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SAFEORD: SAFETY OF EXPLOSