllables. An accurate manual count had been made of each of the 18 passages used in the present analysis. Agreement between the manual and computer counts was nearly perfect. Correlation coefficients for each of the pairs of these three factors were above .99.

COMMON WORD LIST. Evaluation of the Common Word List was basically a subjective process. It consisted of judging whether or not words flagged as uncommon did, in fact, appear to be uncommon. Each passage from the test passages was analyzed using the Common Word List. A listing of words not on the Common Word List was printed at the bottom of each analyzed passage. As a result of a subjective judgment by the authors of this report, it was concluded that the Common Word List was sufficiently complete for most purposes. It was judged that fewer than 1 percent of words in the test passages were inappropriately flagged as uncommon.

WORD SUBSTITUTION LISTS. The word substitution lists required a more thorough evaluation than other features of the system because each substitution made in the CRES analysis of the test passages had to be separately judged by a variety of measures. A description of these measures is presented next, followed by the results of the application of these measures to the test passages.

Evaluation Criteria. Three measures were selected to be used as criteria to evaluate the word substitutions:

- the reduction in grade level from a word to its first substitute, where grade level means the lowest grade in which most individuals know the meaning of the word
- the change in specificity from a word to its first substitute, where specificity is determined by the number of different meanings of a word
- the percent of proposed substitutions that were judged accurate, or appropriate.

Reduction in grade level is a measure of special importance because of its relation to the first of the two word requirements stated in DOD-STD-1685(SH). As discussed above, paragraph 4.4.1 of DOD-STD-1685(SH) emphasized that words used in publications should be simple, familiar, and learned early in life. Both the Army List and the Navy Verb List were designed using this concept.

The evaluation was applied to two different units: individual words with their recommended substitutes and entire substitution lists. The list evaluation is valuable in determining how well already-existing substitution lists perform in actual use. The individual word evaluation is valuable in deciding which word and recommended substitute pairs to keep and which to

discard. For word evaluation, the different inflected forms were grouped into root words, as described above, and the root word was the unit of evaluation.

Grade Level Reduction. The reduction in grade level from a word to its first substitute was determined by use of The Living Word Vocabulary (Dale and O'Rourke, 1976). This publication is a national inventory of the word knowledge of children and young adults in grades 4, 6, 8, 10, 12, 13, and 16. A grade level was obtained from this source for each word and for each first substitute.⁵ This was usually the grade at which at least 67 percent, but less than 85 percent, knew the meaning of the word.⁶ The reduction in grade level was obtained by subtracting the substitute's grade level from the word's grade level. After finding the grade level reduction for each word and first substitute pair in this way, the grade level reduction for each list was determined by taking the mean grade level of all word and first substitute pairs in the list.⁷ Generally, the lower the grade level of a word, the more familiar it is. When substitutes reduce grade level, they are replacing words with more familiar, simpler substitutes.

Specificity. Change in specificity was determined by referring to specific information contained in Dale and O'Rourke (1976). Words often have several meanings. Dale and O'Rourke listed only what they considered the most common definitions for each word. For each word and for each first substitute, the number of meanings listed in this source was found. Since being specific means that a word has relatively few meanings, the fewer the number of meanings the more specific the word. If a substitute has fewer meanings than the word it replaced, the substitute is more specific than the original word. Conversely, if the substitute has more meanings, it is not as specific as the original word. The change in specificity for an entire list was determined by taking the average number of meanings for words and for first

⁵For a few words or substitutes a grade level was not available. A grade level reduction could not be determined for such cases. When the grade level was missing for either a word or its first substitute, both were excluded from computation of the mean grade level reduction for the list.

⁶Many common words have several meanings. Dale and O'Rourke list all of the commonly used meanings for each word, with a grade level for each meaning. The intended meaning of each word in the Army List and the Navy Verb List was usually obvious when the word was compared to its recommended substitute. Likewise, the intended meaning of each substitute was usually obvious when the substitute was compared to its word. Percent levels of 67-85 were arbitrarily chosen by the authors.

⁷The N for this mean was the total number of word forms in the list minus the number of pairs which were excluded. The number of pairs excluded from the Army List was 123 of 727, and the number excluded from the Navy Verb List was 152 of 431.

substitutes of the list and then comparing them to find the mean change in specificity for the list.^{8,9}

Percent of Accurate Substitutions. The appropriateness of word substitution was rated by two TAEG personnel assigned to the computer readability editing project using a rating scale which featured a forced-choice (accurate vs. inaccurate) decision plus an assessed degree of the accuracy or inaccuracy.

The rating of accuracy of a substitution was based on whether the substitute would have the same meaning in the context of the passage as the original word and would fit the sentence well. Whether the substitution made reading easier was judged by grade level reduction and specificity; thus, accuracy was judged by similarity of substitutes. Only the word with the higher rating was used because writers would use only the better substitute.

Evaluation of Two Word Substitution Lists. The Army List and the Navy Verb List were evaluated for specificity, grade level reduction, and percent of accurate substitutions. Separate measures were kept for three types of passages: NAVSEA, procedural, and instructional. As mentioned above, the NAVSEA manual is a widely used document containing both procedural and instructional passages.

Grade Level Reduction. For the Army List the mean grade level reduction from a word to its first substitute was 7.9 to 5.0, a mean reduction of 2.9 grade levels. For the Navy Verb List the mean grade level reduction from a word to its first substitute was 7.1 to 4.9, a mean reduction of 2.2 grade levels. The grade level reduction was greatest for the Army List, but both lists showed substantial reductions.

Specificity. The mean change in specificity from a word to its first substitute for the Army List was from 1.98 meanings to 4.27 meanings, an increase of 2.29 meanings. For the Navy Verb List this same change was from 2.66 meanings to 3.86 meanings, an increase of 1.20 meanings. For both lists, going from words to their substitutes caused an increase in generality although reducing grade level.

⁸Some words and some first substitutes were not listed by Dale and O'Rourke (1976). When either a word or its first substitute was missing, both were excluded from computation of the mean change in specificity for their list. The number of excluded pairs for the Army List was 22 and for the Navy Verb List was 34. This mean was based on the number of words in the original substitution lists prior to expansion. The Ns were then, for the Army List, 183 minus 22 and for the Navy Verb List, 108 minus 34.

⁹Dale and O'Rourke (1976) did not list all meanings of each word. Using criteria of their own they apparently selected enough meanings of each word to cover its usual uses. The selection of different meanings is discussed by Dale and O'Rourke on page III of the introduction. Because not all meanings were used, the number of meanings listed by these authors might not be an interval scale of specificity; this measure should be an excellent approximation to specificity, however, at the rank-order level or better.

Tradeoff Between Grade Level Reduction and Specificity. There was a tradeoff between lists in these measurements. The Army List achieved the most grade level reduction but at the cost of specificity. The Navy Verb List was more specific but had less grade level improvement. The substitutes were more familiar and simple but less specific than the words they replaced. Thus, the substitution lists moved in the direction of the first requirement of DOD-STD-1685(SH) but did not move in the direction of the second requirement. That only one of these measures moved in the desired direction is not surprising. Common words usually have more meanings than uncommon words; therefore, to increase familiarity is usually to reduce specificity. Some substitutes satisfied one requirement while others satisfied the other requirement, but most reduced grade level.

Percent of Accurate Substitutions. Table 6 shows the percent of proposed substitutions which were judged accurate. The values in the table are the means of two raters. Separate values were calculated for each list and kind of text.

TABLE 6. PERCENT OF PROPOSED SUBSTITUTIONS JUDGED ACCURATE AND NUMBER OF PROPOSED SUBSTITUTIONS (BY LIST AND TEST SELECTION)

List	Type of Text			Overall
	NAVSEA	Procedural	Instructional	
Army				
No. Proposed Substitutions	112	103	125	340
Percent of Accurate Substitutions	71.0%*	77.2%*	80.4%*	76.2%**
Navy Verb				
No. Proposed Substitutions	50	129	43	222
Percent of Accurate Substitutions	46.0%*	66.0%*	74.0%*	66.1%**

* The percent was computed for each rater and then averaged over the two raters.

** The total number of accurate substitutions divided by the total number of proposed substitutions for each rater, averaged for the two raters.

For each text selection the Army List was higher in accuracy of substitutions than the Navy Verb List with an overall difference between the two lists of 13.2 percent. The Navy Verb List had an especially low percentage of accurate substitutions when used with the NAVSEA text. The Army List also had its lowest percent of accurate substitutions when used with the NAVSEA text, but the difference between this percentage and those with the other two text selections was less severe with the Army List than with the Navy Verb List.

The test of the Army List showed it to give accurate substitutes with reasonably good success--three of four proposed substitutions had the correct meaning. Also, its percent of accurate substitutions was fairly consistent over different sources of text.

The Army List made more than $1\frac{1}{2}$ times as many proposed substitutions, overall, as the Navy Verb List made, presumably because the Army List is longer and is not restricted to verbs.

The Navy Verb List made many more proposed substitutions when it was used with the procedural text than when used with either of the other two types of text--three times the number of proposed substitutions made with the instructional text and over $2\frac{1}{2}$ times the number made with the NAVSEA text. That this was not due to the procedural text being longer can be seen by looking at the number of proposed substitutions made by the Army List--fewer with the procedural text than with the other two selections. The Navy Verb List's increased number of proposed substitutions when used with the procedural text was probably related to the criteria guiding the list's construction.

In comparing the Army List and the Navy Verb List, the Army List produced the largest grade level reduction, the highest overall percent of accurate substitutions, and the greatest overall frequency of accurate substitutions. The Navy Verb List proved to be more specific than the Army List.

The Army List produces simple words as substitutes, produces them in fair numbers, and with reasonable accuracy. Also, it seems to perform consistently when used with text selections from different sources. The only problem associated with its use is that the substitutions usually are more general than the words replaced. The Army List seems to be reliable and useful in a variety of situations.

The Navy Verb List seems to have its greatest usefulness with a particular type of material--highly technical writing, such as descriptions of procedures to be followed. This list produces many proposed substitutions when used with such material and produces them with sufficient accuracy. (It was competitive with the Army List on this type of material.) Thus, the Navy Verb List seems to be more specialized than the Army List, working best on the material for which it was apparently designed.

This evaluation of the Army List and the Navy Verb List has been based on the complete lists. Modifications of the lists might result in still better performance.

SECTION IV

CONCLUSIONS AND RECOMMENDATIONS

This section contains conclusions about operation of the prototype system and recommendations for its use by the Navy for improving the quality of training materials and technical manuals.

CONCLUSIONS

Specific conclusions regarding operation of the system are given below.

1. The particular configuration of hardware used in the prototype system represents a reasonable cost (about \$40,000) and produces analyses with sufficient speed to be useful in a production context.
2. The computerization of the Flesch-Kincaid Readability Formula has the potential for saving considerable time in the verification and control of readability grade levels for technical manuals produced under military contract. This formula is the DOD standard for readability measurement (MIL-M-38784A, Amendment 5, 24 July 1978), making its use a frequent contractual requirement imposed by the Army and Navy.
3. The feature of the system which flags long sentences appears to satisfactorily encourage writers and editors to rewrite and improve such sentences.
4. The Common Word List and Supplementary Technical Lists appear to be reasonably complete. Flagged words were judged to actually be uncommon. An interesting by-product of the Common Word List is that it aids in detecting misspelled words as they may be flagged as uncommon. This feature should prove useful during the proofreading of the text.
5. The word substitution feature of the system may be the most helpful feature to the writer or editor in that it gives the most concrete suggestion for rewriting. Suggested substitutes in the two lists tested gave correct meanings and were simpler than the words they replaced.

There are two military requirements for word use according to DOD-STD-1685(SH): words should be simple and they should be specific. Both of the word substitution lists tested satisfied the first requirement, but neither of them satisfied the second requirement. It would be almost impossible for word substitution lists to bring about improvement on both of these requirements simultaneously, since simplicity and specificity in words tend to be negatively related. Development of future word substitution lists will have to be based on a compromise between these two requirements.
6. The Navy Verb List works best with a certain type of manual--procedures to be followed. With this type of text, the Navy Verb List produces a greater number of accurate substitutions per 100 words of text than the Army List.

7. Users of the system will have to add to the word lists, particularly the supplementary technical lists, to fit unique needs. Some users will need to construct additional word lists for special purposes.

RECOMMENDATIONS

1. The CRES should now be placed in an operational context to insure its applicability. Several military agencies have expressed an interest in using and further developing the system.

2. A cost-benefit analysis should be conducted as part of the operational test of the system.

3. An on-line editing capability should be added to the CRES. The computer program's efficiency should be increased and made transportable between various makes of computer equipment.

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APPENDIX A

THE COMMON WORD LIST

This is the root-word form of the Common Word List. The expanded form of this list was the form actually used for processing in TAEGs computer readability editing system.

A
ABANDON
ABBREVIATION
ABILITY
ABLE
ABNORMAL
ABOARD
ABOUT
ABOVE
ABRASIVE
ABSENCE
ABSENT
ABSOLUTE
ABSORB
ABUSE
ABUSER
ACCELERATE
ACCEPT
ACCEPTABLE
ACCESS
ACCESSORY
ACCIDENT
ACCOMPLISH
ACCORD
ACCORDANCE
ACCORDING
ACCOUNT
ACCOUNTING
ACCUMULATE
ACCURACY
ACCURATE
ACCUSE
ACID
ACKNOWLEDGE
ACOUSTIC
ACRE
ACROSS
ACT
ACTION
ACTIVATE
ACTIVE
ACTIVITY
ACTUAL
ACTUATE
ADAPT
ADAPTABLE
ADD
ADDITION
ADDITIONAL
ADDITIVE

ADDRESS
ADEQUATE
ADHESIVE
ADJECTIVE
ADJUST
ADJUSTMENT
ADMINISTER
ADMINISTRATION
ADMINISTRATIVE
ADVANCE
ADVANCEMENT
ADVANTAGE
ADVERB
ADVERTISEMENT
ADVISE
AFAR
AFFAIR
AFFECT
AFLOAT
AFT
AFTER
AFTERNOON
AFTERWARD
AGAIN
AGAINST
AGE
AGED
AGENT
AGGREGATE
AGO
AGREE
AGREEMENT
AHEAD
AID
AIM
AIR
AIRBORNE
AIRCRAFT
AIRFIELD
AIRPLANE
AIRPORT
AIRSHIP
AIRSPEED
AIRY
ALARM
ALCOHOL
ALCOHOLIC
ALCOHOLISM
ALERT
ALGEBRA

ALGEBRAIC
ALGORITHM
ALIGN
ALIGNMENT
ALIKE
ALL
ALLIES
ALLOCATE
ALLOW
ALLOWANCE
ALLOY
ALMOST
ALONE
ALONG
ALONGSIDE
ALOUD
ALPHABET
ALPHABETIC
ALPHANUMERIC
ALREADY
ALSO
ALTER
ALTERNATE
ALTHOUGH
ALTIMETER
ALTITUDE
ALUMINIUM
ALWAYS
AM
AMERICAN
AMIDSHIPS
AMMONIA
AMMUNITION
AMONG
AMOUNT
AMPERAGE
AMPERE
AMPHIBIOUS
AMPLIFIER
AMPLIFY
AMPLITUDE
AMUSEMENT
AN
ANALOG
ANALYSIS
ANALYST
ANALYZE
ANCHOR
AND
ANGLE

BATHE
BATTERY
BATTLE
BATTLESHIP
BAY
BE
BEACH
BEACON
BEAD
BEAM
BEAN
BEAR
BEARING
BEAT
BEAUTIFUL
BECAME
BECAUSE
BECOME
BECOMING
BED
BEE
BEEN
BEFORE
BEGAN
BEGIN
BEGINNING
BEHOLD
BEHAVIOR
BEHIND
BEING
BELIEF
BELIEVE
BELL
BELLOW
BELONG
BELT
BENCH
BEND
BENEATH
BENEFIT
BENT
BERY
BERTH
BESIDE
BESIDES
BEST
BET
BETTER
BETWEEN
BEYOND

BIAS
BIDIRECTIONAL
BIG
BILGE
BILL
BILLET
BIN
BINARY
BIND
BINDER
BINOCULARS
BIOLOGICAL
BIRD
BIRTH
BIT
BITE
BITING
BITTEN
BITTER
BLACK
BLACKBOARD
BLADE
BLANK
BLANKET
BLAST
BLAZE
BLEED
BLEED
BLEM
BLIND
BLINDFOLD
BLOCK
BLOOD
BLOT
BLOW
BLOWN
BLUE
BLUEPRINT
BLUR
BOARD
BOAT
BOATSWAIN
BOB
BODY
BOIL
BOILER
BOILING
BOLT
BOMB
BOND

BONE
BOOK
BOOM
BOOST
BOOT
BORE
BORESIGHT
BORNE
BORROW
BOTH
BOTTLE
BOTTOM
BOUGHT
BOUNCE
BOW
BOWL
BOX
BOXCAR
BOY
BRAID
BRAIN
BRAKE
BRAKING
BRANCH
BRASS
BRAZE
BREAD
BREAK
BREAKDOWN
BREAST
BREATH
BREEZE
BRICK
BRIDGE
BRIEF
BRIGHT
BRIGHTNESS
BRING
BRISTLE
BRITISH
BROAD
BROADCAST
BROKE
BROKEN
BRONZE
BROOK
BROOM
BROTHER
BROUGHT

CHEST
CHEW
CHIEF
CHILDREN
CHILL
CHIMNEY
CHIN
CHIP
CHOCK
CHOICE
CHOKE
CHOOSE
CHOP
CHOSE
CHURCH
CHURN
CIRCLE
CIRCUIT
CIRCUMFERENCE
CIRCUMSTANCE
CITIZEN
CITY
CIVIL
CIVILIAN
CLAIM
CLAMP
CLANG
CLAP
CLASS
CLASSIFICATION
CLASSIFY
CLASSROOM
CLAY
CLAY
CLEAN
CLEANLINESS
CLEAR
CLEARANCE
CLEAT
CLERICAL
CLERK
CLICK
CLIFF
CLING
CLIP
CLOCK
CLOCKWISE
CLOSE
CLOSURE
CLOTH

CLOTHES
CLOTHING
CLOUD
CLUB
CLUMP
CLUTCH
COAL
COARSE
COAST
COAT
COCKPIT
CODE
COIL
COIN
COLD
COLLAR
COLLECT
COLLECTION
COLLEGE
COLLISION
COLON
COLOR
COLOUR
COLUMN
COMB
COMBAT
COMBATANT
COMBINATION
COMBINE
COMBUSTION
COME
COMFORT
COMFORTABLE
COMMA
COMMAND
COMMANDER
COMMENDATION
COMMENT
COMMERCIAL
COMMISSION
COMMIT
COMMITTEE
COMMON
COMMUNICATE
COMMUNICATION
COMMUNITY
COMPACT
COMPANY
COMPARE
COMPARISON

COMPARTMENT
COMPASS
COMPENSATE
COMPENSATION
COMPETITION
COMPILE
COMPLAINT
COMPLEMENT
COMPLETE
COMPLETION
COMPLEX
COMPLICATE
COMPLY
COMPONENT
COMPOSE
COMPOSITE
COMPOSITION
COMPOUND
COMPRESS
COMPRESSION
COMPRESSOR
COMPRISE
COMPULSORY
COMPUTE
COMPUTER
CONCENTRATE
CONCENTRATION
CONCEPT
CONCERN
CONCLUDE
CONCRETE
CONDENSATION
CONDENSE
CONDENSER
CONDITION
CONDUCT
CONDUCTOR
CONE
CONFIGURATION
CONFINE
CONFINEMENT
CONFUSE
CONFUSION
CONGRESS
CONJUNCTION
CONNECT
CONNECTION
CONSCIOUS
CONSECUTIVE
CONSEQUENCE

CONSIDER
CONSIDERABLE
CONSIDERATION
CONSIST
CONSTANT
CONSTITUTION
CONSTRUCT
CONSTRUCTION
CONTACT
CONTAIN
CONTAINER
CONTAMINATE
CONTAMINATION
CONTENT
CONTENTION
CONTENTS
CONTINUE
CONTINUOUS
CONTRACT
CONTRAST
CONTROL
CONVENIENCE
CONVENIENT
CONVENTION
CONVENTIONAL
CONVERGE
CONVERSION
CONVERT
CONVULSION
COOK
COOL
COOLING
COORDINATE
COORDINATION
COOPER
COPY
CORD
CORE
CORK
CORKER
CORPS
CORRECT
CORRECTION
CORRESPOND
CORRESPONDENCE
CORRESPONDING
CORROSION
COST
COSTLY
COTTAGE

COUGH
COULD
COUNSEL
COUNSELOR
COURT
COUNTER
COUNTERCLOCKWISE
COUNTERMEASURE
COUNTRY
COUPLE
COUPLING
COURSE
COURT
COVER
COX
COXSAIN
CRACK
CRADLE
CRAFT
CRAMP
CRANK
CRASH
CRAWL
CREATE
CREDIT
CREEK
CREEP
CREPT
CREW
CREWMEMBER
CRIME
CRIMP
CRITICAL
CROP
CROSS
CROWD
CROWN
CRUEL
CRUISE
CRUISER
CRUMBLE
CRUSH
CRUST
GRY
CRYSTAL
CUBE
CUBIC
CUFF
CUP
CUPFUL

CURE
CURL
CURRENCY
CURRENT
CURTAIN
CURVATURE
CURVE
CUSHION
CUSTODY
CUSTOM
CUSTOMER
CUT
CUTTING
CYCLE
CYLINDER
DAB
DAILY
DAM
DAMAGE
DAMP
DANGER
DANGEROUS
DARE
DARK
DART
DASH
DATA
DATE
DATE
DAUGHTER
DAVIT
DAWN
DAY
DAYBREAK
DAYTIME
DEACTIVATE
DEAD
DEAF
DEAL
DEALER
DEALT
DEAR
DEATH
DEBIT
DEBRIS
DEBT
DECEMBER
DECIBEL
DECIDE
DECIMAL
DECISION

DECK
DECODE
DECONTAMINATE
DECONTAMINATION
DECORATION
DECREASE
DECREMENT
DEDICATE
DEDUCTION
DEED
DEENERGIZE
DEEP
DEFEAT
DEFECT
DEFECTIVE
DEFEND
DEFENSE
DEFINE
DEFINITE
DEFLECT
DEGREE
DEHYDRATE
DELAY
DELETE
DELICATE
DELIGHT
DELIVER
DELIVERY
DEMOCRACY
DEMONSTRATE
DEMONSTRATION
DENSITY
DENTAL
DEPART
DEPARTMENT
DEPEND
DEPENDENCE
DEPENDENT
DEPOSIT
DEPRESS
DEPTH
DEPUTY
DESCEND
DESCRIBE
DESCRIPTION
DESERT
DESERTION
DESERVE
DESIGN
DESIGNATE

DESIGNATION
DESIRE
DESK
DESPITE
DESTINATION
DESTROY
DESTRUCTOR
DESTRUCTION
DETACH
DETACHMENT
DETAIL
DETECT
DETECTION
DETERMINE
DETONATE
DEVELOP
DEVELOPMENT
DEVIATE
DEVIATION
DEVICE
DEW
DEWATER
DIAGNOSE
DIAGNOSIS
DIAGNOSTIC
DIAGONAL
DIAGRAM
DIAL
DIAMETER
DIAMOND
DIAPHRAGM
DID
DIE
DIESEL
DIFFER
DIFFERENCE
DIFFERENT
DIFFERENTIAL
DIFFERENTIATE
DIFFICULT
DIFFICULTY
DIG
DIGESTION
DIGIT
DIM
DIMENSION
DIODE
DIOXIDE
DIP
DIRECT

DIRECTION
DIRECTORY
DIRT
DIRTY
DISABILITY
DISABLE
DISADVANTAGE
DISASSEMBLE
DISASSEMBLY
DISASTER
DISBURSE
DISCARD
DISCHARGE
DISCIPLINARY
DISCIPLINE
DISCONNECT
DISCONTINUE
DISCOUNT
DISCOVER
DISCOVERY
DISCREPANCY
DISCRETION
DISCUSS
DISCUSSION
DISEASE
DISENGAGE
DISGUST
DISH
DISK
DISLIKE
DISMISS
DISPENSE
DISPLACE
DISPLACEMENT
DISPLAY
DISPOSAL
DISSIPATION
DISTANCE
DISTINGUISH
DISTORT
DISTORTION
DISTRESS
DISTRIBUTE
DISTRIBUTION
DISTRIBUTOR
DISTRICT
DITCH
DIVE
DIVER
DIVIDE

DIVINE
DIVISION
DI
DOCK
DOCUMENT
DOGS
DOLLAR
DOLLY
DONE
DOOR
DOORKNOB
DOORSTEP
DOME
DOT
DOUBLE
DOUNT
DOWN
DOWNSTAIRS
DOWNSTAIR
DOWNWARD
DOWN
DRAFT
DRAIN
DRAIN
DRAIN
DRAIN
DRAINER
DRAINING
DRAIN
DRESS
DREN
DRIED
DRIFT
DRILL
DRINK
DRIP
DRIVE
DRIVEN
DRIVER
DRIVING
DROP
DROVE
DOWN
DOWNSY
DRUG
DRUM
DRUNK
DRY
DUAL

DUCK
DUE
DUG
DULL
DUMP
DUMP
DURATION
DURING
DUST
DUTY
DWELL
DWELT
DYE
DYNAMIC
EACH
EAGLE
EAR
EARLY
EARN
EARTH
EASE
EASILY
EAST
EASY
EAT
ECONOMY
EDGE
EDIT
EDUCATION
EDUCATIONAL
EDUCTOR
EFFECT
EFFECTIVE
EFFECTIVENESS
EFFICIENCY
EFFICIENT
EFFORT
EGG
EIGHT
EIGHTEEN
EIGHTH
EIGHTY
EITHER
EJECT
ELAPSE
ELASTIC
ELBOW
ELECTION
ELECTRIC
ELECTRICAL

ELECTRICIAN
ELECTRICITY
ELECTRODE
ELECTRON
ELECTRONIC
ELECTRONICS
ELEMENT
ELEVATE
ELEVEN
ELIGIBILITY
ELIGIBLE
ELIMINATE
ELSE
ELSEWHERE
EMBARK
EMBED
EMBOSS
EMERGENCY
EMPLOY
EMPLOYEE
EMPLOYMENT
EMPTY
ENABLE
ENCODE
END
ENDORSE
ENEMY
ENERGIZE
ENERGY
ENFORCE
ENGAGE
ENGINE
ENGINEER
ENGINEERING
ENGINEER
ENLIST
ENLISTMENT
ENOUGH
ENSIGN
ENSURE
ENTER
ENTIRE
ENTITLE
ENTRANCE
ENTRY
ENVELOPE
ENVIRONMENTAL
EQUAL
EQUATE
EQUATOR

EQUIP
EQUIPMENT
EQUIPPED
EQUIVALENT
ERASE
ERECT
ERROR
ESCAPE
ESCORT
ESPECIALLY
ESSENTIAL
ESTABLISH
ESTABLISHMENT
ESTIMATE
ETCH
EVACUATE
EVALUATE
EVALUATION
EVAPORATE
EVE
EVEN
EVENING
EVENT
EVENTUAL
EVENTUALLY
EVER
EVERY
EVERYBODY
EVERYDAY
EVERYONE
EVERYTHING
EVERYWHERE
EXACT
EXAMINATION
EXAMINE
EXAMPLE
EXCEED
EXCELLENT
EXCEPT
EXCEPTION
EXCESS
EXCESSIVE
EXCHANGE
EXCITE
EXCLUDE
EXCUSE
EXECUTE
EXECUTION
EXECUTIVE
EXERCISE

EXHAUST
EXIST
EXISTENCE
EXISTING
EXIT
EXPAND
EXPANSION
EXPECT
EXPECTED
EXPERIENCE
EXPERT
EXPIRATION
EXPLAIN
EXPLANATION
EXPLOSION
EXPLOSIVE
EXPOSE
EXPOSURE
EXPRESS
EXTEND
EXTENDED
EXTENSIVE
EXTENT
EXTERNAL
EXTINGUISH
EXTRA
EXTREME
EYE
FABRICATE
FACE
FACEPIECE
FACILITY
FACING
FACT
FACTOR
FACTORY
FAHRENHEIT
FAIL
FAILURE
FAINT
FAIR
FAKE
FALL
FALLEN
FALLOUT
FALSE
FAMILIAR
FAMILY
FAN
FANTAIL

FAR
FARAWAY
FARE
FARM
FARTHER
FASHION
FAST
FASTEN
FASTENER
FAT
FATAL
FATHER
FATHOM
FAULT
FEAR
FEATHER
FEATURE
FEBRUARY
FED
FEDERAL
FEE
FEEBLE
FEED
FEEDBACK
FEEL
FEELING
FEET
FELL
FELLOW
FELT
FEMALE
FENCE
FERTILE
FEW
FIBER
FICTION
FIELD
FIFTEEN
FIFTH
FIFTY
FIGHT
FIGHTER
FIGURE
FILE
FILL
FILM
FILTER
FINAL
FINALIZE
FINALLY

GEOGRAPHY
GET
GETTING
GIBNET
GIB
GIVE
RIVER
GLANCE
GLASS
GLAZE
GLEAM
GLIDE
GLOSSARY
GLOVE
GLOW
GLUE
GO
GOAL
GOAT
GOES
GOOGLES
GOLD
GONE
GOOD
GOT
GOVERN
GOVERNMENT
GOVERNOR
GRAD
GRADE
GRADUAL
GRAIN
GRAM
GRAND
GRANT
GRAPH
GRASP
GRASS
GRAVE
GRAVEL
GRAVITY
GRAY
GREASE
GREAT
GREEN
GREET
GREY
GREY
GRID
GRIND

GRIP
GROAN
GROCERY
GROOM
GROOVE
GROSS
GROUND
GROUP
GROVE
GROW
GROWTH
GUARD
GUESS
GUEST
GUIDANCE
GUIDE
GUIDELINE
GUILT
GULF
GUM
GUN
GUNFIRE
GUNNERY
GUNPOWDER
GUY
HABIT
HAD
HAIL
HAIR
HAIRPIN
HALF
HALL
HALT
HAMMER
HAND
HANDFUL
HANDLE
HANDLING
HANDS
HANDWRITING
HANG
HANGAR
HANGING
HAPPEN
HAPPY
HARBOR
HARD
HARDEN
HARDENED
HARDLY

HARDNESS
HARDSHIP
HARDWARE
HARM
HARMFUL
HARMONIZE
HARMONY
HARNESS
HARPOON
HAS
HASTE
HASTY
HAT
HATCH
HATCHET
HATE
HAUL
HAVE
HAZARD
HAZARDOUS
HE
HEAD
HEADER
HEADQUARTERS
HEADSET
HEALTH
HEALTHY
HEAP
HEAR
HEARD
HEARING
HEART
HEAT
HEAVE
HEAVING
HEAVY
HEEL
HEIGHT
HELD
HELICOPTER
HELMET
HELMSMAN
HELP
HELPFUL
HEM
HER
HERE
HICKORY
HID
HIDDEN

HIDE
HIGH
HIGHLY
HIGHWAY
HILL
HILLSIDE
HILLTOP
HILLY
HIM
HIMSELF
HIND
HINCE
HINT
HIP
HIPE
HIS
HISS
HISTORY
HIT
HITCH
HITCH
HOLD
HOLDON
HOLE
HOLLER
HONEY
HOING
HONK
HONOR
HONORABLE
HOOD
HOOF
HOOK
HOOP
HOP
HOPE
HORIZON
HORIZONTAL
HORN
HORSE
HORSEPOWER
HOSE
HOSPITAL
HOT
HOTEL
HOUND
HOUR
HOUSE
HOUSEFALL
HOUSING

HOW
HOWEVER
HOWL
HUG
HUGE
HULL
HUM
HUMAN
HUMIDITY
HUMOR
HUMP
HUNDRED
HUNG
HUNK
HUNT
HURRIED
HURRY
HURT
HUSH
HUT
HYDRAULIC
HYGIENE
HYPHEN
I
ICE
ICY
IDEA
IDEAL
IDENTICAL
IDENTIFICATION
IDENTIFY
IDLE
IF
IGHITE
IGNITION
IGNORE
ILL
ILLUMINATE
ILLUSTRATE
ILLUSTRATION
IMAGE
IMAGINE
IMMEDIATE
IMPACT
IMPEDANCE
IMPLEMENT
IMPLY
IMPORTANCE
IMPORTANT
IMPOSE

IMPOSSIBLE
IMPROVE
IMPROVEMENT
IMPULSE
IN
INACTION
INACTIVE
INBOARD
INCENTIVE
INCH
INCLUDE
INCOME
INCORPORATE
INCREASE
INCREMENT
INDEED
INDEPENDENT
INDEX
INDICATE
INDICATION
INDICATOR
INDIRECT
INDIVIDUAL
INDOCTRINATE
INDOORS
INDUCE
INDUCT
INDUSTRY
INFECTION
INFLATE
INFLUENCE
INFORM
INFORMATION
INGREDIENT
INITIAL
INITIALIZE
INITIATE
INJECT
INJECTION
INJURE
INJURY
INK
INLET
INNER
INPUT
INQUIRY
INSECT
INSERT
INSIDE
INSIGNIA

INSPECT
INSPECTION
INSTALL
INSTALLATION
INSTANCE
INSTANT
INSTANTANEOUS
INSTEAD
INSTRUCT
INSTRUCTION
INSTRUCTOR
INSTRUMENT
INSULATE
INSULATION
INSUPANCE
INSURE
INTAKE
INTEGER
INTEGRATE
INTEGRITY
INTELLIGENCE
INTEND
INTENSE
INTENSITY
INTENT
INTERACT
INTERCEPT
INTERCHANGEABLE
INTEREST
INTERESTED
INTERESTING
INTERFACE
INTERFERE
INTERIOR
INTERLOCK
INTERMEDIATE
INTERNAL
INTERNATIONAL
INTERPRET
INTERRUPT
INTERSECT
INTERVAL
INTERVIEW
INTO
INTRODUCE
INTRODUCTION
INVALID
INVENTION
INVENTORY
INVERT

INVESTIGATE
INVESTIGATION
INVITE
INVOICE
INVOLVE
IRON
IS
ISLAND
ISOLATE
ISSUE
IT
ITEM
ITS
ITSELF
IVORY
JACK
JACKBOX
JACKET
JAIL
JAN
JANUARY
JAR
JAW
JAW
JELLY
JERK
JET
JEWEL
JIG
JOB
JOCKEY
JOIN
JOINT
JOURNAL
JOURNEY
JUDGE
JUG
JULY
JUMP
JUMPER
JUNCTION
JUNE
JUNIOR
JUNK
JURISDICTION
JUST
JUSTICE
JUSTIFY
KEEN
KEEP
KEPT

KETTLE
KEY
KEYBOARD
KICK
KILL
KILOGRAM
KIND
KISS
KIT
KITE
KNEE
KNEEL
KNEW
KNIFE
KNIT
KNIVES
KNOB
KNOCK
KNOT
KNOW
KNOWLEDGE
KNOWN
LABEL
LABOR
LABORATORY
LACE
LACK
LADDER
LAID
LAIN
LAKE
LAME
LAMP
LAND
LANDING
LANE
LANGUAGE
LANTERN
LAP
LARD
LARGE
LASH
LAST
LATCH
LATE
LATITUDE
LATTER
LAUGH
LAUNCH
LAUNCHER

LAUNDRY
LAUNDRY
LAW
LAWFUL
LAY
LAYER
LAZY
LEAD
LEADER
LEADERSHIP
LEADING
LEAF
LEAK
LEAKAGE
LEAN
LEAP
LEARN
LEARNING
LEAST
LEATHER
LEAVE
LED
LEE
LEFT
LEG
LEGAL
LEND
LENGTH
LENGTHEN
LENS
LESS
LESSON
LET
LETAL
LETTER
LETTING
LEVEL
LEVER
LIBERTY
LIBRARY
LICE
LICENSE
LICK
LID
LIE
LIEUTENANT
LIFE
LIFEBOAT
LIFT
LIGHT

LIGHTER
LIGHTNING
LIGHTWEIGHT
LIKE
LIKELY
LIMB
LINE
LIMIT
LIMITED
LIMP
LINE
LINEAR
LINEN
LINK
LINT
LIP
LIQUID
LIQUOR
LIST
LISTEN
LIT
LITERAL
LITRE
LITTLE
LIVE
LIVELY
LIVING
LOAD
LOAF
LOAN
LOAVES
LOCAL
LOCALIZE
LOCATE
LOCATION
LOCK
LOCKER
LOCOMOTIVE
LOG
LOGIC
LONE
LONG
LONGITUDE
LOOK
LOOKOUT
LOOP
LOOSE
LOOSEN
LORAN
LOSE

LOSS
LOST
LOT
LOUD
LOVE
LOW
LOWERCASE
LUBRICANT
LUBRICATE
LUBRICATION
LUMBER
LUMP
LUNG
LYING
MACHINE
MACHINERY
MADE
MAGAZINE
MAGNESIUM
MAGNET
MAGNETIC
MAGNETO
MAIL
MAILBOX
MAIN
MAINTAIN
MAINTENANCE
MAJOR
MAJORITY
MAKE
MAKING
MALE
MALFUNCTION
MAN
MANAGE
MANAGEMENT
MANAGER
MANEUVER
MANIFOLD
MANNER
MANUAL
MANUFACTURE
MANUFACTURER
MANY
MAP
MAPLE
MARBLE
MARCH
MARGIN
MARINE

SHAWL
SHEW
SHOWER
SHOWN
SHUT
SHY
SICK
SIDE
SIDEWALK
SIDEWAYS
SIGHT
SIGN
SIGNAL
SIGNALMAN
SIGNATURE
SIGNIFICANT
SILENCE
SILENT
SILICON
SILLY
SILL
SILVER
SIMILAR
SIMPLE
SIMPLY
SIMULATE
SIMULTANEOUS
SINCE
SING
SINGLE
SINK
SIP
SIR
SISTER
SIT
SITE
SITTING
SITUATION
SIX
SIXTEEN
SIXTH
SIXTY
SIAL
SIBER
SKILL
SKIN
SKIN
SKIP
SLANT
SLAY

SLACK
SLAM
SLAP
SLASH
SLATE
SLAVE
SLED
SLEEP
SLEEVE
SLEPT
SLICE
SLID
SLIDE
SLIGHT
SLING
SLIP
SLIPPERY
SLIT
SLOPE
SLOT
SLOW
SLUNG
SMALL
SMART
SMASH
SHELL
SMILE
SMOKE
SMOOTH
SMAIL
SNAKE
SNAP
SHAPPING
SNEEZE
SNOW
SHUG
SO
SOAK
SOAP
SOCIAL
SOCIETY
SOCK
SOD
SOFT
SOIL
SOLD
SOLDER
SOLDIER
SOLE
SOLENOID

SOLID
SOLUTION
SOLVE
SOLVENT
SOME
SOMEBODY
SOMEHOW
SOMEONE
SOMETHING
SOMETIME
SOMETIMES
SOMEWHAT
SOMEWHERE
SON
SONAR
SONG
SOON
SORT
SOUGHT
SOUND
SOUP
SOUR
SOURCE
SOUTH
SPACE
SPADE
SPAN
SPAR
SPARE
SPARK
SPEAK
SPEAR
SPECIAL
SPECIALIST
SPECIALIZE
SPECIALTY
SPECIFIC
SPECIFICALLY
SPECIFICATION
SPECIFY
SPED
SPEECH
SPEED
SPELL
SPEND
SPIKE
SPILL
SPIN
SPINDLE
SPIRAL

SPLASH
SPLICE
SPLINT
SPLIT
SPOIL
SPOKE
SPOKEN
SPARK
SPOON
SPORT
SPOT
SPRING
SPRAY
SPREAD
SPRING
SPRINKLE
SPRUNG
SPUN
SQUADRON
SQUARE
SQUEAK
SQUEEZE
STABILITY
STABLE
STACK
STAFF
STAGE
STAIN
STAKE
STALL
STAMP
STAND
STANDARD
STANDBY
STAR
STARBOARD
STARE
START
STARVE
STATE
STATEMENT
STATIC
STATION
STATIONARY
STATOR
STATUS
STAY
STEADY
STEAM
STEAMER

STEEL
STEEP
STEEPLE
STEER
STEERING
STEM
STEP
STERILE
STERILIZE
STERN
STICK
STICKY
STIFF
STILL
STING
STIR
STITCH
STOCK
STOCKING
STOMACH
STONE
STOOD
STOOL
STOOP
STOP
STOPPED
STOPPER
STOPPING
STORAGE
STORE
STORM
STORY
STOVE
STOW
STOWAGE
STRAIGHT
STRAIGHTEN
STRAIN
STRAND
STRANGE
STRAP
STRATEGIC
STRAW
STREAM
STREET
STRENGTH
STRESS
STRETCH
STRETCHER
STRICT

STRIKE
STRIKEN
STRIKER
STRING
STRIP
STRIPE
STROBE
STROKE
STRONG
STRUCK
STRUCTURAL
STRUCTURE
STRUNG
STUB
STUCK
STUDENT
STUDY
STUFF
STUMP
STUNG
SUBJECT
SUBMARINE
SUBMERGE
SUBMIT
SUBROUTINE
SUBSEQUENT
SUBSTANCE
SUBSTITUTE
SUBSYSTEM
SUBTOTAL
SUBTRACT
SUCCESS
SUCCESSFUL
SUCH
SUCK
SUCTION
SUDDEN
SUFFER
SUFFICIENT
SUGAR
SUGGEST
SUGGESTION
SUIT
SUITABLE
SUM
SUMMARY
SUMMER
SUN
SUNDAY
SUNG

SUNE
SUNLIGHT
SUNNY
SUNRISE
SUNSET
SUNSHINE
SUPERIOR
SUPERLATIVE
SUPERMARKET
SUPERSEDE
SUPERSTRUCTURE
SUPERVISE
SUPERVISION
SUPERVISOR
SUPPLEMENTARY
SUPPLY
SUPPORT
SUPPOSE
SUPPRESSION
SURE
SURFACE
SURGE
SURPLUS
SURPRISE
SURRENDER
SURVEY
SURVIVAL
SUSPECT
SUSPEND
SWALLOW
SWAY
SWAMP
SWARM
SWART
SWEEP
SWEETEN
SWEET
SHELL
SHEPT
SHIFT
SHIN
SHINING
SHING
SWITCH
SHIVEL
SHIRT
SHOE
SYMBOL
SYMPTOM
SYNCHRONISE

SYNTHETIC
SYSTEM
TAB
TABLE
TABLESPOON
TABLET
TABULATION
TACHOMETER
TACK
TACTIC
TACTICAL
TAG
TAIL
TAILOR
TAKE
TAKEN
TAKING
TALK
TALKER
TALL
TAN
TANK
TAP
TAPE
TAPS
TAR
TARGET
TASK
TASTE
TAUGHT
TAUT
TAX
TAXI
TEACH
TEACHING
TEAM
TEAR
TEASPOON
TECHNICAL
TECHNICIAN
TECHNIQUE
TEETH
TELEPHONE
TELL
TELLER
TEMPER
TEMPERATURE
TEMPORARY
TEN
TEND

TENDENCY
TENDER
TENSION
TENT
TENTH
TERM
TERMINAL
TERMINATE
TERRAIN
TEST
TESTIFY
TEXT
THAN
THAT
THE
THEIR
THEM
THEMSELVES
THEN
THEORY
THERE
THEREBY
THEREFORE
THERMAL
THESE
THEY
THICK
THICKNESS
THIMBLE
THIN
THING
THINK
THIRD
THIRSTY
THIRTEEN
THIRTY
THIS
THOROUGH
THOSE
THOUGH
THOUGHT
THOUSAND
THREAD
THREE
THREW
THROAT
THROTTLE
THROUGH
THROUGHOUT
THROW

TANK
TARANT
TARD
TARDON
THURSDAY
THUS
TICK
TICKET
TIDE
TIE
TIGHT
TIGHTEN
TILL
TILT
TIME
TIMING
TIN
TINY
TIP
TIRE
TIRED
TISSUE
TITLE
TO
TODAY
TOE
TOGETHER
TOLD
TOLERANCE
TOLLBOOM
TON
TONE
TONGUE
TOO
TOOK
TOOL
TOOLBOX
TOOT
TOOTH
TOOTHPICK
TOP
TOPSIDE
TOPE
TOPE
TOPPLE
TOPPLE
TOS
TOTAL
TOTE
TOTE

TOURNIQUET
TOW
TOWARD
TOWEL
TOWER
TOWN
TOXIC
TRACE
TRACK
TRACTOR
TRADE
TRAFFIC
TRAIL
TRAILER
TRAILING
TRAIN
TRAINING
TRANSACTION
TRANSCRIBE
TRANSFER
TRANSFORMER
TRANSLATE
TRANSMISSION
TRANSMIT
TRANSMITTER
TRANSPARENT
TRANSPORT
TRANSPORTATION
TRANSVERSE
TRAP
TRASH
TRAVEL
TRAY
TREAT
TREATED
TREATMENT
TREE
TRIAL
TRIANGLE
TRICK
TRIED
TRIGGER
TRIP
TRIP
TROOP
TROOPS
TROUBLESHOOTING
TROPICAL
TROUBLE
TROUBLESHOOT

TROUSERS
TRUCK
TRUE
TRULY
TRUNCATE
TRUNK
TRUST
TRUTH
TRY
TUB
TUBE
TUESDAY
TUG
TUITION
TUMBLE
TUNE
TUNNEL
TURBINE
TURBULENT
TURN
TWELVE
TWENTY
TWICE
TWIG
TWIN
TWINE
TWIRL
TWIST
TWISTED
TWO
TYPE
TYPICAL
UMBRELLA
UNABLE
UNAUTHORIZED
UNCOVER
UNDER
UNDERSTAND
UNDERSTOOD
UNDERWATER
UNDERWAY
UNDESIRE
UNFINISHED
UNFOLD
UNIFORM
UNIMPORTANT
UNION
UNIQUE
UNIT
UNITE

WEST
WET
WEAT
WEATHER
WHEEL
WHEAT
WHENEVER
WHERE
WHEREAS
WHETHER
WHICH
WHILE
WHIP
WHIRL
WHISPER
WHISTLE
WHITE
WHO
WHOLE
WHOLESALE
WHOM
WHOSE
WHY
WIDE
WIDTH
WIGGLE
WILL
WILLFUL
WILLING
WIN
WINCH
MIND
MINDGLASS
MINDON
MINE
MING
MINGWAT
MINTER
WIPE
WIRE
WIRING
WISE
WISH
WITH
WITHDRAW
WITHDRAWAL
WITHIN
WITHOUT
WITHSTAND
WOMAN

WOMEN
WON
WONDER
WOOD
WOODEN
WOODS
WOOL
WOOLEN
WORD
WORE
WORK
WORKMAN
WORKSHEET
WORLD
WORM
WORN
WORRY
WORSE
WORST
WORTH
WOULD
MOUTH
MOVE
WRAP
WRAPPED
WRECK
WRENCH
WRING
WRIST
WRITE
WRITING
WRITTEN
WRONG
WROTE
WRUNG
YARD
YARN
YAW
YEAR
YELL
YELLOW
YES
YESTERDAY
YET
YIELD
YOLK
YOU
YOUNG
YOUR
YOURSELF

YOURSELVES
ZEBRA
ZERO
ZONE

TAEG Report No. 83

APPENDIX B

THE BASIC NAVY WORD LIST

This is the root-word form of the Basic Navy Word List. This list was combined with five others to form the Common Word List.

A
ABANDON
ABILITY
ABLE
ABOARD
ABOUT
ABOVE
ABSENCE
ABSENT
ABUSE
ABUSER
ACCESS
ACCIDENT
ACCOMPLISH
ACCORDANCE
ACCORDING
ACCOUNTING
ACCURACY
ACCURATE
ACCUSE
ACID
ACKNOWLEDGE
ACROSS
ACT
ACTION
ACTIVE
ACTIVITY
ACTUAL
ADD
ADDITION
ADDRESS
ADEQUATE
ADJUST
ADJUSTMENT
ADMINISTER
ADVANCE
AFFAIR
AFFECT
AFLOAT
AFT
AFTER
AGAIN
AGAINST
AGE
AGENT
AHEAD
AID
AIM
AIR
AIRBORNE

AIRCRAFT
ALARM
ALCOHOL
ALERT
ALIGNMENT
ALL
ALLIES
ALLOW
ALLOWANCE
ALMOST
ALONE
ALONG
ALONGSIDE
ALPHABET
ALREADY
ALSO
ALTHOUGH
ALTITUDE
ALUMINUM
ALWAYS
AM
AMERICAN
AMIDSHIPS
AMMONIA
AMMUNITION
AMONG
AMOUNT
AMPHIBIOUS
AN
ANCHOR
AND
ANGLE
ANOTHER
ANSWER
ANTHEM
ANTISUBMARINE
ANY
ANYONE
ANYTHING
APART
APPARATUS
APPEAR
APPEARANCE
APPLICABLE
APPLY
APPOINT
APPREHEND
APPRENTICESHIP
APPROACH
APPROPRIATE

APPROVAL
APPROVE
APPROXIMATE
APTITUDE
ARE
AREA
ARM
ARMAMENT
ARMOR
ARMS
ARMY
AROUND
ARREST
ARTICLE
ARTIFICIAL
AS
ASHORE
ASK
ASSAULT
ASSEMBLY
ASSIGN
ASSIGNMENT
ASSIST
ASSISTANCE
ASSOCIATE
ASSUME
ASTERN
AT
ATMOSPHERE
ATTACH
ATTACK
ATTEMPT
ATTEND
ATTENTION
AUTHORITY
AUTOMATIC
AUXILIARY
AVAILABLE
AVERAGE
AVIATION
AVOID
AWARD
AWAY
AYE
BACK
BACKGROUND
BAD
BADGE
BAG
BALLISTIC

BAND
 BANDAGE
 BARGE
 BARREL
 BASE
 BASIC
 BASIS
 BASKET
 BATTERY
 BATTLE
 BATTLESHIP
 BE
 BEACH
 BEAM
 BEARING
 BECAUSE
 BECOME
 BEEN
 BEFORE
 BEGIN
 BEHIND
 BEING
 BELL
 BELOW
 BELT
 BEND
 BENEFIT
 BERTHING
 BESIDES
 BEST
 BETTER
 BETWEEN
 BEYOND
 BIG
 BILGE
 BILL
 BILLET
 BINOCULARS
 BIOLOGICAL
 BIRTH
 BITTER
 BLACK
 BLANKET
 BLAST
 BLEED
 BLOCK
 BLOOD
 BLOW
 BLUE
 BOARD

BOAT
 BOATSWAIN
 BODY
 BOILER
 BOLT
 BOMB
 BONE
 BOOK
 BOOM
 BOTH
 BOTTOM
 BOW
 BOX
 BOY
 BRAID
 BREAK
 BREAST
 BREATH
 BREATHE
 BRIDGE
 BRIEF
 BRIGHT
 BRING
 BRISTLE
 BRITISH
 BROAD
 BROKEN
 BROUGHT
 BRUSH
 BUILDING
 BUILT
 BULKHEAD
 BUNK
 BUOY
 BUREAU
 BURN
 BURST
 BUSINESS
 BUT
 BUTTON
 BY
 CABLE
 CADENCE
 CALIBER
 CALL
 CAME
 CAMP
 CAN
 CANDIDATE
 CANISTER

CANNISTER
 CANNOT
 CANS
 CANVAS
 CAP
 CAPABILITY
 CAPABLE
 CAPACITY
 CAPSTAN
 CAPTAIN
 CAPTURE
 CARBON
 CARD
 CARE
 CAREER
 CAREFUL
 CARGO
 CARRIER
 CARRY
 CARTRIDGE
 CASE
 CASUALTY
 CATCH
 CATEGORY
 CAUSE
 CAUTION
 CELESTIAL
 CENTER
 CENTERLINE
 CENTRAL
 CEREMONY
 CERTAIN
 CERTIFICATE
 CHAIN
 CHAMBER
 CHAMBRAY
 CHANCE
 CHANGE
 CHAPLAIN
 CHAPTER
 CHARACTERISTIC
 CHARGE
 CHART
 CHECK
 CHEMICAL
 CHEST
 CHIEF
 CHILDREN
 CHOCK
 CHOKE

CHURCH
CIRCLE
CIRCUIT
CIRCUMSTANCE
CITIZEN
CITY
CIVIL
CIVILIAN
CLASS
CLASSIFICATION
CLEAN
CLEANLINESS
CLEAR
CLEARANCE
CLEAT
CLERICAL
CLICK
CLOCKWISE
CLOSE
CLOSURE
CLOTH
CLOTHES
CLOTHING
COAST
COAT
CODE
COIL
COLD
COLLAR
COLLEGE
COLLISION
COLOR
COLUMN
COMBAT
COMBATANT
COMBINATION
COMBINE
COMBUSTION
COME
COMFORTABLE
COMMAND
COMMENDATION
COMMERCIAL
COMMISSION
COMMIT
COMMON
COMMUNICATION
COMPANY
COMPARE
COMPARTMENT

COMPASS
COMPLAINT
COMPLETE
COMPLEX
COMPLICATE
COMPONENT
COMPOSE
COMPRESS
COMPUTER
CONCENTRATE
CONCERN
CONDITION
CONDUCT
CONFINE
CONFUSION
CONGRESS
CONNECT
CONSEQUENCE
CONSIDER
CONSIST
CONSTANT
CONSTITUTION
CONSTRUCTION
CONTACT
CONTAIN
CONTAMINATE
CONTINUE
CONTROL
CONVENTION
CONVERT
CONVULSION
COOL
COORDINATION
CORD
CORNER
CORPS
CORRECT
CORRESPONDENCE
COST
COTTON
COULD
COUNSEL
COUNTERMEASURE
COUNTRY
COUPLING
COURSE
COURT
COVER
COXSWAIN
CRAFT

CRAMP
CREATE
CREDIT
CREW
CRITICAL
CROSS
CRUISE
CRUISER
CURRENT
CUSTODY
CUSTOM
CUT
CYCLE
DAILY
DAMAGE
DANGER
DANGEROUS
DARK
DATA
DATE
DAVIT
DAY
DAYTIME
DEAD
DEAR
DEATH
DEBRIS
DECK
DECONTAMINATION
DECORATION
DEEP
DEFENSE
DEFINE
DEGREE
DELIVER
DEMOCRACY
DENTAL
DEPARTMENT
DEPEND
DEPENDENCE
DEPTH
DEPUTY
DESCRIBE
DESERTION
DESIGN
DESIGNATE
DESIRE
DESPITE
DESTROY
DESTRUCTION

DETACHMENT
DETAIL
DETECT
DETECTION
DETERMINE
DEVELOP
DEVIATION
DEVICE
DEWATER
DIAMETER
DID
DIESEL
DIFFERENCE
DIFFICULT
DIGIT
DIOXIDE
DIRECT
DIRECTION
DIRT
DISABILITY
DISASTER
DISBURSE
DISCHARGE
DISCIPLINARY
DISCRETION
DISCUSS
DISEASE
DISPLACE
DISPOSAL
DISTANCE
DISTRESS
DISTRICT
DIVE
DIVIDE
DIVINE
DIVISION
DO
DOCK
DOG
DONE
DOOR
DOSE
DOUBLE
DOUBT
DOWN
DRAFT
DRAW
DRAWN
DRESS
DRILL

DRINK
DRIVE
DRIVEN
DROP
DRUG
DRUNK
DRY
DUE
DURING
DUST
DUTY
DYE
EACH
EAGLE
EARLY
EARN
EARTH
EASILY
EAST
EASY
EAT
EDGE
EDUCATION
EDUCTOR
EFFECT
EFFECTIVE
EFFICIENCY
EFFORT
EIGHT
EITHER
ELASTIC
ELBOW
ELECTRIC
ELECTRONIC
ELIGIBILITY
ELIGIBLE
ELSE
EMBARK
EMERGENCY
EMPLOYMENT
EMPTY
ENABLE
END
ENEMY
ENERGY
ENGAGE
ENGINE
ENGINEER
ENGINEER ROOM
ENLIST

ENLISTMENT
ENOUGH
ENSIGN
ENSURE
ENTER
ENTIRE
ENTITLE
ENTRANCE
ENTRY
EQUAL
EQUIP
EQUIPMENT
ERROR
ESCAPE
ESCORT
ESPECIALLY
ESSENTIAL
ESTABLISH
EVALUATE
EVEN
EVENING
EVENT
EVENTUALLY
EVER
EVERY
EVERYONE
EVERYTHING
EXACT
EXAMINATION
EXAMPLE
EXCELLENT
EXCEPT
EXCEPTION
EXCESS
EXCESSIVE
EXCHANGE
EXECUTE
EXECUTION
EXERCISE
EXHAUST
EXIST
EXPECT
EXPERIENCE
EXPIRATION
EXPLOSION
EXPOSE
EXPOSURE
EXTEND
EXTENSIVE
EXTENT

EXTERNAL
EXTINGUISH
EXTRA
EXTREME
EYE
FACE
FACEPIECE
FACILITY
FACT
FACTOR
FAIL
FAILURE
FAIR
FAKE
FALL
FALLOUT
FALSE
FAMILIAR
FAMILY
FANTAIL
FAR
FAST
FASTEN
FATAL
FATHOM
FEATURE
FEDERAL
FEEL
FEET
FELLOW
FEMALE
FEW
FIBER
FIELD
FIGHT
FIGHTER
FIGURE
FILE
FILL
FINAL
FINANCIAL
FIND
FINE
FINGER
FIRE
FIREBALL
FIREFIGHTING
FIREPLUG
FIRM
FIRST

FISCAL
FIT
FIVE
FIX
FLAG
FLAME
FLAMMABLE
FLARE
FLASH
FLAT
FLEET
FLIGHT
FLOATING
FLOOD
FLOW
FLOWN
FLUID
FLY
FOAM
FOCUS
FOG
FOLD
FOLLOW
FOOD
FOOT
FOR
FORCE
FORE
FOREARM
FORECASTLE
FOREIGN
FORM
FORMAL
FORMER
FORTH
FORWARD
FOUND
FOUR
FOURTH
FRACTURE
FRAME
FREE
FREQUENT
FRESH
FRIGATE
FROM
FRONT
FUEL
FULL
FUME

FUNCTION
FURTHER
FUZE
GAIN
GAMMA
GANGWAY
GAS
GASOLINE
GEAR
GENERAL
GENERATOR
GET
GIVE
GIVEN
GLASS
GLOVE
GOGGLES
GOLD
GOOD
GOVERNMENT
GRADE
GRADUAL
GRANT
GRASP
GRAY
GREASE
GREAT
GREEN
GROOM
GROUND
GROUP
GUARD
GUIDANCE
GUIDE
GUIDELINES
GUILT
GUN
GUNFIRE
GUNNERY
HAD
HAIR
HALF
HAMMER
HAND
HANDLE
HANDLING
HANDS
HANG
HANGAR
HARBOR

HARD
HARDSHIP
HARM
HARMFUL
HARNESS
HARPOON
HAS
HAT
HATCH
HAUL
HAVE
HAZARD
HAZARDOUS
HE
HEAD
HEADQUARTERS
HEADSET
HEALTH
HEAR
HEART
HEAT
HEAVING
HEAVY
HEEL
HEIGHT
HELD
HELICOPTER
HELMSMAN
HELP
HER
HERE
HIGH
HIGHLINE
HIM
HIMSELF
HIS
HISTORY
HIT
HITCH
HOIST
HOLD
HOME
HOMING
HONOR
HONORABLE
HOOK
HORIZON
HORN
HOSE
HOSPITAL

HOT
HOUR
HOUSEFALL
HOUSING
HOW
HOWEVER
HULL
HUMAN
HUNDRED
HYDRAULIC
HYGIENE
IDEA
IDENTIFICATION
IMMEDIATE
IMPORTANCE
IMPOSE
IMPOSSIBLE
IN
INACTIVE
INBOARD
INCENTIVE
INCH
INCLUDE
INCREASE
INDICATE
INDIVIDUAL
INFECTION
INFLUENCE
INFORMATION
INITIAL
INJURE
INJURY
INNER
INSIDE
INSIGNIA
INSPECT
INSTALL
INSTANCE
INSTANT
INSTEAD
INSTRUCTION
INSTRUMENT
INSURANCE
INTEGRITY
INTELLIGENCE
INTEND
INTENSE
INTENT
INTERCEPT
INTEREST

INTERFERE
INTERIOR
INTERMEDIATE
INTERNAL
INTERVAL
INTO
INTRODUCE
INVESTIGATION
INVOLVE
IS
ISOLATE
ISSUE
IT
ITEM
ITSELF
JACK
JACKBOX
JACKET
JAW
JET
JOB
JOIN
JOINT
JUDGE
JUMPER
JUNIOR
JURISDICTION
JUST
JUSTICE
KEEP
KEPT
KEY
KILL
KIND
KIT
KNEE
KNOCK
KNOT
KNOW
KNOWLEDGE
KNOWN
LABORATORY
LADDER
LAID
LAMP
LAND
LANDING
LANGUAGE
LARGE
LAST

LATE
LAUNCH
LAUNCHER
LAW
LAWFUL
LAY
LEAD
LEADER
LEADERSHIP
LEARN
LEAST
LEAVE
LED
LEE
LEFT
LEG
LEGAL
LENGTH
LENS
LESS
LET
LETTER
LEVEL
LIBERTY
LIE
LIEUTENANT
LIFE
LIFEBOAT
LIFT
LIGHT
LIGHTERS
LIGHTWEIGHT
LIKE
LIMIT
LINE
LINK
LIQUID
LIST
LITTLE
LIVE
LIVES
LOAD
LOCAL
LOCATE
LOCATION
LOCKER
LOG
LONG
LOOK
LOOKOUT

LOOP
LOOSE
LORAN
LOSE
LOSS
LOST
LOT
LOW
LOWER
LUNG
LYING
MACHINE
MADE
MAGAZINE
MAGNESIUM
MAGNETIC
MAIL
MAIN
MAINTAIN
MAINTENANCE
MAJOR
MAJORITY
MAKE
MALE
MAN
MANAGEMENT
MANEUVER
MANNER
MANUAL
MANY
MARCH
MARINE
MARK
MARTIAL
MASK
MAST
MASTER
MATCH
MATE
MATERIAL
MATTER
MAXIMUM
MAY
MEAL
MEAN
MEASURE
MECHANICAL
MEDAL
MEDICAL
MEET

MEMBER
MEN
MENTAL
MENTION
MERCHANT
MERELY
MERITORIOUS
MESS
MESSAGE
MESSENGER
MESSING
METAL
METER
METHOD
MIDWAY
MIGHT
MILE
MILITARY
MIND
MINE
MINIMUM
MINOR
MINORITY
MINUTE
MISCONDUCT
MISSILE
MISSION
MODERN
MODIFY
MONEY
MONITOR
MONKEY
MONTH
MOOR
MORAL
MORALE
MORE
MORNING
MORPHINE
MOST
MOTION
MOTOR
MOUNT
MOUTH
MOVE
MOVEMENT
MUCH
MUST
MUSTARD
MUSTER

MY
NAKED
NAME
NAMEPLATE
NARCOTIC
NARROW
NATION
NATIONAL
NATURAL
NATURE
NAUSEA
NAUTICAL
NAVAL
NAVIGATION
NAVY
NEAR
NEAT
NECESSARILY
NECK
NEED
NEEDLE
NEITHER
NERVE
NERVOUS
NEVER
NEW
NEXT
NIGHT
NINE
NO
NOISE
NONCOMMISSIONED
NOR
NORMAL
NORTH
NOSE
NOT
NOTE
NOTHING
NOTICE
NOW
NOZZLE
NUCLEAR
NUMBER
NUMEROUS
NURSE
NYLON
O' CLOCK
OBEY
OBJECT

OBLIGATE
OBSERVE
OBTAIN
OCCASION
OCCUPATIONAL
OCCUR
OCEAN
ODD
OF
OFF
OFFENDER
OFFENSE
OFFICE
OFFICER
OFFICIAL
OFTEN
OIL
OLD
ON
ONCE
ONE
ONLY
OPEN
OPENING
OPERATE
OPERATION
OPERATOR
OPPORTUNITY
OPPOSITE
ORAL
ORAL
ORDER
ORDINARY
ORDNANCE
ORGANIZATION
ORIGINAL
OTHER
OTHERWISE
OUR
OUT
OUTBOARD
OUTER
OUTFIT
OUTLET
OUTLINE
OUTSIDE
OUTSTANDING
OVER
OVERBOARD
OVERHEAD

OVERSEAS
OWN
OXYGEN
PACIFIC
PAD
PAGE
PAID
PAIN
PAINT
PAINTER
PAPER
PARACHUTE
PARALLEL
PART
PARTICIPATE
PARTICLE
PARTICULAR
PARTY
PASS
PASSENGER
PASSIVE
PAST
PATIENT
PATROL
PAY
PAYGRADE
PAYMENT
PEACE
PEACETIME
PECULIAR
PENNANT
PEOPLE
PER
PERCENT
PERFORM
PERIOD
PERIODICALLY
PERMANENT
PERMISSION
PERMIT
PERSON
PERSONAL
PERSONNEL
PETTY
PHASE
PHONE
PHONETIC
PHYSICAL
PICK
PICTURE

PIECE
PIER
PILOT
PIN
PIPE
PIPING
PITCH
PLACE
PLAIN
PLAN
PLANE
PLANT
PLASTIC
PLATFORM
PLATING
PLAY
PLOT
PLUG
PLUS
POCKET
POINT
POISON
POISONOUS
POLICE
POLICY
POOR
PORT
PORTABLE
PORTION
POSITION
POSSESSION
POSSIBILITY
POSSIBLE
POST
POTENTIAL
POUND
POWDER
POWER
POWERFUL
PRACTICAL
PRECAUTION
PRECEDENCE
PRECEDING
PREPARATION
PREPARE
PRESCRIBED
PRESENCE
PRESENT
PRESERVATION
PRESIDENT

PRESS
PRESSURE
PREVENT
PRIMARILY
PRIMARY
PRINCIPAL
PRINT
PRIOR
PRISONER
PRIVATE
PROBABLY
PROBLEM
PROCEDURE
PROCEED
PROCESS
PRODUCE
PROFESSIONAL
PROGRAM
PROHIBIT
PROJECTILE
PROMOTION
PROMPT
PROPEL
PROPELLER
PROPER
PROPERTY
PROPORTIONER
PROPULSION
PROTECT
PROVIDE
PROVISION
PUBLIC
PUBLICATION
PULL
PULSE
PUMP
PUNISH
PUNISHMENT
PURPOSE
PUSH
PUT
QUALIFICATION
QUALIFY
QUARTER
QUESTION
QUICK
QUIET
RADAR
RADIATION
RADIO

RADIOACTIVE
RAG
RAINCOAT
RAISE
RAMP
RANGE
RANK
RAPID
RATE
RATHER
RATING
RATION
RAY
REACH
REACTOR
READ
READILY
READINESS
READY
REAL
REAR
REASON
REASONABLE
RECEIPT
RECEIVE
RECOGNITION
RECOMMEND
RECORD
RECOVERY
RECRUIT
RED
REDUCE
REDUCTION
REENLIST
REFER
REGARDLESS
REGULAR
REGULATION
REHABILITATION
RELATE
RELATIVE
RELEASE
RELIEF
RELIEVE
REMAIN
REMEMBER
REMOVE
RENDER
REPAIR
REPEAT

REPLACE
REPLENISHMENT
REPORT
REPRESENT
REQUEST
REQUIRE
RESCUE
RESEARCH
RESERVE
RESERVIST
RESIST
RESPECT
RESPIRATION
RESPONSIBILITY
REST
RESTRAINT
RESTRICT
RESULT
RETIRE
RETIREMENT
RETURN
REVEILLE
REVERSE
RIBBON
RIFLE
RIG
RIGHT
RING
RISE
RIVER
RIVERINE
ROCKET
ROLL
ROOM
ROPE
ROUGH
ROUND
ROUTINE
RUBBER
RUDDER
RULE
RUN
RUST
SABOTAGE
SAFE
SAFETY
SAID
SAILOR
SALT
SALUTE

SALVAGE
SAME
SANITATION
SAVE
SAY
SCALE
SCENE
SCHEDULE
SCHOOL
SCOPE
SCORE
SCREW
SEA
SEAL
SEAMAN
SEAMANSHIP
SEARCH
SEAT
SECOND
SECONDARY
SECRET
SECRETARY
SECTION
SECTOR
SECURE
SECURITY
SEE
SEEK
SEEM
SEEN
SEIZE
SELDOM
SELECT
SELECTION
SELECTOR
SELF
SEMAPHORE
SEND
SENIOR
SENSE
SENT
SENTENCE
SENTRY
SEPARATE
SEQUENCE
SERIES
SERIOUS
SERVE
SERVICE
SET

SEVEN
SEVERAL
SEVERE
SHAFT
SHALL
SHALLOW
SHAPE
SHARP
SHE
SHELL
SHELTER
SHIFT
SHIP
SHIPBOARD
SHIPMATE
SHIRT
SHOCK
SHOE
SHOOT
SHOP
SHORE
SHORT
SHOT
SHOULD
SHOULDER
SHOW
SHOWN
SICK
SIDE
SIGHT
SIGN
SIGNAL
SIGNALMAN
SIGNIFICANT
SILENCE
SIMILAR
SIMPLE
SIMPLY
SINCE
SINGLE
SIR
SISTER
SITUATION
SIX
SIZE
SKILL
SKIN
SKY
SLACK
SLEEVE

SLIDE
SLIGHT
SLING
SLIP
SLOW
SMALL
SMART
SMOKE
SMOOTH
SNOW
SO
SOAP
SOCIAL
SOCKS
SOFT
SOLID
SOLUTION
SOLVENT
SOME
SOMEONE
SOMETHING
SOMETIMES
SOMEWHAT
SONAR
SOON
SOUND
SOURCE
SOUTH
SPACE
SPAN
SPAR
SPARE
SPARK
SPEAK
SPECIAL
SPECIFIC
SPECIFY
SPEED
SPLICE
SPLINT
SPOKEN
SPORT
SPOT
SPREAD
SPRING
SQUADRON
SQUARE
SQUEEZE
STABILITY
STAFF

STAGE
STAND
STANDARD
STANDBY
STAR
STARBOARD
START
STATE
STATEMENT
STATION
STATUS
STAY
STEADY
STEAM
STEEL
STEER
STEP
STERILE
STERN
STILL
STOMACH
STOP
STOPPER
STORAGE
STORE
STORY
STOW
STOWAGE
STRAIGHT
STRAIN
STRAND
STRAP
STRATEGIC
STREAM
STRENGTH
STRETCHER
STRIKE
STRIKER
STRIPE
STRONG
STRUCK
STRUCTURAL
STUDY
STUFF
SUBJECT
SUBMARINE
SUBMERGE
SUBSEQUENT
SUBSTANCE
SUBSTITUTE

SUCCESSFUL
SUCH
SUCTION
SUFFICIENT
SUITABLE
SUMMARY
SUN
SUNSET
SUPERIOR
SUPERSTRUCTURE
SUPERVISE
SUPPLEMENTARY
SUPPLY
SUPPORT
SURE
SURFACE
SURGE
SURRENDER
SURVEY
SURVIVAL
SUSPEND
SWEEP
SWEEPER
SWING
SWITCH
SWIVEL
SYMBOL
SYMPTOM
SYNTHETIC
SYSTEM
TABLE
TACTIC
TACTICAL
TAG
TAKE
TAKEN
TALK
TALKER
TANK
TAPS
TARGET
TASK
TAUT
TAX
TEAM
TECHNICAL
TECHNIQUE
TEETH
TELEPHONE
TELL

TEMPERATURE
TEMPORARY
TEN
TEND
TENDER
TENSION
TERM
TEST
THAN
THAT
THE
THEIR
THEM
THEMSELVES
THEN
THERE
THEREFORE
THERMAL
THESE
THEY
THICK
THING
THINK
THIRD
THIS
THOROUGH
THOSE
THOUGH
THOUSAND
THREAD
THREE
THROAT
THROUGH
THROW
THUS
TIDE
TIE
TIGHT
TIME
TISSUE
TITLE
TO
TODAY
TOGETHER
TOLERANCE
TON
TOO
TOOL
TOP
TOPSIDE

TORPEDO
TOTAL
TOUCH
TOUR
TOURNIQUET
TOW
TOWARD
TOXIC
TRACK
TRAFFIC
TRAIN
TRANSFER
TRANSMISSION
TRANSPORT
TRASH
TRAVEL
TREAT
TREATMENT
TRIAL
TRIED
TRIGGER
TROOP
TROPICAL
TROUBLE
TROUSERS
TRUE
TRY
TUBE
TUG
TUITION
TURBINE
TURN
TWICE
TWIN
TWIST
TWO
TYPE
TYPICAL
UNABLE
UNAUTHORIZED
UNCOVER
UNDER
UNDERSTAND
UNDERWATER
UNIFORM
UNIT
UNITE
UNLESS
UNTIL
UP

UPON
UPPER
UPWARD
US
USE
USEFUL
USER
USUAL
VALUE
VALVE
VAPOR
VARIATION
VARIETY
VARIOUS
VARY
VEHICLE
VELOCITY
VENTILATE
VERSION
VERTICAL
VERY
VESSEL
VETERAN
VICE
VICINITY
VICTIM
VIEW
VIOLATION
VISIBILITY
VISIBLE
VISION
VISIT
VISITOR
VISUAL
VITAL
VOICE
VOMIT
WAIT
WALK
WANT
WAR
WARDROOM
WARFARE
WARM
WARNING
WARRANT
WARSHIP
WARTIME
WAS
WASH

WATCH
WATER
WATERLINE
WATERTIGHT
WAVE
WAY
WE
WEAK
WEAPON
WEAR
WEATHER
WEEK
WEIGHT
WELDING
WELL
WERE
WEST
WET
WHAT
WHATEVER
WHEEL
WHEN
WHENEVER
WHERE
WHEREAS
WHETHER
WHICH
WHILE
WHIP
WHISTLE
WHITE
WHO
WHOLE
WHOM
WHOSE
WHY
WIDE
WILL
WILLFUL
WINCH
WIND
WINDLASS
WING
WIRE
WITH
WITHDRAWAL
WITHIN
WITHOUT
WOMAN
WOMEN

WOOD
WOODEN
WORD
WORK
WORLD
WORN
WOULD
WOUND
WRIST
WRITTEN
WRONG
YARD
YEAR
YET
YOLK
YOU
YOUNG
YOUR
YOURSELF
ZEBRA
ZERO
ZONE

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APPENDIX C

THE SUPPLEMENTARY TECHNICAL LISTS

This appendix contains the root-word forms of the three supplementary lists: electronics, propulsion engineering, and administrative-clerical. The sources of the words in the lists are shown after the three lists at the end of the appendix.

Words marked with an asterisk are also found on the Common Word List (appendix A).

ELECTRONICS LIST

AC
 ACCUMULATION
 ACCURATE*
 ADJACENT
 ALTERNATE*
 ALTERNATION
 ALTERNATOR
 AMMETER
 AMPERE*
 AMPLIFICATION
 AMPLIFIER*
 AMPLITUDE*
 ANODE
 ANTENNA*
 APPARENT
 APPLIED
 ARMATURE
 ATOM*
 ATTENUATE*
 ATTENUATOR
 AUDIO
 AUDIOFREQUENCY
 AVALANCHE
 B-PLUS
 BAND-PASS
 BASE*
 BATTERY*
 BIAS*
 BLEEDER
 BRIDGE*
 BRIGHTNESS*
 BRUSH*
 CALIBRATION
 CANDLEPOWER
 CAPACITANCE*
 CAPACITIVE
 CAPACITOR*
 CATHODE*
 CATHODE-RAY
 CELL*
 CHASSIS
 CHIP*
 CIRCUIT*
 COAXIAL
 COIL*
 COLLECTOR
 COMMUTATOR
 CONDENSER*
 CONDUCTANCE
 CONDUCTIVE

CONDUCTIVITY
 CONDUCTOR*
 CONFIGURATION*
 CONNECTOR
 CONTINUITY
 CONTRAST*
 CONTROL*
 CORE*
 COSINE
 COUPLE*
 CRYSTAL*
 CURRENT*
 CURSOR
 CUTOFF
 CYCLE*
 DC
 DECIBEL*
 DECIMAL*
 DEENERGIZE*
 DEMODULATOR
 DETECTION*
 DETECTOR
 DIELECTRIC
 DIODE*
 DISCHARGE*
 DISCRIMINATOR
 DISPLAY*
 DISTORTION*
 ELECTRO-MAGNETIC
 ELECTRODE*
 ELECTROLYTIC
 ELECTROMAGNET
 ELECTROMAGNETIC
 ELECTROMAGNETISM
 ELECTROMOTIVE
 ELECTRON*
 ELECTROSTATIC
 EMF
 EMISSION
 EMIT
 EMITTER
 EXPONENT
 FARAD
 FEEDBACK*
 FIELD-EFFECT
 FILAMENT
 FILTER*
 FLUORESCENT
 FLUX
 FREQUENCY*

FUSE
 GAUGE*
 GENERATOR*
 GRID*
 GROUND*
 GYRO
 HENRY
 HERTZ
 HYPOTENUSE
 ILLUMINATE*
 ILLUMINATION
 IMPEDANCE*
 INCANDESCENT
 INDUCE*
 INDUCTANCE
 INDUCTIVE
 INDUCTOR
 INPHASE
 INSULATION*
 INSULATOR
 INTEGRATE*
 INTEGRATION
 INTENSITY*
 INTERFERENCE
 INVERSE
 JUNCTION*
 LINEAR*
 LOAD*
 LOOP*
 MAGNET*
 MAGNETIZE
 MEGOHM
 METER*
 MICROAMPERE
 MICROFARAD
 MICROMICROFARAD
 MICROVOLT
 MILLIAMMETER
 MILLIAMPERE
 MILLIMICROAMPERE
 MILLIMICROFARAD
 MILLIMICROVOLT
 MILLIVOLT
 MINIATURE
 MODULE*
 MOLECULE*
 MULTIMETER
 NANOAMPERE
 NANOFARAD
 NEGATIVE*

NEUTRAL*
NEUTRON
NONLINEAR
NUCLEUS
OHM*
OHMIC
OHMMETER
ORBIT
OSCILLATE
OSCILLATOR*
OSCILLOSCOPE
PARALLEL-CONNECT
PEAK-TO-PEAK
PENTODE
PHOTODIODE
PICOFARAD
PLATE*
POSITIVE*
POTENTIOMETER
PREAMPLIFIER
PRESET
PROBE
PROTON
RADARSCOPE
RADIATING
RADIOACTIVE*
RADIOACTIVITY
RADIOFREQUENCY
RADIUS*
RATIO*
REACTANCE*
REACTIVE
RECEPTACLE*
RECHARGE
RECHARGEABLE
RECIPROCAL
RECTIFICATION
RECTIFIER
RELAY*
REPEL
RESET*
RESISTANCE*
RESISTIVE
RESISTOR*
RESONANCE
RESONANT
RESULTANT
RHEOSTAT
RMS
ROOT-MEAN-SQUARE

ROTOR*
SATURATION
SCIENTIFIC
SCREEN*
SEMICONDUCTOR
SERIES*
SERIES-AIDING
SERIES-PARALLEL
SERVO*
SERVOMECHANISM
SERVOSYSTEM
SHORT-CIRCUITING
SIGNAL-TO-NOISE
SIMULATOR
SINE
SINE-WAVE
SOLENOID*
SOLID-STATE
SPECTRUM
STATOR*
SUBSYSTEM*
SUPPRESSOR
SWITCH*
TACH
TACHMOMETER
TANGENT
TAP*
TECHNICIAN*
TETRODE
THEORY*
THERMISTOR
THERMOCOUPLE
THREE-CONDUCTOR
TOLERANCE*
TRANSFORMER*
TRANSISTOR
TRANSIT
TRIODE
TUBE*
VACUUM-TUBE
VOLT*
VOLT-AMPERE
VOLTAGE*
VOLTMETER
WATT*
WATTAGE
WATTMETER
WAVEFORM
WAVELENGTH

PROPULSION ENGINEERING LIST

ABSORPTION	COOLANT	FLEXIBILITY
ACCUMULATOR	COOLER	FLUCTUATE
ADJUSTABLE	COOLING*	FLYWHEEL
AFTERBURNER	COTTER	FOG-FOAM
AIR-COOLED	COUNTER*	FOOT-POUND
ALL-PURPOSE	COUNTERCLOCKWISE*	FORCE*
ANNEAL*	COUNTERSINK	FREON
ANTIFRICTION	COUNTERWEIGHT	FRICTION*
APPLICATOR	COUPLING*	FUEL*
ASBESTOS	COVER*	FUME*
AXIAL-FLOW	COVERALL	FUNNEL
AXLE	CRANE	GAGE*
BACK-PRESSURE	CRANK*	GALVANIZE
BAFFLE	CYLINDER*	GAS*
BALL-PEEN	D-RING	GAS-GENERATOR
BAR*	DAMPER	GEAR*
BARREL*	DEAD-CENTER	GEAR-SHIFT
BEARING*	DEFUELING	GOGGLES*
BELT*	DEHUMIDIFICATION	GYRO
BEVEL	DEISEL-DRIVEN	HACKSAW
BIMETALLIC	DIAGONAL*	HAMMER*
BIT*	DIAPHRAGM*	HANDCRANK
BLOCK*	DIE*	HANDLE*
BLOWER	DIFFERENTIAL*	HANDWHEEL
BLUEPRINT*	DIFFUSER	HEAD*
BOLT*	DIRECT-DRIVEN	HELICAL
BOX-END	DISTANCE*	HIGH-PRESSURE
BRISTOL	DRAINAGE	HOIST*
BRONZE*	DRAWING*	HOSE*
BUCKLE*	DRILL*	HOUSING*
BURNER	DRIVEN*	HYDRAULICAL
BUSHING	DUPLEX	IDLER
CALIBRATION	EDGE*	IGNITE*
CAMLOC	EJECTOR	IGNITION*
CAMSHAFT	ELECTROHYDRAULIC	IMPELLER
CARTRIDGE*	ENERGY*	IMPULSE*
CASE*	ENGINE*	INCH*
CASING	EVAPORATION	INJECTION*
CENTRIFUGAL*	EXHAUST*	INJECTOR
CHAINFALL	EXTINGUISH*	INLET*
CHAMBER*	FASTENER*	INTAKE*
CHECK*	FEEDBACK*	JACK*
CHISEL	FEELER	JET*
CLEANER	FILTER*	JOINT*
CLUTCH*	FIREFIGHTER	KEY*
COMBUSTION*	FIREFIGHTING*	KEYWAY
COMPRESSION*	FIREPROOF	KINETIC
COMPRESSOR*	FIRING*	LABYRINTH
CONICAL	FIT*	LATERAL
CONSUMPTION	FIXED*	LEAKAGE*

LEVEL*
LEVER*
LIGHT-OFF
LINE*
LIQUID-PROPELLANT
LONG-NOSE
LONGITUDINAL
LUBRICANT*
MALLET
MANHOLE
MANIFOLD*
MANOMETER
MERCURY*
METALLIC
MICROMETER
NEEDLE*
NOZZLE*
OIL*
PASSAGE*
PETCOCK
PHILLIPS-HEAD
PIN*
PIPE*
PIVOT
PLIERS
PLUG*
POINT*
PORT*
POUND*
POWER*
PRESSURE*
PRIMARY*
PRIME*
PROPELLER*
PUMP*
PUNCH*
PURIFY*
RATCHET
RECHARGE
RETAIN*
RETHREADING
RING*
RISER
POCKER
ROD*
ROTATE*
ROTOR*
SATURATION
SCREW*
SCREWDIVER*

SECTION*
SELF-IGNITION
SELF-PRIMING
SET*
SETPOINT
SETSCREW
SHAFT*
SHEAR*
SLEEVE*
SLIDE*
SLIP-JOINT
SLUDGE
SOLENOID*
SPECIFICATION*
SPIRAL*
SPLASH-LUBRICATION
SPLINE
SPLIT-RING
SPRING*
SPROCKET
SPUR
STEM*
STRAINER
STROKE*
SUPERHEAT
SUPPLY*
SYSTEM*
TANK*
TAP*
TEMPERATURE*
THREAD*
THRUST*
TOOL*
TORQUE*
TORSION
TRAIN*
TURBINE*
TWO-VENTURI
U-JOINT
UNIT*
UNIVERSAL*
V-BELT
VACUUM*
VALVE*
VANE
VENTURI
VISE-GRIP
WALL*
WASHER
WATER-COOLED

WATER-PUMP
WELDING*
WHEEL*
WIRE*
WORK*
WRENCH*
YOKE

ADMINISTRATIVE-CLERICAL LIST

ABBREVIATION*	COPY*	OPERATOR*
ABSENCE*	CORRECTION*	ORDER*
ABSENT*	COVER*	ORGANIZATIONAL
ACCESSIBLE	CUSTODIAN	ORIGINATE
ACCOMPANY	DEFINITION	ORIGINATOR
ACCOMPLISHMENT	DELEGATE	OUTSTANDING*
ACCOUNT*	DELETE*	PAPER*
ACCOUNTABILITY	DELETION	PENCIL*
ACCUMULATION	DEPARTURE	PENDING
ACHIEVE	DEPLOY	PERCENT*
ACTIVITY*	DEPLOYMENT	PERCENTAGE*
ADAPT*	DIAL*	POLITE
ADAPTATION	DIRECTIVE	PRESERVATION*
ADD*	DIRECTORY*	PROFESSION
ADDRESSEE	DISAPPROVE	PROFESSIONAL*
ADHERENCE	DISCRIMINATION	PROFESSIONALISM
ADMIN	DOCUMENT*	QUALIFICATION*
ADMINISTRATION*	DOCUMENTATION	QUOTA
ADMINISTRATIVE*	DOWNGRADE	READINESS*
AFFIX	DUPLICATE	RECIPIENT
AFLOAT*	ELECTRONIC*	RECORDKEEPING
AIR*	ENCLOSE	RECURE
ALPHABET*	ERASER	RELIABLE*
ALPHABETICAL	EVALUATION*	REPRODUCTION
ANALYSIS*	FEEDBACK*	RESPONSIBILITY*
ANNUAL	FEEDER	RETENTION
APPLICABLE*	FILE*	REUSABLE
APPROPRIATION	FINISH*	ROUTE*
ARRANGEMENT*	FLUID*	SAFEGUARD
AUDIT*	FOLDER	SECRET*
AUDITOR	FRAME*	SECURITY*
AUTHORIZATION	FUND	SERIAL*
AUTOMATE	HYPHENATE	SIGN*
BACK*	INCORPORATE*	SIGNIFICANCE
BOTTOM*	INDENT	SPACE*
BOX*	LETTERHEAD	SPOOL
CALCULATION	LINE*	STAFF*
CALL*	LISTING	STANDARDIZE
CARBON*	LOCAL*	STAPLE
CARD*	MACHINE*	STAPLER
CHAIN*	MAIL*	STATION*
CLASSIFICATION*	MANUAL*	STATIONERY
CLEAN*	MARGIN*	STENCIL
CODE*	MEMORANDUM	SUBJ
COMMAND*	NOMENCLATURE	SUBJECT*
COMMUNICATION*	NUMBER*	SUBMISSION
COMPLIANCE	NUMERAL*	SUBORDINATE
CONFIDENTIAL	NUMERICAL*	SUBSYSTEM*
CONSECUTIVE*	OBJECTIVE	SUPERVISOR*
CONSUMABLE	OFFICE*	SUPERVISORY

SUPPLY*
SURVEY*
SURVEYOR
SYMBOL*
TABLE*
TELEPHONE*
TEXT*
TISSUE*
TONE*
TYPE*
TYPEWRITER
TYPIST
UNAUTHORIZED*
UNCLASSIFIED
UNSATISFACTORY*
URGENT
UTILIZATION
VERSUS
VIA

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APPENDIX D

THE ARMY WORD SUBSTITUTION LIST WITH GRAMMATICAL VARIATIONS

This list resulted from expanding the 183 original words, with their substitutes, of the Army Word Substitution List, words originally found in Cir. 310-9, Headquarters Department of the Army. The expanded Army Word Substitution List contains 725 different word-substitute forms. This is the form of the Army List that was actually used in the computer readability editing system.

ACCOMPANIED	WENT WITH	
ACCOMPANIES	GOES WITH	
ACCOMPANY	GO WITH	
ACCOMPANYING	GOING WITH	
ACCOMPLISH	CARRY OUT	DO
ACCOMPLISHABLE	DOABLE	
ACCOMPLISHED	CARRIED OUT	DID/DONE
ACCOMPLISHES	CARRIES OUT	DOES
ACCOMPLISHING	CARRYING OUT	DOING
ACCORDINGLY	SO	
ACCRUAL	ADDITION	GAIN
ACCRUALS	ADDITIONS	GAINS
ACCRUE	ADD	GAIN
ACCRUED	ADDED	GAINED
ACCRUEMENT	ADDITION	GAIN
ACCRUES	ADDS	GAINS
ACCRUING	ADDING	GAINING
ACCURACY	CORRECTNESS	EXACTNESS
ACCURATE	CORRECT	EXACT
ACCURATELY	CORRECTLY	EXACTLY
ACHIEVABLE	DOABLE	MAKABLE
ACHIEVE	DO	MAKE
ACHIEVED	DID	MADE
ACHIEVES	DOES	MAKES
ACHIEVING	DOING	MAKING
ACTUAL	REAL	
ACTUALLY	REALLY	
ADDITIONAL	ADDED	MORE
ADVANTAGEOUS	HELPFUL	
ADVANTAGEOUSLY	HELPFULLY	
ADVISABLE	RECOMMENDABLE	
ADVISE	RECOMMEND	TELL
ADVISED	RECOMMENDED	TOLD
ADVISES	RECOMMENDS	TELLS
ADVISING	RECOMMENDING	TELLING
AFFIX	PUT	STICK
AFFIXED	PUT	STUCK
AFFIXES	PUTS	STICKS
AFFIXING	PUTTING	STICKING
AIRCRAFT	PLANE/PLANES	
AIRCRAFT'S	PLANE'S	
AIRCRAFTS'	PLANES'	
ANTICIPATABLE	EXPECTABLE	
ANTICIPATE	EXPECT	
ANTICIPATED	EXPECTED	
ANTICIPATES	EXPECTS	
ANTICIPATING	EXPECTING	
ANTICIPATION	EXPECTATION	
APPARENT	CLEAR	PLAIN
APPARENTLY	CLEARLY	PLAINLY
APPEAR	SEEM	
APPEARED	SEEMED	

APPEARING
APPEARS
APPRECIABLE
APPROPRIATE
APPROPRIATELY
APPROXIMATELY
ASCERTAIN
ASCERTAINED
ASCERTAINING
ASCERTAINS
ASSIST
ASSISTANCE
ASSISTED
ASSISTING
ASSISTS
ATTEMPT
ATTEMPTED
ATTEMPTING
ATTEMPTS
BENEFICIAL
BENEFICIARIES
BENEFICIARY
BENEFIT
BENEFITED
BENEFITER
BENEFITERS
BENEFITING
BENEFITS
BENEFITTED
BENEFITTING
CAPABILITIES
CAPABILITIES'
CAPABILITY
CAPABILITY'S
CATEGORIES
CATEGORIES'
CATEGORIZE
CATEGORIZED
CATEGORIZES
CATEGORIZING
CATEGORY
CATEGORY'S
COMBINE
COMBINED
COMBINES
COMBINING
COMPLIED
COMPLIER
COMPLIERS
COMPLIES
COMPLY
COMPLYING

SEEING
SEEMS
MAY
PROPER
PROPERLY
ABOUT
FIND OUT
FOUND OUT
FINDING OUT
FINDS OUT
AID
AID
AIDED
AIDING
AIDS
TRY
TRIED
TRYING
TRIES
HELPFUL
PERSONS HELPED
PERSON HELPED
HELP
HELPED
HELPER
HELPERS
HELPING
HELPS
HELPED
HELPING
ABILITIES
ABILITIES'
ABILITY
ABILITY'S
CLASSES
CLASSES'
CLASS
CLASSED
CLASSES
CLASSING
CLASS
CLASS'S
JOIN
JOINED
JOINS
JOINING
FOLLOWED
FOLLOWER
FOLLOWERS
FOLLOWS
FOLLOW
FOLLOWING

RIGHT
RIGHTLY

LEARN
LEARNED
LEARNING
LEARNS
HELP
HELP
HELPED
HELPING
HELPS

AM/ARE HELPED
WAS HELPED

BEING HELPED
IS HELPED
WAS HELPED
BEING HELPED

GROUPS
GROUPS'
GROUP
GROUPED
GROUPS
GROUPING
GROUP
GROUP'S

COMPONENT	PART	
COMPONENT'S	PART'S	
COMPONENTS	PARTS	
COMPONENTS'	PARTS'	
COMPRISF	FORM	INCLUDE
COMPRISED	FORMED	INCLUDED
COMPRISES	FORMS	INCLUDES
COMPRISING	FORMING	INCLUDING
CONCERNING	ABOUT	ON
CONCLUDE	CLOSE	END
CONCLUDED	CLOSED	ENDED
CONCLUDES	CLOSES	ENDS
CONCLUDING	CLOSING	ENDING
CONCLUSION	CLOSE	END
CONCUR	AGREE	
CONCURRED	AGREED	
CONCURRENCE	AGREEMENT	
CONCURRING	AGREEING	
CONCURS	AGREES	
CONFRONT	FACE	MEET
CONFRONTATION	MEETING	
CONFRONTATIONS	MEETINGS	
CONFRONTED	FACED	MET
CONFRONTING	FACING	MEETING
CONFRONTS	FACES	MEETS
CONSEQUENTLY	SO	
CONSOLIDATE	COMBINE	JOIN
CONSOLIDATED	COMBINED	JOINED
CONSOLIDATES	COMBINES	JOINS
CONSOLIDATING	COMBINING	JOINING
CONSOLIDATION	COMBINATION	MERGER
CONSOLIDATOR	COMBINER	MERGER
CONSOLIDATORS	COMBINERS	MERGERS
CONSTITUTE	BE	FORM
CONSTITUTED	WAS	FORMED
CONSTITUTES	IS	FORMS
CONSTITUTING	BEING	FORMING
CONSTITUTION	FORM	MAKE-UP
CONSTRUCT	BUILD	
CONSTRUCTED	BUILT	
CONSTRUCTING	BUILDING	
CONSTRUCTOR	BUILDER	
CONSTRUCTS	BUILDS	
CONTAIN	HAVE	
CONTAINED	HAD	
CONTAINING	HAVING	
CONTAINS	HAS	
CONTINUE	KEEP ON	
CONTINUED	KEPT ON	
CONTINUES	KEEPS ON	
CONTINUING	KEEPING ON	
CONTRIBUTE	GIVE	

CONTRIBUTED
CONTRIBUTES
CONTRIBUTING
CONTRIBUTION
CONTRIBUTIONS
CONTRIBUTIVELY
CONTRIBUTOR
CONTRIBUTORS
CONTRIBUTORY
COOPERATE
COOPERATED
COOPERATES
COOPERATING
COOPERATIVE
COOPERATOR
COOPERATORS
DEEM
DEEMED
DEEMING
DEEMS
DELETE
DELETED
DELETES
DELETING
DELETION
DEMONSTRABLE
DEMONSTRATE
DEMONSTRATED
DEMONSTRATES
DEMONSTRATING
DEPART
DEPARTED
DEPARTING
DEPARTS
DESIGNATE
DESIGNATED
DESIGNATES
DESIGNATING
DESIRE
DESIRED
DESIRES
DESIRING
DESIROUSLY
DESIROUSNESS
DETERMINABLE
DETERMINE
DETERMINED
DETERMINES
DETERMINING
DEVELOP
DEVELOPED
DEVELOPING

GAVE
GIVES
GIVING
GIFT
GIFTS
GIVINGLY
GIVER
GIVERS
GIVING
HELP
HELPED
HELPS
HELPING
HELPFUL
HELPER
HELPERS
THINK
THOUGHT
THINKING
THINKS
CUT
CUT
CUTS
CUTTING
CUTTING
PROVABLE
PROVE
PROVED
PROVES
PROVING
LEAVE
LEFT
LEAVING
LEAVES
APPOINT
APPOINTED
APPOINTS
APPOINTING
WISH
WISHED
WISHES
WISHING
WISHFULLY
WISHFULNESS
DECIDABLE
DECIDE
DECIDED
DECIDES
DECIDING
GROW
GREW/GROWN
GROWING

DROP
DROPPED
DROPS
DROPPING
DROPPING

SHOW
SHOWED
SHOWS
SHOWING

CHOOSE
CHOSE/CHOSEN
CHOOSES
CHOOSING

FIGURABLE
FIGURE
FIGURED
FIGURES
FIGURING
MAKE
MADE
MAKING

DEVELOPS
DISCLOSE
DISCLOSED
DISCLOSES
DISCLOSING
DISCONTINUANCE
DISCONTINUATION
DISCONTINUE
DISCONTINUED
DISCONTINUES
DISCONTINUING
DISSEMINATE
DISSEMINATED
DISSEMINATES
DISSEMINATING
DISSEMINATION
DISSEMINATOR
DISSEMINATORS
ECHELON
ECHELON'S
ECHELONS
ECHELONS'
EFFECTED
EFFECTING
ELECT
ELECTED
ELECTING
ELECTS
ELIMINATE
ELIMINATED
ELIMINATES
ELIMINATING
ELIMINATION
EMPLOY
EMPLOYED
EMPLOYING
EMPLOYMENT
EMPLOYMENTS
EMPLOYS
ENCOUNTER
ENCOUNTERED
ENCOUNTERING
ENCOUNTERS
ENCOURAGE
ENCOURAGED
ENCOURAGES
ENCOURAGING
ENDEAVOR
ENDEAVORED
ENDEAVORING
ENDEAVORS
ENSURE

GROWS
SHOW
SHOWN
SHOWS
SHOWING
DROPPING
DROPPING
DROP
DROPPED
DROPS
DROPPING
ISSUE
ISSUED
ISSUES
ISSUING
ISSUANCE
ISSUER
ISSUERS
LEVEL
LEVEL'S
LEVELS
LEVELS'
MADE
MAKING
CHOOSE
CHOSE/CHOSEN
CHOOSING
CHOOSES
CUT
CUT
CUTS
CUTTING
CUTTING
USE
USED
USING
USE
USES
USES
MEET
MET
MEETING
MEETS
URGE
URGED
URGES
URGING
TRY
TRIED
TRYING
TRIES
MAKE SURF

MAKES

SHOWED

STOPPING
STOPPING
STOP
STOPPED
STOPS
STOPPING
SEND OUT
SENT OUT
SENDS OUT
SENDING OUT
SENDING OUT

PICK
PICKED
PICKING
PICKS
DROP
DROPPED
DROPS
DROPPING
DROPPING

ENSURED
ENSURES
ENSURING
ENUMERATE
ENUMERATED
ENUMERATES
ENUMERATING
ENUMERATION
ENUMERATIONS
ENUMERATOR
ENUMERATORS
EQUITABLE
EQUITABLY
EQUIVALENT
EQUIVALENTLY
ESTABLISH
ESTABLISHED
ESTABLISHES
ESTABLISHING
EVALUATE
EVALUATED
EVALUATES
EVALUATING
EVALUATION
EVALUATIONS
EVALUATOR
EVALUATORS
EVIDENCED
EVIDENCES
EVIDENCING
EVIDENT
EXAMINATION
EXAMINATIONS
EXAMINE
EXAMINED
EXAMINES
EXAMINING
EXHIBIT
EXHIBITED
EXHIBITING
EXHIBITION
EXHIBITIONS
EXHIBITS
EXPEDITE
EXPEDITED
EXPEDITES
EXPEDITING
EXPEDITIOUS
EXPEDITIOUSLY
EXPEND
EXPENDED
EXPENDING

MADE SURE
MAKES SURE
MAKING SURE
COUNT
COUNTED
COUNTS
COUNTING
COUNT
COUNTS
COUNTER
COUNTERS
FAIR
FAIRLY
EQUAL
EQUALLY
SET UP
SET UP
SETS UP
SETTING UP
CHECK
CHECKED
CHECKS
CHECKING
CHECK
CHECKS
CHECKER
CHECKERS
SHOWED
SHOWS
SHOWING
CLEAR
CHECK
CHECKS
CHECK
CHECKED
CHECKS
CHECKING
SHOW
SHOWED
SHOWING
SHOW
SHOWS
SHOWS
HURRY
HURRIED
HURRIES
HURRYING
FAST
QUICKLY
PAY OUT
PAID OUT
PAYING OUT

PROVE
PROVED
PROVES
PROVING
RATE
RATED
RATES
RATING
RATING
RATINGS
RATER
RATERS

CHECKING

LOOK AT
LOOKED AT
LOOKS AT
LOOKING AT

SHOWN

SHOWING
SHOWINGS

RUSH
RUSHED
RUSHES
RUSHING
QUICK

SPEND
SPENT
SPENDING

EXPENDS
EXPENSE
EXPLAIN
EXPLAINED
EXPLAINING
EXPLAINS
FACILITATE
FACILITATED
FACILITATES
FACILITATING
FACILITATION
FACTOR
FACTOR'S
FACTORS
FACTORS'
FEASIBLE
FEMALE
FEMALE'S
FEMALES
FEMALES'
FINAL
FINALIZATION
FINALIZATIONS
FINALIZE
FINALIZED
FINALIZES
FINALIZING
FORFEIT
FORFEITED
FORFEITING
FORFEITS
FORFEITURE
FORFEITURES
FORWARD
FORWARDED
FORWARDER
FORWARDERS
FORWARDING
FORWARDS
FUNCTION
FUNCTIONED
FUNCTIONING
FUNCTIONS
FUNDAMENTAL
FUNDAMENTALLY
FURNISH
FURNISHED
FURNISHER
FURNISHERS
FURNISHES
FURNISHING
HEREIN

PAYS OUT
COST
SHOW
SHOWED
SHOWING
SHOWS
EASE
EASED
EASES
EASING
HELP
REASON
REASON'S
REASONS
REASONS'
CAN BE DONE
WOMAN
WOMAN'S
WOMEN
WOMEN'S
LAST
COMPLETION
COMPLETIONS
COMPLETE
COMPLETED
COMPLETES
COMPLETING
GIVE UP
GAVE UP
GIVING UP
GIVES UP
GIVING UP
LOSINGS
SEND
SENT
SENDER
SENDERS
SENDING
SENDS
ACT
ACTED
ACTING
ACTS
BASIC
BASICALLY
GIVE
GAVE/GIVEN
GIVER
GIVERS
GIVES
GIVING
HERE

SPENDS
FEE
TELL
TOLD
TELLING
TELLS
HELP
HELPED
HELPS
HELPING
HELPING
CAUSE
CAUSE'S
CAUSES
CAUSES'

FINISH
FINISHINGS
FINISH
FINISHED
FINISHES
FINISHING
LOSE
LOST
LOSING
LOSES
LOSS
LOSSES

ROLE
WORKED
WORKING
WORKS

SEND
SENT
SENDER
SENDERS
SENDS
SENDING

HOWEVER
IDENTICAL
IDENTICALNESS
IDENTIFIED
IDENTIFIER
IDENTIFIES
IDENTIFY
IDENTIFYING
IMMEDIATELY
IMPACTED
IMPACTING
IMPACTION
IMPACTS
IMPLEMENT
IMPLEMENTATION
IMPLEMENTED
IMPLEMENTING
IMPLEMENTS
INCEPTION
INCEPTION'S
INCEPTIONS
INCEPTIONS'
INCORPORATE
INCORPORATED
INCORPORATES
INCORPORATING
INDICATE
INDICATED
INDICATES
INDICATING
INDICATION
INDICATION'S
INDICATIONS
INDICATIONS'
INITIAL
INITIALIZATIONS
INITIALIZE
INITIALLY
INITIATE
INITIATED
INITIATES
INITIATING
JUSTIFIED
JUSTIFIES
JUSTIFY
JUSTIFYING
LEGISLATION
LEGISLATION'S
LIMITATION
LIMITATION'S
LIMITATIONS
LIMITATIONS'

BUT
SAME
SAMENESS
FOUND
FINDER
FINDS
FIND
FINDING
AT ONCE
CHANGED
CHANGING
CHANGE
CHANGES
CARRY OUT
CARRYING OUT
CARRIED OUT
CARRYING OUT
CARRIES OUT
START
START'S
STARTS
STARTS'
BLEND
BLENDED
BLENDS
BLENDING
SHOW
SHOWED/SHOWN
SHOWS
SHOWING
SIGN
SIGN'S
SIGNS
SIGNS'
FIRST
STARTS
START
AT FIRST
START
STARTED
STARTS
STARTING
PROVED/PROVEN
PROVES
PROVE
PROVING
LAW
LAW'S
LIMIT
LIMIT'S
LIMITS
LIMITS'

NAMED

NAMES
NAME
NAMING

HIT
HITTING
HITTING
HITS
DO
DOING
DID
DOING
DOES

JOIN
JOINED
JOINS
JOINING
WRITE DOWN
WRITEN DOWN
WRITES DOWN
WRITING DOWN

LAWS
LAWS'

ALIGHTED
ALIGHTS
ALIGHTING
OBSERVE
OBSERVED
OBSERVES
OBSERVING
OBTAIN
OBTAINED
OBTAINING
OBTAINS
OPERATE
OPERATED
OPERATES
OPERATING
OPERATIONAL
OPTIMUM
OPTION
OPTION'S
OPTIONS
OPTIONS'
PARTICIPATE
PARTICIPATED
PARTICIPATES
PARTICIPATING
PARTICIPATION
PERFORM
PERFORMED
PERFORMING
PERFORMS
PERMIT
PERMITS
PERMITTED
PERMITTING
PERSONNEL
PLACE
PLACED
PLACES
PLACING
PORTION
PORTION'S
PORTIONS
PORTIONS'
POSITION
POSITIONED
POSITIONING
POSITIONS
POSSESS
POSSESSED
POSSESSES
POSSESSING
PRECLUDE

BOUND
BINDS
BINDING
SEE
SAW
SEES
SEEING
GET
GOT/GOTTEN
GETTING
GETS
RUN
RAN/RUN
RUNS
RUNNING
WORKING
BEST
CHOICE
CHOICE'S
CHOICES
CHOICES'
TAKE PART
TOOK PART
TAKES PART
TAKING PART
TAKING PART
DO
DID/DONE
DOING
DOES
LET
LETS
LET
LETTING
PEOPLE
PUT
PUT
PUTS
PUTTING
PART
PART'S
PARTS
PARTS'
PLACE
PLACED
PLACING
PLACES
HAVE
HAD
HAS
HAVING
PREVENT

COMPELLED
COMPELS
COMPELLING

SEEN

WORK
WORKED
WORKS
WORKING

GREATEST
WAY
WAY'S
WAYS
WAYS'

TAKEN PART

STAFF

OWN
OWNED
OWNS
OWNING

PRECLUDED	PREVENTED	
PRECLUDES	PREVENTS	
PRECLUDING	PREVENTING	
PREPARATION	READINESS	
PREPARE	GET READY	READY
PREPARED	READY	READYED
PREPAREDLY	READILY	
PREPAREDNESS	READINESS	
PREPARES	READIES	
PREPARING	GETTING READY	
PREVIOUS	EARLIER	PAST
PREVIOUSLY	BEFORE	
PRIORIZATION	RANKING	
PRIORIZATIONS	RANKINGS	
PRIORIZE	RANK	
PRIORIZED	RANKED	
PRIORIZES	RANKS	
PRIORIZING	RANKING	
PROBABILITIES	CHANCES	
PROBABILITIES'	CHANCES'	
PROBABILITY	CHANCE	
PROBABILITY'S	CHANCE'S	
PROCEDURE	RULE	WAY
PROCEDURE'S	RULE'S	WAY'S
PROCEDURES	RULES	WAYS
PROCEDURES'	RULES'	WAYS'
PROCEED	DO	GO ON
PROCEEDED	DID/DONE	WENT/GONE ON
PROCEEDING	DOING	GOING ON
PROCEEDS	DOES	GOES ON
PROFICIENCIES	SKILLS	
PROFICIENCIES'	SKILLS'	
PROFICIENCY	SKILL	
PROFICIENCY'S	SKILL'S	
PROGRAMED	PLANNED	
PROGRAMING	PLANNING	
PROGRAMMED	PLANNED	
PROGRAMMING	PLANNING	
PROGRAMS	PLANS	
PROMULGATE	ANNOUNCE	ISSUE
PROMULGATED	ANNOUNCED	ISSUED
PROMULGATES	ANNOUNCES	ISSUES
PROMULGATING	ANNOUNCING	ISSUING
PROMULGATION	ANNOUNCEMENT	
PROMULGATIONS	ANNOUNCEMENTS	
PROVIDE	GIVE	SAY
PROVIDED	GAVE/GIVEN	SAID
PROVIDES	GIVES	SAYS
PROVIDING	GIVING	SAYING
PURCHASE	BUY	
PURCHASED	BOUGHT	
PURCHASER	BUYER	

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PURCHASERS
PURCHASES
PURCHASING
RECAPITULATE
RECAPITULATED
RECAPITULATES
RECAPITULATING
RECAPITULATION
REDUCE
REDUCED
REDUCES
REDUCING
REDUCTION
REDUCTIONS
REFLECT
REFLECTED
REFLECTING
REFLECTS
REGARDING
RELOCATE
RELOCATED
RELOCATES
RELOCATING
RELOCATION
RELOCATION'S
RELOCATIONS
RELOCATIONS'
REMAIN
REMAINDER
REMAINDER'S
REMAINED
REMAINES
REMAINING
REMUNERATE
REMUNERATED
REMUNERATES
REMUNERATING
REMUNERATION
REMUNERATION'S
REMUNERATIONS
REMUNERATIONS'
RENDER
RENDERABLE
RENDERED
RENDERER
RENDERING
RENDERS
REQUEST
REQUESTED
REQUESTING
REQUESTS
REQUIRE

BUYERS
BUYS
BUYING
SUM UP
SUMMED UP
SUMS UP
SUMMING UP
SUMMING UP
CUT
CUT
CUTS
CUTTING
CUT
CUTS
SAY
SAID
SAYING
SAYS
ABOUT
MOVE
MOVED
MOVES
MOVING
MOVE
MOVE'S
MOVES
MOVES'
STAY
REST
REST'S
STAYED
STAYS
STAYING
PAY
PAID
PAYS
PAYING
PAY
PAY'S
PAYMENTS
PAYMENTS'
GIVE
GIVABLE
GAVE/GIVEN
GIVER
GIVING
GIVES
ASK
ASKED
ASKING
ASKS
JUST

SHOW
SHOWED
SHOWING
SHOWS
OF

MAKE
MAKABLE
MADE
MAKER
MAKING
MAKES

NEED

REQUIRED
REQUIREMENT
REQUIREMENT'S
REQUIREMENTS
REQUIRES
REQUIRING
RETAIN
RETAINED
RETAINING
RETAINS
RETENTION
RETURN
RETURNED
RETURNEE
RETURNEES
RETURNER
RETURNERS
RETURNING
RETURNS
REVIEW
REVIEWED
REVIEWING
REVIEWS
SELECT
SELECTED
SELECTING
SELECTION
SELECTION'S
SELECTIONS
SELECTIONS'
SELECTS
SIMILAR
SIMILARITY
SOLICIT
SOLICITED
SOLICITING
SOLICITS
STATE
STATED
STATES
STATING
SUBMIT
SUBMITS
SUBMITTED
SUBMITTER
SUBMITTERS
SUBMITTING
SUBSEQUENT
SUBSEQUENTLY
SUBSTANTIAL
SUFFICIENT
TERMINATE

NEEDED
NEED
NEED'S
NEEDS
NEEDS
NEEDING
KEEP
KEPT
KEEPING
KEEPS
KEEPING
GO BACK
WENT BACK
ONE WHO GOES BACK
THOSE WHO COME BACK
ONE WHO TAKES BACK
THOSE WHO TAKE BACK
GOING BACK
GOES BACK
CHECK
CHECKED
CHECKING
CHECKS
CHOOSE
CHOSE/CHOSEN
CHOOSING
CHOICE
CHOICE'S
CHOICES
CHOICES'
CHOOSES
LIKE
LIKENESS
ASK FOR
ASKED FOR
ASKING FOR
ASKS FOR
SAY
SAID
SAYS
SAYING
GIVE
GIVES
GAVE/GIVEN
GIVER
GIVERS
GIVING
LATER
AFTER
LARGE
ENOUGH
END

GONE BACK

GO OVER
WENT/GONE OVER
GOING OVER
GOES OVER

SEND
SENDS
SENT
SENDER
SENDERS
SENDING
NEXT
LATER
REAL

STOP

TERMINATED
TERMINATES
TERMINATING
TERMINATION
TERMINATIONS
THEREFORE
THEREOF
TRANSMIT
TRANSMITS
TRANSMITTABLE
TRANSMITTED
TRANSMITTING
TRANSPARATION
TRANSPIRATIONS
TRANSPIRE
TRANSPIRED
TRANSPIRES
TRANSPIRING
UTILIZABILITIES
UTILIZABILITY
UTILIZABLE
UTILIZATION
UTILIZATIONS
UTILIZE
UTILIZED
UTILIZER
UTILIZERS
UTILIZES
UTILIZING
VALIDATE
VALIDATED
VALIDATES
VALIDATING
VALIDATION
VALIDATIONS
VALUE
VERBATIM
VIA
VIABLE
WARRANT
WARRANTED
WARRANTING
WARRANTS
WHENEVER
WHEREAS
WITNESS
WITNESSED
WITNESSES
WITNESSING

ENDED
ENDS
ENDING
ENDING
ENDING
SO
ITS
SEND
SENDS
SENDABLE
SENT
SENDING
HAPPENING
HAPPENINGS
HAPPEN
HAPPENED
HAPPENS
HAPPENING
USES
USABILITY
USABLE
USE
USES
USE
USED
USER
USERS
USES
USING
CONFIRM
CONFIRMED
CONFIRMS
CONFIRMING
CONFIRMATION
CONFIRMATIONS
COST
WORD FOR WORD
IN
WORKABLE
CALL FOR
CALLED FOR
CALLING FOR
CALLS FOR
WHEN
SINCE
SEE
SAW
SEES
SEEING

STOPPED
STOPS
STOPPING

THEIR

OCCURRENCE
OCCURRENCES
OCCUR
OCCURRED
OCCURS
OCCURRING

USEFULNESS
USEFUL

WORTH
EXACT
ON

PERMIT
PERMITTED
PERMITTING
PERMITS

SEEN

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APPENDIX E

THE NAVY VERB LIST WITH VERB VARIATIONS

This list resulted from expanding the 108 root verbs of the Navy Verb List with their substitutes. The root verbs were originally found in DOD-STD-1685(SH). The expanded Navy Verb List contains 431 different verb-substitute forms. These forms of the Navy Verb List were actually used in the Computer Readability Editing System.

Word to be Substituted	First Substitute	Second Substitute
ACCOMPLISH	PERFORM	DO
ACCOMPLISHED	PERFORMED	DID/DONE
ACCOMPLISHES	PERFORMS	DOES
ACCOMPLISHING	PERFORMING	DOING
ACTUATE	OPERATE	MOVE
ACTUATED	OPERATED	MOVED
ACTUATES	OPERATES	MOVES
ACTUATING	OPERATING	MOVING
ADVANCE	MOVE FOWARD	MOVE AHEAD
ADVANCED	MOVED FORWARD	MOVED AHEAD
ADVANCES	MOVES FORWARD	MOVES AHEAD
ADVANCING	MOVING FOWARD	MOVING AHEAD
ADVISE	REPORT TO	TELL
ADVISED	REPORTED TO	TOLD
ADVISES	REPORTS TO	TELLS
ADVISING	REPORTING TO	TELLING
AGITATE	SHAKE	
AGITATED	SHOOK/SHAKEN	
AGITATES	SHAKES	
AGITATING	SHAKING	
AID	HELP	
AIDED	HELPED	
AIDING	HELPING	
AIDS	HELPS	
ALERT	WARN	
ALERTED	WARNED	
ALERTING	WARNING	
ALERTS	WARNS	
ALLOCATE	ASSIGN	DISTRIBUTE
ALLOCATED	ASSIGNED	DISTRIBUTED
ALLOCATES	ASSIGNS	DISTRIBUTES
ALLOCATING	ASSIGNING	DISTRIBUTING
ALLOW	LET	WAIT FOR
ALLOWED	LET	WAITED FOR
ALLOWING	LETTING	WAITING FOR
ALLWS	LETS	WAITS FOR
ALTERNATE	GO BACK AND FORTH	
ALTERNATED	WENT BACK AND FORTH	GONE BACK AND FORTH
ALTERNATES	GUES BACK AND FORTH	
ALTERNATING	GOING BACK AND FORTH	
ANALYZE	THINK ABOUT	
ANALYZED	THOUGHT ABOUT	
ANALYZES	THINKS ABOUT	
ANALYZING	THINKING ABOUT	
ARRANGE	PUT IN ORDER	
ARRANGED	PUT IN ORDER	
ARRANGES	PUTS IN ORDER	
ARRANGING	PUTTING IN ORDER	
ASCERTAIN	BE SURE	
ASCERTAINED	WAS/WERE SURE	
ASCERTAINING	BEING SURE	
ASCERTAINS	IS SURE	

Word to be Substituted	First Substitute	Second Substitute
ASSESS	EVALUATE	
ASSESSED	EVALUATED	
ASSESSES	EVALUATES	
ASSESSING	EVALUATING	
ASSIST	HELP	
ASSISTED	HELPED	
ASSISTING	HELPING	
ASSISTS	HELPS	
ASSURE	TELL	REPORT TO
ASSURED	TOLD	REPORTED TO
ASSURES	TELLS	REPORTS TO
ASSURING	TELLING	REPORTING TO
CATEGORIZE	CLASSIFY	
CATEGORIZED	CLASSIFIED	
CATEGORIZES	CLASSIFIES	
CATEGORIZING	CLASSIFYING	
CHANGE	REPLACE	MODIFY
CHANGED	REPLACED	MODIFIED
CHANGES	REPLACES	MODIFIES
CHANGING	REPLACING	MODIFYING
CHANNEL	FORM	CUT
CHANNELED	FORMED	CUT
CHANNELING	FORMING	CUTTING
CHANNELLED	FORMED	CUT
CHANNELLING	FORMING	CUTTING
CHANNELS	FORMS	CUTS
CHECK	BE SURE	
CHECKED	WAS/WERE SURE	
CHECKING	BEING SURE	
CHECKS	IS SURE	
COMMUNICATE	REPORT TO	TELL
COMMUNICATED	REPORTED TO	TOLD
COMMUNICATES	REPORTS TO	TELLS
COMMUNICATING	REPORTING TO	TELLING
COMPILE	COLLECT	
COMPILED	COLLECTED	
COMPILES	COLLECTS	
COMPILING	COLLECTING	
COMPLIED	FOLLOWED	
COMPLIES	FOLLOWS	
COMPLY	FOLLOW	
COMPLYING	FOLLOWING	
COMPUTE	CALCULATE	
COMPUTED	CALCULATED	
COMPUTES	CALCULATES	
COMPUTING	CALCULATING	
CONFER	ASK	
CONFERRED	ASKED	
CONFERRING	ASKING	
CONFERS	ASKS	
CONSTRUCT	MAKE	BUILD
CONSTRUCTED	MADE	BUILT

Word to be Substituted	First Substitute	Second Substitute
CONSTRUCTING	MAKING	BUILDING
CONSTRUCTS	MAKES	BUILDS
DEPRESS	PRESS	PUSH
DEPRESSED	PRESSED	PUSHED
DEPRESSES	PRESSES	PUSHES
DEPRESSING	PRESSING	PUSHING
DEPRESSURIZE	RELEASE PRESSURE	
DEPRESSURIZED	RELEASED PRESSURE	
DEPRESSURIZES	RELEASES PRESSURE	
DEPRESSURIZING	RELEASING PRESSURE	
DETERMINE	MEASURE	BE SURE
DETERMINED	MEASURED	WAS/WERE SURE
DETERMINES	MEASURES	IS SURE
DETERMINING	MEASURING	BEING SURE
DISCONNECT	UNPLUG	
DISCONNECTED	UNPLUGGED	
DISCONNECTING	UNPLUGGING	
DISCONNECTS	UNPLUGS	
DISENGAGE	RELEASE	UNLOCK
DISENGAGED	RELEASED	UNLOCKED
DISENGAGES	RELEASES	UNLOCKS
DISENGAGING	RELEASING	UNLOCKING
DISMANTLE	DISASSEMBLE	
DISMANTLED	DISASSEMBLED	
DISMANTLES	DISASSEMBLES	
DISMANTLING	DISASSEMBLING	
DISPATCH	SEND	
DISPATCHED	SENT	
DISPATCHES	SENDS	
DISPATCHING	SENDING	
DISTRIBUTE	HAND OUT	SPREAD OUT
DISTRIBUTED	HANDED OUT	SPREAD OUT
DISTRIBUTES	HANDS OUT	SPREADS OUT
DISTRIBUTING	HANDING OUT	SPREADING OUT
EFFECT	PERFORM	DO
EFFECTED	PERFORMED	DID/DONE
EFFECTING	PERFORMING	DOING
EFFECTS	PERFORMS	DOES
ELIMINATE	GET RID OF	
ELIMINATED	GOT/GOTTEN RID OF	
ELIMINATES	GETS RID OF	
ELIMINATING	GETTING RID OF	
EMPLOY	USE	
EMPLOYED	USED	
EMPLOYING	USING	
EMPLOYS	USES	
ENSURE	BE SURE	
ENSURED	WAS/WERE SURE	
ENSURES	IS SURE	
ENSURING	BEING SURE	
ENTER	GO IN	COME IN
ENTERED	WENT/GONE IN	CAME IN

Word to be Substituted	First Substitute	Second Substitute
ENTERING	GOING IN	COMING IN
ENTERS	GOES IN	COMES IN
ERECT	SET UP	PUT TOGETHER
ERECTED	SET UP	PUT TOGETHER
ERECTING	SETTING UP	PUTTING TOGETHER
ERECTS	SETS UP	PUTS TOGETHER
EXAMINE	INSPECT	
EXAMINED	INSPECTED	
EXAMINES	INSPECTS	
EXAMINING	INSPECTING	
EXTEND	STRETCH OUT	MAKE LONGER
EXTENDED	STRETCHED OUT	MADE LONGER
EXTENDING	STRETCHING OUT	MAKING LONGER
EXTENDS	STRETCHES OUT	MAKES LONGER
EXTRACT	PULL OUT	
EXTRACTED	PULLED OUT	
EXTRACTING	PULLING OUT	
EXTRACTS	PULLS OUT	
FABRICATE	MAKE	BUILD
FABRICATED	MADE	BUILT
FABRICATES	MAKES	BUILDS
FABRICATING	MAKING	BUILDING
FIGURE	CALCULATE	
FIGURED	CALCULATED	
FIGURES	CALCULATES	
FIGURING	CALCULATING	
FIND	MEASURE	
FINDING	MEASURING	
FINDS	MEASURES	
FOUND	MEASURED	
FURNISH	GIVE	
FURNISHED	GAVE/GIVEN	
FURNISHES	GIVES	
FURNISHING	GIVING	
GUIDE	INSERT CAREFULLY	
GUIDED	INSERTED CAREFULLY	
GUIDES	INSERTS CAREFULLY	
GUIDING	INSERTING CAREFULLY	
IMMERSE	SUBMERGE	
IMMERSED	SUBMERGED	
IMMERSES	SUBMERGES	
IMMERSING	SUBMERGING	
INDICATE	POINT OUT	TELL
INDICATED	POINTED OUT	TOLD
INDICATES	POINTS OUT	TELLS
INDICATING	POINTING OUT	TELLING
INFORM	TELL	REPORT TO
INFORMED	TOLD	REPORTED TO
INFORMING	TELLING	REPORTING TO
INFORMS	TELLS	REPORTS TO
INITIATE	START	BEGIN
INITIATED	STARTED	BEGAN/BEGUN

Word to be Substituted	First Substitute	Second Substitute
INITIATES	STARTS	BEGINS
INITIATING	STARTING	BEGINNING
INJECT	FORCE	
INJECTED	FORCED	
INJECTING	FORCING	
INJECTS	FORCES	
INSURE	BE SURE	
INSURED	WAS/WERE SURE	
INSURES	IS SURE	
INSURING	BEING SURE	
INTERPRET	EXPLAIN	
INTERPRETED	EXPLAINED	
INTERPRETING	EXPLAINING	
INTERPRETS	EXPLAINS	
JOIN	ATTACH	CONNECT
JOINED	ATTACHED	CONNECTED
JOINING	ATTACHING	CONNECTING
JOINS	ATTACHES	CONNECTS
LOCATE	FIND	
LOCATED	FOUND	
LOCATES	FINDS	
LOCATING	FINDING	
MARK	TAG	
MARKED	TAGGED	
MARKING	TAGGING	
MARKS	TAGS	
MATE	ATTACH	CONNECT
MATED	ATTACHED	CONNECTED
MATES	ATTACHES	CONNECTS
MATING	ATTACHING	CONNECTING
MONITOR	WATCH	
MONITORED	WATCHED	
MONITORING	WATCHING	
MONITORS	WATCHES	
MOUNT	INSTALL	ATTACH
MOUNTED	INSTALLED	ATTACHED
MOUNTING	INSTALLING	ATTACHING
MOUNTS	INSTALLS	ATTACHES
NOTIFIED	REPORTED TO	TOLD
NOTIFIES	REPORTS TO	TELLS
NOTIFY	REPORT TO	TELL
NOTIFYING	REPORTING TO	TELLING
OBSERVE	WATCH	OBEY
OBSERVED	WATCHED	OBEYED
OBSERVES	WATCHES	OBEYS
OBSERVING	WATCHING	OBEYING
OBTAIN	GET	
OBTAINED	GOT/GOTTEN	
OBTAINING	GETTING	
OBTAINS	GETS	
ORDER	PUT IN ORDER	REQUISITION
ORDERED	PUT IN ORDER	REQUISITIONED

Word to be Substituted	First Substitute	Second Substitute
ORDERING	PUTTING IN ORDER	REQUISITIONING
ORDERS	PUTS IN ORDER	REQUISITIONS
ORIENT	PUT	SET
ORIENTED	PUT	SET
ORIENTING	PUTTING	SETTING
ORIENTS	PUTS	SETS
ORIGINATE	START	
ORIGINATED	STARTED	
ORIGINATES	STARTS	
ORIGINATING	STARTING	
PLACE	PUT	SET
PLACED	PUT	SET
PLACES	PUTS	SETS
PLACING	PUTTING	SETTING
POSITION	PUT	SET
POSITIONED	PUT	SET
POSITIONING	PUTTING	SETTING
POSITIONS	PUTS	SETS
PRE-SET	SET	
PRE-SETS	SETS	
PRE-SETTING	SETTING	
PROVIDE	GIVE	
PROVIDED	GAVE/GIVEN	
PROVIDES	GIVES	
PROVIDING	GIVING	
READYED	PREPARED	
READIES	PREPARES	
READJUST	ADJUST	
READJUSTED	ADJUSTED	
READJUSTING	ADJUSTING	
READJUSTS	ADJUSTS	
READY	PREPARE	
READYING	PREPARING	
REASSEMBLE	ASSEMBLE	
REASSEMBLED	ASSEMBLED	
REASSEMBLES	ASSEMBLES	
REASSEMBLING	ASSEMBLING	
RECAP	CAP	
RECAPPED	CAPPED	
RECAPPING	CAPPING	
RECAPS	CAPS	
RECEIVE	GET	
RECEIVED	GOT/GOTTEN	
RECEIVES	GETS	
RECEIVING	GETTING	
RECONNECT	CONNECT	
RECONNECTED	CONNECTED	
RECONNECTING	CONNECTING	
RECONNECTS	CONNECTS	
RECORD	WRITE	WRITE IN
RECORDED	WROTE/WITTEN	WROTE/WITTEN IN
RECORDING	WRITTING	WRITTING IN

Word to be Substituted	First Substitute	Second Substitute
RECORDS	WRITES	WRITES IN
REINFLATE	INFLATE	
REINFLATED	INFLATED	
REINFLATES	INFLATES	
REINFLATING	INFLATING	
REINSTALL	INSTALL	
REINSTALLED	INSTALLED	
REINSTALLING	INSTALLING	
REINSTALLS	INSTALLS	
REJECT	DO NOT USE	DESTROY
REJECTED	DID NOT USE	DESTROYED
REJECTING	IS/WAS NOT USING	DESTROYING
REJECTS	DOES NOT USE	DESTROYS
RELAY	GIVE	TELL
RELAYED	GAVE/GIVEN	TOLD
RELAYING	GIVING	TELLING
RELAYS	GIVES	TELLS
RELIEVE	REDUCE	
RELIEVED	REDUCED	
RELIEVES	REDUCES	
RELIEVING	REDUCING	
REPLACE	PUT BACK	INSTALL NEW
REPLACED	PUT BACK	INSTALLED NEW
REPLACES	PUTS BACK	INSTALLS NEW
REPLACING	PUTTING BACK	INSTALLING NEW
REPRESSURIZE	PRESSURIZE	
REPRESSURIZED	PRESSURIZED	
REPRESSURIZES	PRESSURIZES	
REPRESSURIZING	PRESSURIZING	
REQUEST	ASK FOR	
REQUESTED	ASKED FOR	
REQUESTING	ASKING FOR	
REQUESTS	ASKS FOR	
RESET	SET	
RESETS	SETS	
RESETTING	SETTING	
RETARD	HOLD BACK	SLOW DOWN
RETARDED	HELD BACK	SLOWED DOWN
RETARDING	HOLDING BACK	SLOWING DOWN
RETARDS	HOLDS BACK	SLOWS DOWN
RETRACT	PULL BACK	
RETRACTED	PULLED DOWN	
RETRACTING	PULLING DOWN	
RETRACTS	PULLS BACK	
ROTATE	TURN	
ROTATED	TURNE	
ROTATES	URNS	
ROTATING	TURNING	
ROUTE	SEND	
ROUTED	SENT	
ROUTES	SENDS	
ROUTING	SENDING	

Word to be Substituted	First Substitute	Second Substitute
SCAN	WATCH	
SCANNED	WATCHED	
SCANNING	WATCHING	
SCANS	WATCHES	
SELECT	CHOOSE	
SELECTED	CHOSE/CHOSEN	
SELECTING	CHOOSING	
SELECTS	CHOOSES	
STOP	SHUT DOWN	
STOPPED	SHUT DOWN	
STOPPING	SHUTTING DOWN	
STOPS	SHUTS DOWN	
STRICKEN	HIT	
STRICKING	HITTING	
STRIKE	HIT	
STRIKES	HITS	
STRUCK	HIT	
SUPERINTEND	SUPERVISE	
SUPERINTENDED	SUPERVISED	
SUPERINTENDING	SUPERVISING	
SUPERINTENDS	SUPERVISES	
SUPPORT	HOLD UP	
SUPPORTED	HELD UP	
SUPPORTING	HOLDING UP	
SUPPORTS	HOLDS UP	
TABULATE	MAKE A TABLE	LIST
TABULATED	MADE A TABLE	LISTED
TABULATES	MAKES A TABLE	LISTS
TABULATING	MAKING A TABLE	LISTENING
THREW	SET SWITCH TO	
THROW	SET SWITCH TO	
THROWING	SETTING SWITCH TO	
THROWN	SET SWITCH TO	
THROWS	SETS SWITCH TO	
TRANSFER	MOVE	
TRANSFERRED	MOVED	
TRANSFERRING	MOVING	
TRANSFERS	MOVES	
TRANSPORT	MOVE	
TRANSPORTED	MOVED	
TRANSPORTING	MOVING	
TRANSPORTS	MOVES	
UNCAP	REMOVE CAP	
UNCAPPED	REMOVED CAP	
UNCAPPING	REMOVING CAP	
UNCAPS	REMOVES CAP	
UNPLUG	REMOVE PLUG	
UNPLUGGED	REMOVED PLUG	
UNPLUGGING	REMOVING PLUG	
UNPLUGS	REMOVES PLUG	
UNSCREW	REMOVE SCREW	
UNSCREWED	REMOVED SCREW	

Word to be
Substituted

First
Substitute

UNSCREWING	REMOVING SCREW
UNSCREWS	REMOVES SCREW
UTILIZE	USE
UTILIZED	USED
UTILIZES	USES
UTILIZING	USING
VERIFIED	WAS/WERE SURE
VERIFIES	IS SURE
VERIFY	BE SURE
VERIFYING	BEING SURE
WITHDRAW	PULL OUT
WITHDRAWING	PULLING OUT
WITHDRAWN	PULLED OUT
WITHDRAWS	PULLS OUT
WITHDREW	PULLED OUT

APPENDIX F

THE TEST PASSAGES

These test passages were used to evaluate the performance of the features of the Computer Readability Editing System. Complete references on the sources of the passages are contained at the end of the appendix. The heading of each passage gives the manual number and paragraph number of that passage. The passages are presented in two main groups: (1) the NAVSEA passages and (2) the instructional and procedural passages. The third group, the FORCAST and Kincaid passages, have been published elsewhere. The FORCAST passages are available in Caylor, Sticht, Fox, and Ford (1973) and the Kincaid passages in Kincaid, Fishburne, Rogers, and Chissom (1975).

TEST PASSAGES FROM THE NAVSEA MANUAL

NAVSEA S9086-BH-STM-00/CH 041. PARAGRAPHS 041-1.1 THROUGH 041-1.4

SECTION 1 GENERAL 041-1.1 GENERAL 041-1.2 THIS SECTION CONTAINS THE BASIC REGULATIONS AND REFERENCES TO REGULATIONS PERTAINING TO THE ADMINISTRATION OF FUNDS APPROPRIATED FOR PROGRAMS ASSIGNED TO THE NAVAL SEA SYSTEMS COMMAND (NAVSEA). 041-1.3 SOURCES OF AUTHORITY 041-1.4 IN ORDER TO CONDUCT THE FUNCTIONS WITH WHICH NAVSEA IS CHARGED IN NAVY REGULATIONS AND OTHER SECRETARY OF THE NAVY (SECNAV) INSTRUCTIONS, REQUESTS FOR FUNDS ARE MADE ANNUALLY VIA VARIOUS LEVELS OF EXECUTIVE REVIEW TO THE CONGRESS. RESULTANT FUNDS APPROPRIATED BY THE CONGRESS ARE MADE AVAILABLE TO THE COMMANDER, NAVSEA THROUGH THE APPORTIONMENT PROCEDURES OF THE EXECUTIVE BRANCH VIA SECRETARY OF DEFENSE (COMPTROLLER) AND SECRETARY OF THE NAVY. TITLE IV OF THE NATIONAL SECURITY ACT OF 1947, AS AMENDED, PRESCRIBES HOW DEPARTMENT OF DEFENSE BUDGET ESTIMATES SHALL BE PREPARED, PRESENTED, AND JUSTIFIED; ESTABLISHES THE FUNCTIONS OF THE DEPARTMENTAL COMPTROLLER ORGANIZATION; AND PRESCRIBES THE USES OF WORKING CAPITAL FUNDS. SECTION 3679 OF THE REVISED STATUTES, AS AMENDED, PROVIDES THAT ALL AGENCIES OF THE GOVERNMENT RECEIVING APPROPRIATIONS OF PUBLIC FUNDS WILL ESTABLISH ADMINISTRATIVE REGULATIONS TO PREVENT OVER-EXPENDITURE OR OVER-OBLIGATION OF FUNDS AND WILL REQUIRE MAINTENANCE OF ACCOUNTING RECORDS TO PROVIDE FULL DISCLOSURE OF FINANCIAL OPERATIONS. IMPLEMENTING THESE LAWS, THE SECRETARY OF DEFENSE (COMPTROLLER) AND THE SECRETARY OF THE NAVY (COMPTROLLER) HAVE ISSUED ADMINISTRATIVE REGULATIONS, APPLICABLE TO THE FINANCIAL OPERATIONS OF THE COMMANDS, WHICH ARE EMBODIED IN DOD, SECNAV, AND NAVCOMPT DIRECTIVES AND INSTRUCTIONS, AND NAVCOMPT AND NAVAL SUPPLY SYSTEMS COMMAND MANUALS. ADDITIONAL INSTRUCTIONS APPLICABLE TO FUNDS OF NAVSEA ARE PROMULGATED BY AMENDMENTS TO THE NAVCOMPT AND NAVAL SUPPLY SYSTEMS COMMAND MANUALS, AND BY NAVSEA NOTICES AND INSTRUCTIONS. IT IS INTENDED THAT THIS CHAPTER SERVE AS A GENERAL FINANCIAL GUIDE IN PROGRAMS ADMINISTERED BY NAVSEA WITH SPECIFIC INSTRUCTIONS AND REGULATIONS BEING PROVIDED IN THE

AFOREMENTIONED SOURCES. SECTION 2

RESPONSIBILITIES 041-2.1 NAVSEA RESPONSIBILITY

041-2.2 THE COMMANDER, NAVAL SEA SYSTEMS COMMAND, IS RESPONSIBLE TO THE SECRETARY OF THE NAVY (COMPTROLLER) FOR THE PREPARATION OF APPROPRIATION BUDGETS FOR PROGRAMS WITHIN HIS TECHNICAL COGNIZANCE AND FOR THE ADMINISTRATION OF APPROPRIATED FUNDS RECEIVED FROM THE OFFICE OF MANAGEMENT AND BUDGET INCLUDING ESTIMATED REIMBURSEMENTS, TRANSFERS, AND ALL OTHER ITEMS OF ANTICIPATED RECEIPTS. HE HAS AUTHORITY WITHIN THE STATUTORY LANGUAGE OF THE APPROPRIATIONS AND THE APPORTIONMENT SCHEDULE TO EMPLOY ALLOCATED FUNDS AS HE MAY DEEM PROPER IN THE EXECUTION OF THE PROGRAMS. HE IS ALSO RESPONSIBLE FOR THE ESTABLISHMENT OF ADEQUATE FUNDS CONTROL RECORDS, AND FOR ENSURING THAT THE OFFICIAL ACCOUNTING RECORDS MAINTAINED BY THE NAVAL MATERIAL COMMAND SUPPORT ACTIVITY PROVIDE FULL DISCLOSURE OF THE FINANCIAL OPERATIONS AND RESOURCES DERIVED FROM APPROPRIATIONS AND FUNDS ASSIGNED TO NAVSEA FOR ADMINISTRATIVE CONTROL. HE HAS POWER TO DELEGATE THIS AUTHORITY, AND HAS DONE SO, WITH FURTHER REDELEGATION AUTHORIZED, TO HIS COMPTROLLER WHOSE FUNCTIONS ARE CONTAINED IN PARAGRAPH 041-2.7.

041-2.3 CONCURRE WITH THE RESPONSIBILITY FOR ADMINISTRATION OF FUNDS IS THE RESPONSIBILITY FOR DETERMINING PROGRESS ACHIEVED IN THE ACCOMPLISHMENT OF AUTHORIZED PROGRAMS. THE ACCURATE AND TIMELY PREPARATION OF STATISTICAL AND FINANCIAL DATA COMPILED FOR MANAGEMENT OF NAVSEA PROGRAMS IS ALSO PART OF THE FINANCIAL STEWARDSHIP VESTED IN THE COMMANDER AND DELEGATED BY HIM TO HIS PRIMARY OFFICERS COGNIZANT OF VARIOUS PARTS OF ASSIGNED PROGRAMS.

041-2.4 GENERAL CONCEPT OF THE COMPTROLLER FUNCTION 041-2.5 THE

SECRETARY OF THE NAVY HAS PROMULGATED THE FOLLOWING EXPLANATION OF THE COMPTROLLER FUNCTION FOR GUIDANCE: THE COMPTROLLER MUST PROVIDE TECHNICAL GUIDANCE AND DIRECTION TO THE CONDUCT OF SPECIFIC FACT COLLECTION SYSTEMS IN THE AREAS OF BUDGET FORMULATION AND EXECUTION, PROGRAM ANALYSIS, ACCOUNTING, PROGRESS REPORTS, AND STATISTICS. THE FULLY COORDINATED STAFF SERVICE PROVIDED BY THE COMPTROLLER SHOULD RELIEVE THE COMMANDING OFFICER OF MUCH OF THE BURDEN OF DETAILED FACT COLLECTION, COORDINATION, AND ANALYSIS. WHEN PROPERLY PERFORMED, COMPTROLLERSHIP WILL ENABLE THE COMMANDING OFFICER TO SPEND MORE OF HIS TIME IN THE AREAS OF POLICY FORMULATION, DECISION, AND PROGRAM DIRECTION. 041-2.6NAVSEA COMPTROLLER RESPONSIBILITY 041-2.7THE COMPTROLLER IS THE OFFICER IN CHARGE OF THE PLANS, PROGRAMS, AND FINANCIAL MANAGEMENT OR COMPTROLLER DIRECTORATE WHICH IS COMPRISED OF FIVE APPROPRIATION DIVISIONS, THREE ACCOUNTING DIVISIONS, AS WELL AS SUPPORTING STAFF OFFICES. THESE DIVISIONS PERFORM FISCAL STAFF FUNCTIONS FOR ALL DIVISIONS OF NAVSEA ENGAGED IN EXECUTION OF THE GENERAL FINANCIAL PLAN FOR EACH FUNDED PROGRAM. THE AUTHORITY OF THE COMMANDER, NAVSEA FOR THE ADMINISTRATIVE CONTROL OF APPROPRIATIONS AND FUNDS ALLOCATED OR OTHERWISE MADE AVAILABLE TO NAVSEA HAS BEEN DELEGATED TO THE COMPTROLLER. SUBJECT TO THE DIRECTION AND CONTROL OF THE COMMANDER, NAVSEA, THE COMPTROLLER WILL PERFORM THE FOLLOWING FUNCTIONS: PREPARE AND SIGN ALL COMMAND REQUESTS FOR BUDGET ACTIVITY ALLOCATIONS, APPORTIONMENTS, AND REAPPORTIONMENT ESTABLISH AND DEFINE PROJECTS AND SUBPROJECTS IN APPROVED COMMAND PROGRAMS, MAKE INTERNAL ALLOCATIONS TO SUCH PROJECTS AND SUBPROJECTS WITHIN THE APPORTIONMENTS OR REAPPORTIONMENT AND BUDGET ACTIVITY ALLOCATIONS APPROVED BY AUTHORITY, APPROVE OR DISAPPROVE, ON THE BASIS OF THE APPROVED FINANCIAL PLAN, ALL REQUESTS FOR THE ISSUANCE OF DOCUMENTS COMMITTING, OBLIGATING, OR AUTHORIZING THE EXPENDITURE OF FUNDS, REQUIRE ACCOUNTING RECORDS TO BE MAINTAINED, ESTABLISH, OR REQUIRE TO BE ESTABLISHED, FISCAL CONTROLS WHICH WILL PREVENT OVERCOMMITMENT, OVEROBLIGATION, OR OVER-EXPENDITURE OF FUNDS, APPORTIONMENTS, REAPPORTIONMENT OR SUBDIVISIONS THEREOF. THE COMPTROLLER IS ALSO AUTHORIZED TO PERFORM AUDITS IN NAVSEA, FIELD ACTIVITIES, AND COMMANDS WHERE NAVSEA HAS BEEN ASSIGNED COMMAND. 041-2.8DELEGATE FIELD RESPONSIBILITY 041-2.9EACH COMMAND OR ACTIVITY AUTHORIZED BY NAVSEA TO OBLIGATE OR EXPEND APPROPRIATED FUNDS WILL ADMINISTER AND ACCOUNT FOR SUCH FUNDS IN COMPLIANCE WITH APPLICABLE FEDERAL LAW, APPLICABLE DEPARTMENT OF DEFENSE REGULATIONS AND NAVCOMPT INSTRUCTIONS, AND SUCH SUPPLEMENTARY NAVSEA INSTRUCTIONS AS MAY BE ISSUED

TEST PASSAGES FROM THE NAVSEA MANUAL

NAVSEA S9086-BH-STM-00/CH 079. PARAGRAPHS 079-20.1 THROUGH 079-21.6

ON THE MORE DETAILED PHASES OF SPECIFIC PROGRAMS.

CHAPTER 079 DAMAGE CONTROL VOLUME 2 PRACTICAL DAMAGE CONTROL SECTION 20
GENERAL 079-20.1 BASIC DAMAGE CONTROL CONSIDERATIONS 079-20.2 THE MOST
IMPORTANT PHASE OF DAMAGE CONTROL IS THAT WHICH TAKES PLACE BEFORE DAMAGE
HAPPENS. ONLY THROUGH TRAINING, EXERCISES, TESTS, AND INSPECTIONS CAN
PERSONNEL OF THE SHIP OBTAIN THE CAPABILITY AND KNOWLEDGE OF HOW TO ACT WHEN
ACTION IS NEEDED. 079-20.3 IT IS TOO
LATE TO START AN INTENSIVE DAMAGE CONTROL OR FIREFIGHTING PROGRAM WHEN THE
SHIP IS SINKING OR INVOLVED WITH A CONFLAGRATION. TRAINING MUST START WHEN
THE SHIP IS IN CHARGE OF A PRECOMMISSIONING DETAIL AND MUST NEVER CEASE
UNTIL THE SHIP IS STRICKEN FROM THE NAVY LIST. 079-20.4 THE INFORMATION IN
THIS VOLUME IS NOT INTENDED TO SUPERSEDE, MAKE OBSOLETE, OR INVALIDATE ANY
DIRECTIVE OR PUBLICATION PERTAINING TO TYPE, CLASS, OR PARTICULAR SHIP
ISSUED BY COMPETENT AUTHORITY. 079-20.5 ANY REFERENCE TO THE DAMAGE CONTROL
OFFICER SHALL BE INTERPRETED TO MEAN THAT OFFICER IN THE CHAIN OF COMMAND,
WHO IS AUTHORIZED AND ASSIGNED THE RESPONSIBILITY FOR THE DAMAGE CONTROL
ORGANIZATION IN ALL MATTERS, INCLUDING MAKING DECISIONS AND TAKING ACTION.
079-20.6 OBJECTIVES. THE THREE BASIC OBJECTIVES OF SHIPBOARD DAMAGE CONTROL
ARE: TO TAKE ALL PRACTICABLE PRELIMINARY ACTION, BEFORE DAMAGE OCCURS, SUCH
AS MAINTENANCE OF WATERTIGHT AND AIRTIGHT INTEGRITY, PRESERVATION OF RESERVE
BUOYANCY AND STABILITY, REMOVAL OF FIRE HAZARDS, AND UPKEEP AND DISTRIBUTION
OF EMERGENCY EQUIPMENT, TO MINIMIZE AND LOCALIZE SUCH DAMAGE AS DOES OCCUR,
BY SUCH ACTIONS AS CONTROL OF FLOODING, PRESERVATION OF STABILITY AND
BUOYANCY, COMBATING FIRE, AND FIRST-AID TREATMENT OF PERSONNEL, TO
ACCOMPLISH EMERGENCY REPAIRS OR RESTORATIONS AS QUICKLY AS POSSIBLE AFTER
THE OCCURRENCE OF DAMAGE, BY SUCH ACTIONS AS SUPPLYING CASUALTY POWER,
REGAINING A SAFE MARGIN OF STABILITY AND BUOYANCY, REINFORCING DAMAGED
STRUCTURES, AND MANNING ESSENTIAL EQUIPMENT. 079-20.7 THE SHIP'S ABILITY TO
INFLECT PUNISHMENT UPON AND DESTROY AN ENEMY OR TO PERFORM ANY OTHER
ASSIGNED MISSION MAY DEPEND

UPON THE EFFECTIVENESS OF DAMAGE CONTROL PROCEDURES. IT IS ESSENTIAL THAT
EVERY MEMBER OF THE SHIP'S COMPANY RECOGNIZE HIS RESPONSIBILITY AND ITS
IMPORTANCE. 079-20.8 DAMAGE CONTROL MUST BE CONSIDERED AS AN OFFENSIVE, AS
WELL AS A DEFENSIVE FUNCTION. 079-20.9 SCOPE. DAMAGE CONTROL IS CONCERNED
NOT ONLY WITH BATTLE DAMAGE BUT ALSO WITH NONBATTLE DAMAGE SUCH AS FIRE,
COLLISION, GROUNDING, OR EXPLOSION. IT MAY BE NECESSARY IN PORT AS WELL AS
AT SEA, AND MAY INVOLVE THE USE OF PERSONNEL AND FACILITIES OF AN UNDAMAGED
SHIP. 079-20.10 NECESSARY KNOWLEDGE 079-20.11 DAMAGE CONTROL REQUIRES A
DETAILED KNOWLEDGE OF SHIP CONSTRUCTION, CHARACTERISTICS COMPARTMENTATIO
STABILITY, AND OF THOSE APPURTENANCES PLACED IN A SHIP TO PREVENT OR CONTROL
DAMAGE SHOULD THE SHIP BE ENDANGERED. 079-20.12 THE CONTROL OF DAMAGE
DEPENDS UPON THE ABILITY AND INITIATIVE OF PERSONNEL TO TAKE PROMPT
CORRECTIVE ACTION, USING THE MATERIAL WHICH IS READILY AVAILABLE. HAVING A
THOROUGH KNOWLEDGE OF THE SHIP WILL ENABLE PERSONNEL TO DETERMINE READILY
THE CORRECTIVE ACTION TO BE TAKEN. 079-20.13 THIS VOLUME PRESENTS, OR
INCORPORATES BY REFERENCE TO OTHER NAVAL SHIPS TECHNICAL MANUAL (NSTM)
CHAPTERS, INFORMATION CONCERNING THOSE FEATURES OF DAMAGE CONTROL AS A
RESPONSIBILITY OF THE NAVAL SEA SYSTEMS COMMAND (NAVSEA) WHICH ARE OF
GENERAL APPLICATION, BULLETINS, INDIVIDUAL SHIPS DAMAGE CONTROL BOOKS, AND
EQUIPMENT INSTRUCTION PAMPHLETS CONTAIN ADDITIONAL OR MORE SPECIFIC

MATERIAL, DOCTRINES AND INSTRUCTIONS CONCERNING ORGANIZATION AND TRAINING ARE PROMULGATED BY THE CHIEF OF NAVAL OPERATIONS (CNO), THE CHIEF OF NAVAL PERSONNEL, AND ABOARD COMMANDERS. 079-20.14 DAMAGE CONTROL BOOKS SURFACE SHIPS. DAMAGE CONTROL BOOKS ISSUED BY NAVSEA CONTAIN INFORMATION IN THE FORM OF TEXT, TABLES, AND DIAGRAMS CONCERNING DAMAGE CONTROL FACILITIES AND CHARACTERISTICS COMPARTMENTATION PIPING, AND WIRING SYSTEMS. THE BOOKS ARE SUPPLIED TO FLEET COMMANDERS, FORCE COMMANDERS, DIVISION COMMANDERS, SQUADRON COMMANDERS, AND COMMANDING OFFICERS OF SHIPS AND OTHER NAVAL ACTIVITIES. IN ACCORDANCE WITH THEIR REQUIREMENTS, A RECORD OF ALL BOOKS DISTRIBUTED IS MAINTAINED BY NAVSEA; THEY SHALL NOT BE TRANSFERRED WITH OUT NAVSEA AUTHORITY. RECIPIENTS ARE CONSIDERED RESPONSIBLE FOR BOOKS TO THE SAME EXTENT AS FOR SHIPS PLANS AND SPECIFICATIONS. CUSTODIANS OF THE BOOKS, UPON DETACHMENT, SHALL INSURE THAT ALL BOOKS ARE ACCOUNTED FOR AND TURNED OVER TO THEIR SUCCESSORS. WHEN THE STATUS OF A SHIP IS CHANGED FROM ACTIVE TO RESERVE, THE OVERHAULING ACTIVITY WILL REVISE THE MASTER COPY AND FORWARD IT TO NAVSEA. 079-20.15 DAMAGE CONTROL BOOKS ARE SUPPLIED TO SHIPS IN THE RESERVE FLEET. RESERVE FLEET COMMANDERS SHALL TAKE ACTION TO ASCERTAIN THAT THE LATEST DAMAGE CONTROL BOOKS ARE MADE AVAILABLE TO THE OVERHAULING ACTIVITY PRIOR TO AN AVAILABILITY. 079-20.16 WHEN A SHIP IS DECOMMISSIONED AND SCHEDULED FOR DISPOSAL OR SCRAPPING, THE DAMAGE CONTROL BOOKS (TEXT AND DIAGRAMS) SHALL BE BURNED AND THEIR DISPOSITION REPORTED TO NAVSEA. 079-20.17 DAMAGE CONTROL BOOKS ARE SUPPLIED TO ALL COMBATANT, MISCELLANEOUS, AND AUXILIARY SHIPS OVER 220 FEET IN LENGTH (INCLUDING FLOATING DRYDOCKS), AND TO CERTAIN SMALL FLEET-OPERATED SHIPS UNDER 220 FEET IN LENGTH, SUCH AS MINE WARFARE SHIPS. 079-20.18 FOR OTHER SHIPS, DAMAGE CONTROL BOOKS MAY BE INDEPENDENTLY DEVELOPED BY THE SHIP. 079-20.19 REQUESTS FOR DAMAGE CONTROL BOOKS SHALL BE IN ACCORDANCE WITH CHAPTER 080 (9001), PUBLICATIONS AND DRAWINGS. 079-20.20 DAMAGE CONTROL DIAGRAMS. DAMAGE CONTROL DIAGRAMS ARE THREE-DIMENSION ISOMETRIC DIAGRAMS. THEY ARE DEVELOPED AND PROVIDED UNDER RIGID REQUIREMENTS ESTABLISHED BY NAVSEA AND ARE SUPPLIED TO SHIPS. ON ALL DIAGRAMS, EACH COMPARTMENT, TANK, VOID OR OTHER AREA WILL BE DESIGNATED BY NUMBER, LETTER, OR COMBINATION THEREOF. THE VARIOUS SYSTEMS SUCH AS PIPING AND COMMUNICATIONS ARE REPRESENTED AS NEAR TO ACTUAL INSTALLATIONS AS PRACTICABLE AND ARE DESIGNATED BY COLORS, LETTERING, AND NUMERALS, AS WELL AS SYMBOLS. 079-20.21 FIGURE 079-100 ILLUSTRATES SOME OF THE SYMBOLS USED IN DAMAGE CONTROL DIAGRAMS. FIGURE 079-100. DAMAGE CONTROL DIAGRAM SYMBOLS 079-20.22 EACH DECK OR PLATFORM IS SHOWN AS A SEPARATE LEVEL. COMPARTMENTS NOT INTERSECTED BY DECKS OR PLATFORMS ARE DRAWN AS PART OF THE DECK FROM WHICH THEY EXTEND. HEAVY LINES ARE USED TO INDICATE WATERTIGHT AND OILTIGHT BOUNDARIES; LIGHTER LINES INDICATE AIRTIGHT, FUMETIGHT, AND NON-TIGHT BOUNDARIES. DOTTED LINES AND CROSSHATCHING ARE USED TO INDICATE HIDDEN BOUNDARIES, PIPING, AND VALVES. THE VISIBLE PIPING IS REPRESENTED BY SOLID LINES. PIPING WHICH PIERCES A BULKHEAD HAS A CIRCLE SHOWING THE POINT OF PENETRATION. THERE IS NO CIRCLING AT THE POINT OF DECK PENETRATION. 079-20.23 FIGURE 079-101 (TWO SHEETS) IS A TYPICAL DAMAGE CONTROL DIAGRAM SHOWING THE UTILIZATION OF THE DIAGRAM SYMBOLS. FIGURE 079-101. TYPICAL DAMAGE CONTROL DIAGRAM (SHEET 1 OF 2) FIGURE 079-101. TYPICAL DAMAGE CONTROL DIAGRAM (SHEET 2 OF 2) 079-20.24 DIAGRAMS MEASURING 38 BY 53 INCHES ARE SUPPLIED TO AIRCRAFT CARRIERS, HEAVY CRUISERS, AND MISCELLANEOUS LARGE SHIPS, EXCEPT: VITAL DAMAGE CONTROL ELECTRICAL EQUIPMENT AND POWER SUPPLY CHARTS ARE 38 BY 26 INCHES. COMMUNICATION DIRECTORIES ARE 48 BY 26 INCHES. LIQUID LOADING DIAGRAMS ARE EITHER 10 X 26 INCHES OR 10 BY 53 INCHES. 079-20.25 DIAGRAMS ARE SUPPLIED TO OTHER SHIPS IN THE FOLLOWING SIZES: GUIDED MISSILE CRUISERS AND COMPARABLE SIZE SHIPS LARGER THAN DESTROYERS AND SMALLER THAN HEAVY CRUISERS ARE 25 X 38 INCHES. DESTROYERS AND OTHER TYPES OF COMPARABLE SIZE ARE 16 BY 28 INCHES. MISCELLANEOUS VARIATIONS OF THE FOREGOING SIZES AS APPROVED BY NAVSEA. 079-20.26 SHIPS

REVISION RESPONSIBILITY. DAMAGE CONTROL BOOKS ARE AS NEARLY CORRECT AS POSSIBLE: HOWEVER, ERRORS ARE INEVITABLE. ACCURACY OF THE INFORMATION WILL BE REDUCED AS ALTERATIONS TO THE SHIP ARE MADE. EFFORTS SHOULD BE MADE TO MAINTAIN THE BOOKS TO REFLECT THE MOST RECENT INSTALLATIONS. 079-20.27 THE MASTER COPY CONSISTING OF DIAGRAMS AND TEXT SHALL BE KEPT CURRENT AT ALL TIMES. AND REVISIONS SHOULD BE CLEARLY MARKED SO THAT OTHER COPIES MAY BE REVISED FROM IT. ALL COPIES OF DAMAGE CONTROL BOOKS SHALL BE REVISED TO REFLECT ALTERATIONS MADE BY THE SHIPS FORCE OR ACTIVITIES OTHER THAN THE OVERHAUL

ACTIVITY. ALTERATIONS ARE TO BE ENTERED ON THE MASTER COPY AS SOON AS THEY ARE COMPLETED. 079-20.28 WHEN NAVSEA FURNISHES DIAGRAMS AND TEXT FOR A CLASS, I.E., A GROUP OF SHIPS, THE SHIPS FORCE SHALL CHECK AND REVISE THIS MATERIAL TO REFLECT THE ACTUAL INSTALLATION IN THE INDIVIDUAL SHIP. AT THE TIME OF EACH OVERHAUL, OR WHEN ALTERATIONS ARE MADE BY AN OVERHAUL ACTIVITY, THE COMMANDING OFFICER SHALL DELIVER THE MASTER AND ONE DUPLICATE COPY TO THE ACTIVITY. THESE COPIES SHALL BE HAND-CORRECTED OR RELITHOGRAPHED FOR THE PRECEDING OVERHAUL, AND THE ACTIVITY SHALL BE REQUESTED TO HAVE THE VOLUMES REVISED. REVISIONS WILL INCLUDE ALTERATIONS MADE BY THE ACTIVITY IN ADDITION TO ALL THE WORK ACCOMPLISHED BY THE SHIPS FORCE, AS SHOWN ON THE MASTER COPY. THE COMMANDING OFFICER SHALL ASCERTAIN THAT T

HE MASTER COPY HAS BEEN REVISED AND ACCURATELY REPRESENTS THE SHIP AT THE TIME OF ITS DEPARTURE FROM THE SHIP YARD. THE REVISIONS SHALL BE INCLUDED IN THE CURRENT SHIPS MAINTENANCE PROJECT (CSMP). IT SHALL BE STATED THEREIN WHETHER THE SHIPS FORCE REQUIRES ASSISTANCE FROM THE SHIPYARD IN CHECKING THE DAMAGE CONTROL DIAGRAMS AND/OR TEXT. 079-20.29 REVISIONS TO THE SHIPS MASTER COPY, BY SHIPS FORCE, SHALL BE MADE AS FOLLOWS: DELETIONS ON THE DIAGRAMS ARE TO BE INDICATED BY CROSSING OUT THE DELETED MATTER WITH RED INK. NO ERASURES SHALL BE MADE, NOR IS IT NECESSARY TO MAKE ANY NOTES ON THE DIAGRAMS TO INDICATE THAT THE MATTER IS TO BE DELETED. ADDITIONS TO THE DIAGRAM SHALL BE MADE IN ACCORDANCE WITH THE ESTABLISHED COLOR CODING SYSTEMS. INDICATE ADDITIONS IN THEIR CORRECT POSITIONS. EACH CHANGE OR ADDITION IS TO BE EMPHASIZED BY CIRCLING THE AREAS AFFECTED WITH RED INK. CHANGES IN THE NAMES OF COMPARTMENTS OR IN NOTES ON THE DIAGRAMS MAY BE MADE BY A MARGINAL NOTE. MINOR CHANGES, SUCH AS FROM NONTIGHT DUCT TO WATERTIGHT AND VICE VERSA, OR IN THE TYPE OF VALVE, CAN BE INDICATED BY A MARGINAL NOTE WITH A MARK TO INDICATE THE EXTENT OF THE CORRECTION. REVISIONS TO TEXT SHALL BE MADE IN RED INK. 079-20.30 OVERHAULING ACTIVITY'S REVISION RESPONSIBILITY. WHEN DIAGRAMS ARE PROCESSED IN COLOR, THE ACTIVITY SHALL REVISE THEM AS FOLLOWS:

THE SHIPS MASTER COPY AND THE DUPLICATE COPY SHALL BE REVISED TO SUIT ALL CHANGES MADE DURING AN OVERHAUL. IN ACCORDANCE WITH MIL-STD-784, THE REVISIONS MUST BE COMPLETED PRIOR TO THE SHIPS DEPARTURE FROM THE SHIPYARD. IF IT IS IMPOSSIBLE TO MEET THE SAILING DATE, THE OVERHAULING ACTIVITY SHALL INFORM NAVSEA IMMEDIATELY, AND INDICATE THE EARLIEST COMPLETION DATE AFTER DEPARTURE. THE OVERHAUL OF T

HE SHIP WILL NOT BE CONSIDERED COMPLETED UNTIL THE REVISIONS ARE MADE. DAMAGE CONTROL DIAGRAMS AND RELATED TEXT SHALL BE CHECKED AGAINST THE ACTUAL INSTALLATION IN THE SHIP, ONLY IF REQUIRED BY THE COMMANDING OFFICER. CHECKING SHALL NOT NECESSITATE THE REMOVAL OF BULKHEADS OR WIREWAYS.

079-20.31 THE DUPLICATE COPY OF THE REVISED SHIPS MASTER COPY DIAGRAMS AND TEXT SHALL BE RETURNED TO THE SHIP BEFORE DEPARTURE. THE LETTER FROM THE OVERHAULING ACTIVITY, FORWARDING THE DUPLICATE COPY TO THE SHIP, SHALL STATE THAT THE MATERIAL IS FOR INTERIM USE ONLY AND THAT THE EXISTING MATERIAL IN THE SHIP SHOULD NOT BE DESTROYED PENDING RECEIPT OF REPRINTED MATERIAL FROM NAVSEA. WHEN THE REPRINTED MATERIAL IS ISSUED, OBSOLETE COPIES SHALL BE DESTROYED BY BURNING. 079-20.32 WHEN THE SHIPS DAMAGE CONTROL DIAGRAMS ARE REPRODUCED IN HALFTONE, THE ACTIVITY SHALL REVISE THEM AS FOLLOWS: THE SHIPS MASTER COPY HALFTONE ILLUSTRATIONS AND RELATED TEXT SHALL BE REVISED TO SUIT ALL CHANGES MADE DURING AN OVERHAUL, INCLUDING ANY CHANGES MADE BY THE SHIPS FORCE. IN ACCORDANCE WITH MIL-STD-784, REVISIONS MUST BE COMPLETED PRIOR TO

SHIPS DEPARTURE. THE NEW COPIES OF THE DAMAGE CONTROL DIAGRAMS AND REVISED TEXT SHALL BE DELIVERED TO THE SHIP PRIOR TO DEPARTURE. TOGETHER WITH THE MASTER COPY BINDER. THREE SETS SHALL BE PROVIDED FOR SHIPS UNDER 220 FEET IN LENGTH AND FIVE SETS SHALL BE SUPPLIED FOR SHIPS OVER 220 FEET IN LENGTH. 079-20.33 DAMAGE CONTROL BOOKS SUBMARINES. DAMAGE CONTROL BOOKS PREPARED FOR SUBMARINES CONTAIN TEXT, TABLES, PLATES, AND DRAWINGS. THE TEXT DISCUSSES DAMAGE CONTROL AND ASSOCIATED PROBLEMS PECULIAR TO SUBMARINES. THE TABLES PRESENT FACTUAL DATA. AND THE PLATES AND DRAWINGS SUPPORT THE TEXT. THE PLATES ARE PREPARED IN BLACK AND WHITE. ONE COPY OF THE DAMAGE CONTROL BOOK SHALL BE

MARKED SHIPS MASTER COPY AND SHALL BE KEPT CURRENT AS REQUIRED FOR SURFACE SHIPS. SEE PARAGRAPHS 079-20.26 THROUGH 079-20.32. THE OVERHAULING ACTIVITY SHALL REVISE THE DAMAGE CONTROL BOOK TO REFLECT ALL CHANGES MADE DURING OVERHAUL. INCLUDING ANY CHANGES MADE BY SHIPS FORCE. AND REPRODUCE AND DISTRIBUTE IT IN ACCORDANCE WITH MIL-STD-797. 079-20.34 REPORTING REQUIREMENTS. SUPERVISORS OF SHIPBUILDING AND COMMANDERS OF NAVAL SHIPYARDS SHOULD SUBMIT QUARTERLY REPORT NAVSEA 9664-1 ON NAVSEA FORM 9664/1 (FORMERLY NAVSEC 9880/1). STATUS OF DAMAGE CONTROL BOOK. TO THE COMMANDER. NAVAL SHIP ENGINEERING CENTER (NAVSEC). WITH COPIES TO NAVSEA. INDICATING ACTUAL AND ESTIMATED COMPLETION DATES FOR ALL DAMAGE CONTROL BOOK PROJECTS. NAVSEA FORM 9880/1 SHALL BE USED UNTIL THE SUPPLY OF THAT FORM IS DEPLETED. 079-20.35 MANUFACTURERS INSTRUCTION BOOKS. THIS VOLUME CONTAINS GENERAL INSTRUCTIONS FOR THE OPERATION, MAINTENANCE, AND REPAIR OF DAMAGE CONTROL AND FIREFIGHTING EQUIPMENT. ALL CONDITIONS CANNOT BE COVERED BECAUSE OF THE GREAT NUMBER OF MAKES, TYPES, AND DESIGNS OF EQUIPMENT ENCOUNTERED IN NAVAL SERVICE. FOR ALL BUT THE MOST SIMPLE TYPES OF EQUIPMENT. MANUFACTURERS INSTRUCTION BOOKS ARE SUPPLIED. THEY CONTAIN DETAILED INFORMATION CONCERNING THE OPERATION, MAINTENANCE, AND REPAIR OF THE SPECIFIC PIECE OF EQUIPMENT AND SHOULD BE STUDIED CAREFULLY BEFORE THE UNIT IS OPERATED OR SERVICED. SHOULD ANY CONFLICT EXIST BETWEEN THE INSTRUCTIONS GIVEN IN THIS VOLUME AND THE MANUFACTURERS INSTRUCTIONS. NAVSEA SHALL BE CONSULTED. 079-20.36 OTHER DAMAGE CONTROL REFERENCES. TABLE 079-3 LISTS PUBLICATIONS WHICH CONTAIN INFORMATION AND INSTRUCTIONS NECESSARY FOR KNOWLEDGE OF DAMAGE CONTROL PRACTICES AND PROCEDURES. TABLE 079-3. DAMAGE CONTROL REFERENCE PUBLICATIONS SECTION 21 THE SHIP AND DAMAGE CONTROL 079-21.1 DAMAGE CONTROL ORGANIZATION 079-21.2 THE PRIMARY DAMAGE CONTROL BATTLE ORGANIZATION UNIT IS THE REPAIR PARTY. CERTAIN REPAIR PARTIES MAY BE SUBDIVIDED. OR CERTAIN FUNCTIONS MAY BE

THE JOINT RESPONSIBI

LITY OF TWO OR MORE REPAIR PARTIES. 079-21.3 INASMUCH AS THE ASSIGNMENT AND ORGANIZATION OF SHIP PERSONNEL TO DAMAGE CONTROL FUNCTIONS IS NOT A FUNCTION OF NAVSEA. IT IS SUGGESTED THAT CURRENT DIRECTIVES ISSUED BY PROPER AUTHORITY BE CONSULTED WHEN ORGANIZING OR REORGANIZING SHIP DAMAGE CONTROL PERSONNEL. THE DAMAGE CONTROL ORGANIZATION IN A SHIP SHALL CONFORM WITH THE RECOMMENDATIONS CONTAINED IN NWIP 50-3 AND SUCH OTHER DIRECTIVES ISSUED BY PROPER AUTHORITY. 079-21.4 IN CARRYING OUT THE PROVISIONS OF IMPLEMENTING DIRECTIVES. THE COMMANDING OFFICER. THROUGH THE EXECUTIVE OFFICER AND THE DAMAGE CONTROL ORGANIZATION. SHOULD IMPRESS UPON ALL PERSONNEL UNDER HIS COMMAND THE NECESSITY FOR OBTAINING THE HIGHEST DEGREE OF EFFICIENCY IN THE CONTROL OF DAMAGE THROUGH THOROUGH UNDERSTANDING AND APPLICATION OF DAMAGE CONTROL PRINCIPLES. 079-21.5 RESPONSIBILITY OF DAMAGE CONTROL OFFICER. RESPONSIBILITY OF THE DAMAGE CONTROL OFFICER INCLUDES THE EFFICIENT FUNCTIONING OF THE DAMAGE CONTROL ORGANIZATION. WATERTIGHT INTEGRITY, FIRE PREVENTION. MAINTENANCE OF CONDITION OF CLOSURE. AND DAMAGE CONTROL EQUIPMENT. 079-21.6 THE DAMAGE CONTROL OFFICER ALSO SHOULD INSURE THAT ALL DAMAGE CONTROL PERSONNEL RECEIVE TRAINING AND QUALIFY IN READING AND PROPERLY INTERPRETING DAMAGE CONTROL DIAGRAMS. BLUEPRINTS. DRAWINGS, AND OTHER SIMILAR MATERIAL CONCERNED WITH THEIR DUTIES. 079-21.7 RESPONSIBILITY OF DAMAGE CONTROL PERSONNEL. ALL OFFICERS AND MEN OF THE DAMAGE CONTROL

ORGANIZATION SHOULD OBTAIN A WORKING KNOWLEDGE OF THE ABILITY OF THE SHIP TO RESIST DAMAGE AND REMAIN AFLOAT. BY A THOROUGH STUDY OF THE SHIP AND ITS SYSTEMS, AND BY THE STUDY OF METHODS USED, BOTH SUCCESSFULLY AND UNSUCCESSFULLY, BY OTHER SHIPS IN COMBATING DAMAGE. 079-21.8 EFFICIENCY. THE ENTIRE SHIPS COMPANY SHOULD BE TRAINED TO UNDERSTAND THE NECESSITY FOR MAINTENANCE OF THE HIGHEST DEGREE OF EFFICIENCY IN DAMAGE CONTROL. THIS SHOULD INCLUDE: PROPER SETTING OF MATERIAL CONDITIONS OF READINESS, AND PROPER OPERATION, USE, AND MAINTENANCE FOR DAMAGE CONTROL PURPOSES OF HULL AND ENGINEERING SYSTEMS; AND USE AND MAINTENANCE OF DAMAGE CONTROL MATERIAL AND EQUIPMENT, INCLUDING INTERIOR BATTLE COMMUNICATIONS, LOCATING DAMAGE, SUCH AS LEAKS, AND MAKING EMERGENCY REPAIRS UNDER ADVERSE CONDITIONS.

● ESTABLISHING AND MAINTAINING A RIGID FIRE PREVENTION PROGRAM, AND KNOWING THE CAPABILITIES OF AVAILABLE EQUIPMENT AND THE CORRECT METHODS USED TO COMBAT ALL SHIP FIRES, COMBATING ATTACK BY CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL WARFARE AGENTS, GIVING FIRST AID TO INJURED PERSONNEL, WHEN DIRECTED TO DARKEN SHIP, CLOSING ALL DOORS, HATCHES, PORTS, AND OTHER FITTINGS WHICH ALLOW INTERIOR LIGHTS TO BE EXPOSED TO THE OUTSIDE. (TRAFFIC OF PERSONNEL FROM THE WEATHER TO THE INTERIOR MUST BE RESTRICTED TO ACCESS OPENINGS FITTED WITH LIGHT TRAPS OR DOOR SWITCHES.) 079-21.9 PERSONNEL SHOULD UNDERSTAND THAT THE SAME DEGREE OF EFFICIENCY IS AS NECESSARY UNDER IN-PORT CONDITIONS AS IT IS UNDER AT SEA CONDITIONS. 079-21.10 OVERLAPPING SKILLS. EACH MEMBER OF A REPAIR PARTY MUST BE A JACK-OF-ALL-TRA EACH MEMBER SHOULD LEARN TO DO ANY JOB THAT MAY BE REQUIRED OF ANY OTHER MEMBER. ELECTRICIANS MATES CAN LEARN TO SHORE, SHIPFITTERS TO HOOK UP THE CASUALTY POWER SYSTEM, AND DAMAGE CONTROLMEN TO PATCH PIPE LINES. ALL HANDS SHOULD LEARN HOW TO FIGHT FIRES AND TO APPLY FIRST AID. EVERY MAN MAY NOT BECOME AN EXPERT IN EVERY FIELD, BUT HE CAN AT LEAST BECOME A CAPABLE HELPER AND IN AN EMERGENCY, HIS

ADDED ABILITY MAY BE NEEDED TO SAVE A SHIP. 079-21.11 TRAINING. IT IS NOT SUFFICIENT THAT PERSONNEL MERELY READ ABOUT HOW TO MAKE REPAIRS, STUDY PICTURES OF EQUIPMENT, OR DISCUSS METHODS, NOR IS IT ENOUGH THAT THEY HAVE ALL THE TOOLS AUTHORIZED BY THE SHIPS HULL ALLOWANCE LIST, OR THAT THEY MAKE ALL THE PREFABRICATED PATCHES AND TOOLS AS MAY BE SUGGESTED. ALL DAMAGE CONTROL PERSONNEL MUST KNOW HOW TO APPLY PRINCIPLES AND USE MATERIALS IN THE MOST EFFECTIVE WAY. THAT KNOWLEDGE CAN BE GAINED BY EDUCATION, TRAINING, AND ACTUAL PRACTICE. 079-21.12 AS EMPHASIZED IN PARAGRAPH 079-21.7, THOROUGH KNOWLEDGE OF THE SHIP IS OF PRIME IMPORTANCE. REPAIR PARTY PERSONNEL MUST KNOW THEIR OWN AREA, THEY ALSO MUST KNOW THE AREAS OF OTHER REPAIR PARTIES, IN CASE THEY HAVE TO MAKE REPAIRS OR ASSIST THOSE REPAIR PARTIES. PERSONNEL SHOULD BE EXCHANGED BETWEEN REPAIR PARTIES FROM TIME TO TIME, IN ORDER THAT THEY MAY TRAIN AND DRILL IN OTHER AREAS.

079-21.13 SIMULATING DAMAGE. TRAINING IN MAKING BATTLE REPAIRS IN SHIPS GENERALLY IS LIMITED BY CIRCUMSTANCES. OCCASIONALLY, THE NEED ARISES TO REPAIR A LEAKY PIPE OR TO RENEW A SMALL CABLE; BUT SELDOM IS THERE A CHANCE FOR THE AVERAGE MEMBER OF A REPAIR PARTY TO DO ANY REAL SHORING, TO STOP A LEAK IN THE HULL, OR TO GAIN EXPERIENCE IN ANY ASPECT OF DAMAGE CONTROL OUTSIDE HIS OWN SPECIALTY. THE MOST IMAGINATIVE AND ENERGETIC ORGANIZATION HAS TO PRETEND DAMAGE HAS OCCURRED. THERE IS NO WAY TO KNOW IF THE SIMULATED REPAIRS MADE WOULD BE EFFECTIVE UNDER THE PRESSURE AND VIBRATION INCIDENT TO BATTLE CONDITIONS. THE TEST COMES WHEN ACTUAL DAMAGE IS SUSTAINED. 079-21.14 TRAINING MOCK-UPS. FIGURES 079-102 AND 079-103 SHOW MOCK-UPS THAT CAN BE USED IN SHIPS FOR TRAINING MEN IN MAKING MANY OF THE SUGGESTED REPAIRS. SMALL GROUPS SHOULD BE DETAILED FOR INSTRUCTION ON THESE MOCK-UPS EACH DAY. WHILE THESE MOCK-UPS ARE FAR SHORT OF ACTUAL BATTLE DAMAGE, THEY WILL GIVE THE MEN GOOD PRACTICE IN USING THEIR HANDS, AND AN OPPORTUNITY TO STUDY BETTER METHODS AND SHORT CUTS FOR MAKING REPAIRS. THE USE OF WATER PRESSURE NOT ONLY MAKES THE INSTRUCTION MORE INTERESTING BUT WILL CONVINCE ALL HANDS OF THEIR NEED OF PRACTICE. FIGURE 079-102, BULKHEAD TRAINING MOCK-UP FIGURE 079-104, PIPING TRAINING MOCK-UP 079-21.15 READING

DIAGRAMS AND DRAWINGS. A THOROUGH UNDERSTANDING OF HOW TO READ AND INTERPRET DIAGRAMS AND DRAWINGS, PARTICULARLY ISOMETRIC AND ORTHOGRAPHIC (MECHANICAL) DRAWINGS, IS ESSENTIAL FOR ALL PERSONNEL IN THE DAMAGE CONTROL ORGANIZATION. DAMAGE CONTROL PERSONNEL ALSO SHOULD HAVE AN UNDERSTANDING OF NAVY SYSTEMS FOR FILING AND STORING BLUEPRINTS AND DRAWINGS. 079-21.16 INSPECTION SCHEDULES 079-21.17 THE COMMANDING OFFICER THROUGH THE DAMAGE CONTROL OFFICER, SHALL PROVIDE FOR AND ENFORCE REGULAR SCHEDULES OF INSPECTION, MAINTENANCE, REPAIR, AND REPLACEMENT TO INSURE WATERTIGHT INTEGRITY, PROPER OPERATION OF HULL AND ENGINEERING SYSTEMS FOR DAMAGE CONTROL, AND PROPER OPERATION OF ALL DAMAGE CONTROL EQUIPMENT AND MATERIALS. A MORE DETAILED DISCUSSION OF DAMAGE CONTROL INSPECTIONS AND TESTS IS INCLUDED IN SECTION 23.

INSTRUCTIONAL PASSAGES

ARMY 'NEW LOOK' MANUAL. PERSHING MISSILE SYSTEM PROCEDURAL MANUAL

Don't work on electronic equipment unless someone else is near who knows about the operation and hazards of this equipment. He should also know how to give first aid. If you have a helper, make sure he knows what items are dangerous. Whenever you can, shut off power to the equipment before you start to work on it. Ground every capacitor that is likely to be dangerous. When you are working inside the equipment, and after you have turned off power, ground every part before you touch it. Do not touch high-voltage connections when you install or operate this equipment. Don't be fooled by the term 'low voltage'. You could be killed by as little as 50 volts! Whenever you can, keep one hand away from equipment to reduce the chances of current flowing through vital organs of your body. Read FM 21-11 so you'll know about artificial respiration.

Panel lamps - provide panel lighting. Panel lamps switch - turns panel lamps on and off. Reverse phase lamp - indicates improper phase of ac power from ac generator set 2. Gen no. 1 on lamp - indicates that power is available from ac generator set 1. Gen no. 2 on lamp - indicates that power is available from ac generator set 2. Vent door bypass switch - not used (for maintenance purposes only at a higher level of maintenance). Overvolt lamp - indicates that output voltage from motor generator set 2 is too high. Power on lamp - indicates that motor generator set 2 power is available. Generator on switch - makes output of motor generator set 2 available for distribution. Generator off switch - removes output of motor generator set 2. Motor stop switch - stops motor generator set 2 drive motor. Motor start switch - starts motor generator set 2 drive motor. Voltage increase control - adjusts output voltage from motor generator set 2. Voltmeter - indicates dc output voltage from motor generator set 2.

INSTRUCTIONAL PASSAGES

NAVPERB 15665C 1104.2.4.5.. 1106.1.. AND 1106.2

The Commandant of each Naval District is assigned the responsibility for establishing and controlling uniform policies within the geographical limits of his District. He shall prescribe uniforms for the season, day or special occasion for all Naval personnel (including Marines under his command) which will provide the greatest uniformity. Personnel of all Naval Activities domiciled within the District shall wear only those uniforms prescribed for personnel assigned to the District. The Commandant may designate sub-areas and assign area coordinators/see officers present authority to prescribe local uniforms which are compatible with mission and climate. Senior officers present afloat in district waters shall insofar as practicable, follow the uniforms prescribed by the Commandant with regard to liberty parties and members of the command operating ashore. Uniform selections are to be at the discretion of the prescribing authority and not optional to the individual. Local Uniform Regulations shall be promulgated by each Commandant, Area Commander, SOPA or other designated authority utilizing the format provided in the sample instruction appended to this chapter. Uniforms for daily wear are equivalent to civilian business attire and prescribed for normal executive office work, watchstanding, liberty and official business ashore. Service Dress uniforms are normally prescribed as the uniform of the day.

Working uniforms are prescribed for working situations which would unduly soil dress uniforms or dress uniforms would be inconvenient or unsafe. Working uniforms are prescribed as the uniform of the day aboard ship when at sea and are usually permitted for shipboard personnel in port during normal working hours. They may also be worn at shore stations during normal working hours, in industrial areas, and when otherwise deemed appropriate by the Senior Officer Present. Work uniforms normally are not authorized for wear off naval establishments.

INSTRUCTIONAL PASSAGES

NAVATR 01-40 AVM-2-7.2. PARAGRAPHS 4.5 TO 4.7

A maintenance assurance inspection is required for all maintenance procedures that, if improperly performed, could cause equipment failure or jeopardize ground personnel. An underlined procedural step indicates that a maintenance assurance inspection shall be performed prior to proceeding to the next step. A Maintenance Assurance Summary at the end of a procedure lists the maintenance assurance inspections that shall be performed after completion of the procedure. Clean all parts of the bench test set adapter before and after use to remove dirt, dust, oil, grease, and corrosion-producing matter. Wipe surfaces clean with a soft, clean cloth dampened in aliphatic naphtha (TT-N-95). Remove dirt, oil, and grease from the electrical receptacle and connectors with a small, nonmetallic, firm bristle brush moistened with aliphatic naphtha, and dry thoroughly with dry air or soft, clean cloth. After cleaning, apply antiseize compound (TT-A-580) sparingly to the threaded portion of the receptacle. Inspect all parts of the adapter assembly for corrosion, wear, and damage. Check mechanical action of toggle switches and tone generator switch for proper detents. Check continuity of fuses and light with ohmmeter. Examine light assembly lens for cracks. Inspect earphones jack for corrosion and bent contacts. Inspect fuses, fuse holders, and extractor posts for corrosion and damage. Inspect electrical receptacle and connectors for corrosion, security of solder connections, and condition of pins. Inspect all wiring for condition of insulation.

INSTRUCTIONAL PASSAGES

NAVSEA S9086-CN-STM-00/CH 079 PARAGRAPHS 21.4, 21.11, AND 21.13

In carrying out the provision of implementing directives, the Commanding Officer, through the Executive Officer and the damage control organization, should impress upon all personnel under his command the necessity for obtaining the highest degree of efficiency in the control of damage through thorough understanding and application of damage control principle. It is not sufficient that personnel merely read about how to make repairs, study pictures of equipment, or discuss methods. Nor is it enough that they have all tools authorized by the Ship's Hull Allowance List, or that they make all the prefabricated patches and tools as may be suggested. All damage control personnel must know how to apply principles and use materials in the most effective way. That knowledge can be gained by education, training, and actual practice. Training in making battle repairs in ships generally is limited by circumstances. Occasionally, the need arises to repair a leaky pipe or to renew a small cable; but seldom is there a chance for the average member of a repair party to do any real shoring, to stop a leak in the hull, or to gain experience in any aspect of damage control outside his own specialty. The most imaginative and energetic organization has to pretend damage has occurred. There is no way to know if the simulated repairs made would be effective under the pressure and vibration incident to battle conditions. The test comes when actual damage is sustained.

INSTRUCTIONAL PASSAGES

NAVAIR 01-40 AVM-2-7.2 PARAGRAPHS 1-11., 1-12., AND 1-33

The theory of operation text for the system explains how the system performs its functions by utilizing the capabilities of its related circuitry and components. The text is supported by diagrams, charts, and illustrations to assist the user of the manual. Operating instructions for the system include the identification and location of controls, switches, instruments, indicators, and lights as they appear in the aircraft. Instructions are given in normal sequence for activating the system, and all the resulting indications that the system is operating satisfactorily are defined. Subsequent to the publication of the initial issue of the A-4M Technical Manual Maintenance Instructions, changes in the aircraft and equipment, in support concepts and in procedures, as well as additional information developed by experience, affect the contents of the manual.

INSTRUCTIONAL PASSAGES

NAVAIR 05-35 EAC-1 TABLE 3-2

Attach to top and bottom surfaces of the test set computer to allow the test set computer to be placed on any side surface during maintenance. Used to lift signal converter. Used to remove card assemblies. Gauges torque, within the range of 6 to 100 ounce-inches, applied to screws of replacement assemblies. Gauges torque, within the range of 2 to 30 pound-inches, applied to screws of replacement assemblies. Adapts torque screwdrivers to no. 2 through no.4 Phillips screws. Adapts torque screwdrivers to no. 4 slotted screws. Adapts torque screwdrivers to Allen screwdriver bits of screwdriver set (index number 11), and nutdriver/screw set (index number 12). Hand tools which fit slotted screws and Phillips screws of replacement assemblies. Hand tools which fit nuts of replacement assemblies. Used with torque screwdrivers on Allen screws of replacement assemblies. Used with torque screwdrivers on Phillip screws, slotted screws, and nuts of replacement assemblies. Gauges torque, within the range of 0 to 200 pound-inches, applied to jam nuts of replacement assemblies. Used to remove and replace test set switches. Used to remove and replace jamnuts of test set computer malfunction indicators and reset switch. Adapts 3/8-inch drive torque wrench to sockets with 1/2-inch drives. Used to remove and replace connector jamnuts of cable, harness, and back panel assemblies from their respective mounting surfaces. Used to insert the roll pin of test set computer page assembly jackscrews. Used to removed and insert the roll pin of the test set computer mounting bolts. Used to make contact with test points on page assembly A6 during strobe pulse adjustment.

INSTRUCTIONAL PASSAGES

NAVAIR 05-35 EAC-1 PARAGRAPHS 4-6 THROUGH 4-8

The tactical computer set solves a navigation function five times a second and a weapon delivery function 25 times a second, when required. The operating mode of the tactical computer set is determined by an external

master function switch. The results of the computations can be displayed by the tactical computer control and/or by the interface components having displayed capabilities such as the head-up display, etc. The pilot monitors the displays to steer the aircraft to a desired destination or target. The tactical computer performs the arithmetic and logical computations required to solve navigation and weapons delivery functions. The tactical computer operates under control of the self-contained program to accept and retain data from the tactical computer control and the external equipment until needed. The tactical computer executes the operations directed by the program to solve the functions required using externally supplied data and previously stored data as necessary. The results of the computations are transmitted as display data or discrete commands to the tactical computer control or external equipment. Data is transmitted to and from the tactical computer as either serial digital signals or analog signals. The tactical computer modifies the interface signals as necessary to provide a compatible signal interface with the external equipment. Power application to the electronic circuits of the tactical computer set is controlled by the COMPUTER toggle switch on the tactical computer control. The tactical computer control will also control power application to the Loran equipment (growth item) and enable the pilot to select the Loran operating mode. Built-in tests of the tactical computer set are also activated by the COMPUTER toggle switch on the tactical computer control.

PROCEDURAL TEST PASSAGES

NAVAIR 01-245 FDN-2-8.5. PARAGRAPHS 3-419 AND 3-422

Procedure. Open radome and extend radar package per figure 3-2. a. Is el strobe positioned correctly on one indicator? b. Adjust RD or PILOT A GUN V CENT. Is malfunction corrected? c. Replace A3720 (aft) or A3719 (fwd) for correct indication. d. Rotate elevation control. Does elevation strobe move? e. Replace control-power supply per paragraph 3-910. f. Place POWER to TEST and TEST to 2. Does elevation strobe position to +40 elevation. g. Does elevation strobe move. h. Does antenna vernier indicate +40 +2 elevation? i. Is 13.84Vac present at TP4920? j. Remove hydraulic power. Pin antenna at BST. Adjust B6215. k. Perform antenna hydraulic balance. Can balance be performed? l. Replace antenna per paragraph 3-873. m. Is malfunction corrected? n. Is elevation strobe within +2 of 40? o. Replace roll and climb assembly per paragraph 3-913. p. Place TEST to 0 and POWER to STBY. Adjust EL STROBE CENT ADJ to position elevation strobe at zero. Is malfunction corrected? q. Replace the indicator control unit per paragraph 3-940.

Procedure. Open radome and extend radar package per figure 3-2. a. Place POWER to TEST; MODE to MAP; TEST to 2. Does B-sweep position to 20 right and elevation strobe to 40 up? b. Replace control-power supply per paragraph 3-910 or K4807. c. Replace radar set control per paragraph 3-969.

PROCEDURAL TEST PASSAGES

NAVAIR 01-245 FDN-2-8.5. PARAGRAPH 3-670

Procedure. Open radome and extend package per figure 3-2. a. Is GYRO IN light (TS-1828D/A) illuminated? b. Short 1J3/22 to ground. Does GYRO IN light illuminate? c. Replace 1A3 platter. d. Does continuity exist between 1J5/M and 1J3/22? e. Does continuity exist between 1P5/M and 3P1/w? f. Repair AMCS package wiring. g. Does continuity exist between 3J1/w and 3J2/x? h. Replace radar modular per paragraph 3-994. i. Repair wiring between 73P414/x(3P2 and 73P404/AB(AMCS test panel). j. Does continuity exist between 1J3/53 and 73P404/w? k. Repair aircraft wiring between 1J3/53 and 73J404/w.

Procedure. Open radome and extend radar package per figure 3-2. a. Is malfunction common to all stations? b. Is malfunction at wing station? c. Is malfunction common to all fuselage stations? d. Press warning lights test switch (fwd cockpit). Does SELECTED light illuminate? e. Replace SELECTED light(s) bulb. for station connected? Does SELECTED light illuminate? f. Replace missile status panel per paragraph 3-959. Does SELECTED light illuminate? g. Repair wiring from missile firing relay panel to missile status panel. Refer to NAVAIR 01-245FDN-2-10. h. Check continuity of applicable wiring. Does continuity exist? i. Repair wiring. j. Replace tuning drive per paragraph 3-1030. Does SELECTED light illuminate? k. Check continuity of applicable wiring from 62P416A to 63P355A (missile firing relay panel assembly). Does continuity exist? l. Is malfunction at fwd station? m. Replace missile firing relay panel assembly per paragraph 3-956. n. Check continuity for applicable station.

PROCEDURAL TEST PASSAGES

NAVAIR 01-245 FDN-2-8.5. PARAGRAPH 3-1171

Error Detector Balance. Back Bias. a. Position control as follows. b. Connect test cable between A300J2 on AN/APM130 and J114. Place S2206, on the synchronizer, to TEST and press S2205. Rotate R2226 to its midrange position. c. Connect test probe from METER IN to ERROR DET OUT A3003/TP6. d. Connect TP2209 to ground. e. Observe meter while RDR RCVR ST and press S2205. Rotate R2226 to its midrange position. c. Connect test probe from METER IN to ERROR DET OUT A3003/TP6. d. Connect TP2209 to ground. e. Observe meter while RDR RCVR gain is increased. c. adjust DL2207 to 0.01-usec steps to increase time delay. g. Repeat step f until change in voltage at A3003/TP6 is less than 0.004Vdc as RDR RCVR GAIN is alternately rotated from ccw to cw position. h. Remove meter lead from A3003/TP6. i. Position AN/APM-130 controls as follows. j. Place TEST (ARSC) to 1 and S2206 to OPERATE. Lock on 2 target. k. Adjust FREQUENCY & NULL REFERENCE dial to produce a null on meter with VOLTAGE SCALE at 0.40. l. Place POWER (RSC) to STBY. Observe meter for drift of range voltage. Range voltage does not change more than 0.060Vdc before system unlocks. If voltage change is greater than 0.060Vdc, adjust B.B. BAL A3003/R39 to correct for drift. m. Repeat steps j, k and l until range voltage drift is as close to zero as possible, but less than 0.060Vdc.

PROCEDURAL TEST PASSAGES

NAVATR 01-245 FDN-2-8.5. PARAGRAPHS 3-920 THROUGH 3-926

Removal. a. Place both generator control switches to OFF. b. Disconnect two air lines from aft end of unit. c. Loosen wing nut on clamp until clamp can be released. Released clamps. Slide unit out of clamp and remove from aircraft. Installation. a. Place both generator control switches to OFF. b. Place unit in clamp with air connections aft. c. Latch clamp (loosen wing nut if necessary) and tighten wing nut finger-tight. d. Connect and tighten two air lines to unit. e. Perform checks required per table 3-14.

DISTRIBUTION BOX. The distribution box is located in the aft cockpit, mounted on the underside of the shelf that mounts the stabilization data generator forward and below the right console. Removal. CAUTION Exercise care during replacement of distribution box to prevent damage to fuel drain lines. a. Place both generator control switches to OFF. b. Remove stabilization data generator. c. Disconnect electrical connector. d. Hold unit and remove four mounting screws. e. Remove unit from aircraft.

Installation. a. Place both generator control switches to OFF. b. Inspect electrical connector for damage and corrosion and wiring for chafing, fraying and security of harness. (Quality Assurance) c. Hold unit in mounting position and install four mounting screws. d. Connect electrical connector. e. Install stabilization data generator. f. Perform checks required per table 3-14. ELECTRICAL SYNCHRONIZER. The synchronizer is located in the nose equipment compartment mounted on the left side forward end of the electrical equipment rack and is accessible with the radome open and the radar package extended. Removal. a. Open radome and extend AMCS radar package per figure 3-2. b. Disconnect P2201, P2202, P2203, P2204, P2205 and P2206 from underside of unit. c. Loosen two bolts on the clamps at bottom of unit that attach to hinge bar. d. Hold unit in position and loosen two bolts at top of unit securing unit to electrical equipment rack. e. Lower unit to end of safety cable travel. hold unit. release safety cable and lift unit off hinge bar.

PROCEDURAL TEST PASSAGES

NAVAIR 01-245 FDN-2-8.5. PARAGRAPH 3-1175

Five-second Unlock Time Delay. a. Position controls as follows. b. Lock on any target, and allow 5 seconds for system to stabilize. c. Place TEST (ARSC) to 0 and measure time required for system to unlock as indicated by indicator display returning to search. Time delay is 5+1 seconds. Check target detector balance (refer to paragraph 3-1170). If balance is satisfactory, adjust A3001/R12 so time delay is 5+1 seconds.

PROCEDURAL TEST PASSAGES

NAVAIR 05-35 EAC-1 PARAGRAPH 7-103

To remove blower B1 (4, figure 7-9) from the tactical computer proceed as follows: **WARNING** Make certain power is removed from the tactical computer prior to removing the blower. a. Slide rubber shroud up harness (18) and remove three screw-mounted terminal clips from blower; retain screws and washers for reassembly. b. Remove three screw-hole plugs (6) from front of blower. c. While supporting blower with one hand, remove three socket-head mounting screws (5) and lift blower from tactical computer; retain screws and gasket (7) for reassembly. **NOTE** Disassemble blower only to the extent required for replacement or repair of defective components. d. Remove air inlet ring cover (4B). e. Loosen two hex socket setscrews on impeller (4C) sufficiently for removal of impeller from shaft of motor assembly. f. Remove impeller. g. Remove impeller blower housing (4D) from motor assembly (4F) by removing four machine screws (4E) and retain screws for reassembly.

PROCEDURAL TEST PASSAGES

NAVAIR 05-35 EAC-1 PARAGRAPH 7-109

To remove main store array assembly A9 (1, figure 7-10) from the tactical computer, proceed as follows: **NOTE** The tactical computer must be removed from the test set prior to removing the main store array assembly. a. Remove left cover (2) by removing 28 mounting screws (3, figure 7-9). b. Remove four array assembly mounting screws (2, figure 7-10) and four associated fiber washers (4). **CAUTION** Array assembly Allen jackscrews located on lower mounting flanges must be alternately loosened two turns at a time, to prevent damage to array assembly. As array assembly Allen jackscrews are loosened, washers (3) become freed. Observe that washers do not become misplaced. **NOTE** Allen screwdriver set is supplied with the test set special tools. c. Alternately loosen four array assembly Allen jackscrews located on lower mounting flanges, two turns at a time, until array assembly is disengaged from frame. d. Carefully lift array assembly from frame.

PROCEDURAL TEST PASSAGES

NAVAIR 05-35 EAC-1 PARAGRAPH 8-22

To remove display assembly A3 (22, figure 8-3) from the tactical computer control, proceed as follows: a. Remove two knobs (2 and 3, figure 8-2) by loosening three setscrews. b. Remove four screws (4), two screws (5) and associated washers (6) and rubber grommets (7). c. Gently pry the lighting panel (14) from control to disengage connector; then, remove lighting panel. d. Remove right cover (15) by removing 12 screws (16). e. Remove seven screws (2, figure 8-3) and one screw (3); then, carefully pull out front panel assembly (1) to gain access to interior of control. f. Remove 4 screws (23, figure 8-3) that secure the 15 lamp segment of the display assembly to the front panel.

PROCEDURAL TEST PASSAGES

NAVAIR 05-35 EAC-1 PARAGRAPH 8-25

To remove rf filters FL1 through FL4 (26 and 27, figure 8-3) from the tactical computer, proceed as follows: a. Remove left and right covers (15, figure 8-2) by removing 24 screws (16). CAUTION Page assembly jackscrews must be alternately loosened, three turns at a time, to prevent damage to alignment pins and page assembly frame. b. Remove two page assemblies (20 and 21, figure 8-3) by alternately loosening four page assembly jackscrews, three turns at a time, until page assemblies are disengaged from frame; carefully lift page assemblies from frame. c. Dismount cable receptacle 2J1 from rear panel by removing four screws (15) and nuts (19). NOTE Filters FL1 through FL4 are mounted in respective order, top to bottom. d. Tag and unsolder lead from left side of defective rf filter. e. Remove two bracket mounting screws (29). f. Move bracket (28) to right side opening as far as cabling permits; then, tag and unsolder lead from right side of defective rf filter. g. Dismount defective rf filter from bracket by removing nut and washer.

REFERENCES FOR PROCEDURAL AND INSTRUCTIONAL TEST PASSAGES

- NAVAIR 01-40 AVM-27.2. Maintenance Instructions (Organizational and Intermediate) Navy Model A-4M Air Craft AH/APG-53A Radar System. 15 May 1973. Naval Air Systems Command.
- NAVAIR 01-245 FDN-2-8.5. Maintenance Instructions (Organizational) Naval Model F-4N Aircraft AERO 1A(NX-4) Maintenance Procedures. 15 October 1972. Naval Air Systems Command.
- NAVAIR 05-35 EAC-1. Maintenance Instructions (Intermediate) Tactical Computer Set AN/ASN-92(V). 1 March 1972. Naval Air Systems Command.
- NAVAIR 01-245-FDF-2-4.16. Radar Set AN/APG-59R System Configuration. December 1978. Naval Air Systems Command.
- TM 9-1450-383-10. Operator's Technical Manual, Trailer Mounted Guided Missile System Power Station Group OA-6793 (XO-30)/MJQ-3. June 1978. Headquarters, Department of the Army.
- NAVPER 15665C. United States Navy Uniform Regulations. 1978. Bureau of Naval Personnel.

REFERENCES FOR NAVSEA TEST PASSAGES

- NAVSEA S9086-BH-STM-000/CH 041. Administration of Funds. 1 March 1976. Change, 1 November 1977. Naval Sea Systems Command.
- NAVSEA S9086-CN-STM-030/CH 079. Damage Control-Engineering Casualty Control. Vol 3, 1 October 1977. Change, 1 July 1978. Naval Sea Systems Command.
- NAVSEA S9086-CN-STM-020/CH 079. Practical Damage Control. Vol 2, 1 July 1977. Change, 30 April 1979. Naval Sea Systems Command.
- NAVSEA S9086-CN-STM-010/CH 079. Damage Control Stability and Buoyancy. Vol 1, 15 August 1976. Change, 1 November 1977. Naval Sea Systems Command.
- NAVSEA S9086-Q5-STM-000/CH 491. Electrical Measuring and Test Instruments 1 August 1976. Change, November 1977. Naval Sea Systems Command.
- NAVSEA S9086-MD-STM-000/CH 400. Electronics. 1 June 1976. Change, 1 November 1977. Naval Sea Systems Command.
- NAVSEA S9086-CZ-STM-000/CH 090. Inspections, Tests, Records, and Reports. 15 February 1977. Change, 15 December 1977. Naval Sea Systems Command.
- NAVSEA S9086-K9-STM-000/CH 330. Lighting. 1 June 1977. Change, 15 May 1979. Naval Sea Systems Command.

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REFERENCES FOR NAVSEA TEST PASSAGES (continued)

NAVSEA S9086-WK-STM-000/CH 670. Storage, Handling and Disposal of Hazardous General Use Consumables. 1 August 1978. Change, 1 February 1979. Naval Sea Systems Command.

APPENDIX G

HOW TO USE TAEGs COMPUTER READABILITY EDITING SYSTEM

To use TAEGs Computer Readability Editing System, an author would key into the computer a sample of text such as that shown in figure G-1, which is the author's writing before any computer editing has been done. To find out whether Navy personnel will be able to read this writing, and to receive suggestions on how to make it more readable, the sample of text is processed by the computer. Figure G-2 is a computer printout containing the output of the editing system.

The output in figure G-2 consists of the text with suggested changes as well as Notes, Readability Results, and Words Not on Basic List. The single most important indicator of text readability is Grade Level, listed under Readability Results. This measure is computed by the Flesch-Kincaid Reading Ease Formula. Also found under Readability Results is the information that the formula uses to compute the grade level--average number of words per sentence and average number of syllables per word. In this example, the grade level is 16.6. If the intended readers have an average reading grade level below this level, the author should try to reduce the reading grade level. This will most certainly be the case here, since the average reading level for Navy enlisted personnel is about the 10th grade.

Specific suggestions on how to reduce the grade level are found in other features of the editing system. One of these is the flagging of uncommon words. Within the text of figure G-2, all uncommon words have been enclosed in parentheses. These same words are listed with their frequencies of occurrence under Words Not on Basic List at the bottom of the printout. The uncommon words are words that are not on the Common Word List; they are words with which most readers are not familiar. To make the text more readable, the author should try to replace these words with simpler words; if that is not possible, then the author should consider defining the word, either in context or in a glossary.

The word-substitution feature of the editing system has placed in brackets all words recommended for replacement. These are words for which specific substitutes are recommended. The brackets are shown in the text of figure G-2. Each word in brackets is followed by its proposed substitute(s) in brackets and in capital letters. The author should decide whether to use one of these substitutes or to retain the original word. In most cases, one of the substitutes will help to improve the readability of the text.

Sentences that are too long have been flagged with a number between slash marks following each such sentence. Under Notes, this number appears again with information on the amount of words in the sentence. The author should try to rewrite such sentences so as to make them shorter.

Figure G-3 shows how the text is rewritten using the suggestions of the editing system. The author uses proofreading symbols to indicate corrections to be made on the editing system output. Many of the uncommon words in parentheses have been deleted as shown by the ~~_____~~ through them. Some of these have been replaced with simpler words; for example, "housed" for

"domiciled." Other uncommon words have only been deleted, such as "geographical." Several uncommon words have been retained and were not marked; for example, "sub-areas." There is no more suitable replacement for this word. In every case the author makes a final decision on the suggestions made by the editing system.

The author's response to the sentence length flagged by the editing system might influence the choice of words described above. The first sentence of figure G-3 is flagged with /1/, and under notes the /1/ indicates 23 words in the sentence. The author has responded by deleting several words from the sentence. The author's response to the long sentence, marked by note /5/, has been to divide it into two sentences. Throughout the editing process, the author's judgment plays a critical role, especially in rewriting long sentences. Throughout figure G-3, examples of human judgment in editing can be seen. However, the need for the CRES is shown by the suggestions in the edited text which guide the author by pointing out problems that the human editor might not have seen.

The next step in the editing process is to analyze the edited product of figure G-3 using the computer editing program again. This step checks the results of the first editing. Figure G-4 shows the output of the editing system after analyzing the edited text of figure G-3. The average number of words per sentence has been reduced from 22.66 to 15.38, while the average number of syllables per word has been reduced slightly. As a result, the grade level of the text has been reduced from 16.6 to 11.2, a reading level much closer to the skill of Navy personnel. The number of uncommon words has been reduced from 13 to 2. These two words are uncommon but the author considered them essential to the meaning of the text.

The final product appearing in figure G-5 resulted through the combination of the analysis of the CRES plus the author's acting on the suggested changes. The result in figure G-5 is a much more readable sample of text than the original version of figure G-1. A comparison of the text in the two figures clearly points this out.

The Commandant of each Naval district is assigned the responsibility for establishing and controlling uniform policies within the geographical limits of his district. He shall prescribe uniforms for the season, day, or special occasion for all Naval personnel (including Marines under his command) which will provide the greatest uniformity. Personnel of all Naval activities domiciled within the district shall wear only those uniforms prescribed for personnel assigned to the district. The Commandant may designate sub-areas and assign area coordinators/senior officers present authority to prescribe local uniforms which are compatible with mission and climate. Senior officers presently afloat in district waters shall, insofar as practicable, follow the uniforms prescribed by the Commandant with regard to liberty parties and members of the command operating ashore.

Uniform selections are to be at the discretion of the prescribing authority and not optional to the individual.

Local uniform regulations shall be promulgated by each Commandant, area Commander, SOPA, or other designated authority utilizing the format provided in the sample instruction appended to this chapter.

Uniforms for daily wear are equivalent to civilian business attire and are prescribed for normal executive office work, watchstanding, liberty, and official business ashore. Service dress uniforms are normally prescribed as the uniform of the day.

Figure G-1. Sample of Text Taken from the Navy's Uniform Policy Regulations (NAVPERS 15665C, 1978) Before Processing by TAEGs Computer Readability Editing System. (Readability is at the College Graduate Level.)

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The Commandant of each Naval District is assigned the
MISSPELLED WORD IS FLAGGED
(responsabilitu) for <establishing> <*SETTING UP.PROVING*> and
controlling uniform policies within the [geographical] limits of
his District. (1) He shall prescribe uniforms for the season, day
(LONG SENTENCE IS FLAGGED AND FOOTNOTE PRODUCED
or special occasion for all Naval personnel (including Marines
under his command) which will <provide> <*GIVE.SAY*> the greatest
UNCOMMON WORD IS FLAGGED
[uniformity.]/2/ Personnel of all Naval Activities (domiciled)
*
within the District shall wear only those uniforms prescribed for
personnel assigned to the District. The Commandant may
<designate> <*APPOINT.CHOOSE*> [sub-areas] and assign area
[coordinators/senior] officers present authority to prescribe local
uniforms which are [compatible] with mission and climate./3/
*
Senior officers present afloat in district waters shall [insofar]
as [practicable.] follow the uniforms prescribed by the Commandant
with [regard] to liberty parties and members of the command
<operating> <*RUNNING.WORKING*> ashore./4/ Uniform
*
<selections> <*CHOICES*> are to be at the discretion of the
prescribing authority and not optional to the individual. Local

Figure G-2. Same Sample of Text After Computer Processing. Various Features of the System are Annotated.

T A E G Report No. 83

TWO EASIER SUBSTITUTES ARE OFFERED FOR DIFFICULT WORD

Uniform Regulations shall be <promulgated> <*ANNOUNCED,ISSUED*> by
each Commandant, Area Commander, SOPA or other
<designated> <*APPOINTED,CHOSE/CHOSEN*> authority
<utilizing> <*USING*> the format <provided> <*GAVE/GIVEN.SAID*> in
the sample instruction [appended] to this chapter./5/ Uniforms for
*
daily wear are <equivalent> <*EQUAL*> to civilian business [attire]
and prescribed for normal executive office work. [watchstanding.]
liberty and official business ashore./6/ Service Dress uniforms
*
are normally prescribed as the uniform of the day.

-----NOTES-----

- / 1/ This sentence contains 23 words - consider shortening it.
- / 2/ This sentence contains 26 words - consider shortening it.
- / 3/ This sentence contains 23 words - consider shortening it.
- / 4/ This sentence contains 30 words - consider shortening it.
- / 5/ This sentence contains 28 words - consider shortening it.
- / 6/ This sentence contains 23 words - consider shortening it.

----- READABILITY RESULTS -----

Number of Sentences	Number of Words	Number of Syllables
9	204	404

Figure G-2. Same Sample of Text After Computer Processing. Various Features of the System are Annotated (continued)

TAEG Report No. 83

The Commandant of each Naval District is assigned the
[responsability] for ~~establishing~~ ^P ~~and~~ ^{<SETTING UP, PROVING*>} and
controlling uniform policies within the ~~geographical~~ ^{limits of}
his District. /1/ He shall prescribe uniforms for the season, day
* or special occasion for all Naval ^{and Marine} personnel ~~including Marines~~
^{be most uniform.}
~~under his command~~ which will ~~provide~~ ^{<GIVE, SAY*>} the ~~greatest~~
~~uniformity~~ /2/ Personnel of all Naval Activities ^{housed} ~~located~~
* within the District shall wear only those uniforms prescribed for
~~personnel assigned to~~ the District. The Commandant may
~~designate~~ ^{<APPOINT, CHOOSE*>} [sub-areas] ^{He may also} ~~and~~ ^{assign} area
(coordinators ^{and} senior) officers present authority to prescribe local
uniforms which ^{meet} ~~are compatible with~~ mission and climate ^{needs} /3/
* Senior officers present afloat in district waters shall ~~insofar~~
^{much as possible}
as ~~feasible~~ follow the uniforms prescribed by the Commandant
This applies ^{both} ~~with regard to~~ ^{personnel} ~~members of the command~~
~~operating~~ ^{<RUNNING, WORKING*>} ashore. /4/ Uniform
* ~~selections~~ ^{<CHOICES*>} are to be at the discretion of the
prescribing authority and not optional to the individual. Local

Figure G-3. Same Printout with Editing Notes

Uniform Regulations shall be ~~promulgated~~ ~~ANNOUNCED~~ ~~ISSUED~~ by
each Commandant, Area Commander, SOPA or other
~~designated~~ ~~APPOINTED~~ ~~CHOSE~~ ~~CHOSEN~~ authority
~~utilizing~~ ~~USING~~ the format ~~provided~~ ~~GAVE~~ ~~GIVEN~~ ~~SAID~~ in
the sample instruction, ^{attached} ~~forwarded~~ to this chapter, ^{shall be used} /5/ Uniforms for
daily wear are ^{used like} ~~equivalent~~ ~~EQUAL~~ to civilian business ^{clothes} ~~clothing~~.
They are used for things like ^{standing watch} ~~and prescribed for normal executive~~ office work. ^{watch standing} ~~if~~
liberty and official business ashore. /6/ Service Dress uniforms
are normally prescribed as the uniform of the day.

-----NOTES-----

- / 1/ This sentence contains 23 words - consider shortening it.
- / 2/ This sentence contains 26 words - consider shortening it.
- / 3/ This sentence contains 23 words - consider shortening it.
- / 4/ This sentence contains 30 words - consider shortening it.
- / 5/ This sentence contains 28 words - consider shortening it.
- / 6/ This sentence contains 23 words - consider shortening it.

----- READABILITY RESULTS -----

Number of Sentences	Number of Words	Number of Syllables
9	204	404

Figure G-3. Same Printout with Editing Notes
(continued)

TAEG Report No. 83

The Commandant of each Naval District is assigned the responsibility for setting up and controlling uniform policies within his District. He shall prescribe uniforms for the season, day or special occasion for all Naval and Marine personnel which will be most uniform. Personnel of all Naval Activities housed within the District shall wear only those uniforms prescribed for the District. The Commandant may choose [sub-areas.] He may also assign area [coordinators] (or senior officers present) authority to prescribe local uniforms which meet mission and climate needs. Senior officers present afloat in district waters shall, as much as possible, follow the uniforms prescribed by the Commandant. This applies to both liberty parties and personnel working ashore. Uniform choices are to be at the discretion of the prescribing authority and not optional to the individual. Local Uniform Regulations shall be issued by each Commandant, Area Commander, SOPA or other chosen authority. The format given in the sample instruction attached to this chapter shall be used. Uniforms for daily wear are used like civilian business clothes. They are used

Figure G-4. Passage After Changes Suggested by Computer Analysis

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for things like office work, standing watch, liberty and official business ashore. Service Dress uniforms are normally prescribed as the uniform of the day.

----- READABILITY RESULTS -----					
Number of Sentences	13	Number of Words	200	Number of Syllables	354
Avg. Number of Words per Sentence	15.38	Avg. Number of Syllables per Word	1.77		
GRADE LEVEL	11.2	(Based on DOD Readability Standard)			
----- WORDS NOT ON BASIC LIST -----					
WORD	FREQ	WORD	FREQ		
coordinators	1	sub-areas	1		

Figure G-4. Passage After Changes Suggested by Computer Analysis (continued)

The Commandant of each Naval district is assigned the responsibility for setting up and controlling uniform policies within his district. He shall prescribe uniforms for the season, day, or special occasion for all Naval and Marine personnel which will be most uniform. Personnel of all Naval activities housed within the district shall wear only those uniforms prescribed for the district. The Commandant may choose sub-areas. He may also assign area coordinators (or senior officers present) authority to prescribe local uniforms which meet mission and climate needs. Senior officers presently afloat in district waters shall, as much as possible, follow the uniforms prescribed by the Commandant. This applies to both liberty parties and personnel working ashore.

Uniform choices are to be at the discretion of the prescribing authority and not optional to the individual.

Local uniform regulations shall be issued by each Commandant, area Commander, SOPA, or other chosen authority. The format given in the sample instruction attached to this chapter shall be used.

Uniforms for daily wear are used like civilian business clothes. They are used for things like office work, standing watch, liberty, and official business ashore. Service dress uniforms are normally prescribed as the uniform of the day.

Figure G-5. Final Manuscript of Revised Text After Processing by TAEGs Computer Readability Editing System. (Readability is at the High School Level.)

**DAT
ILM**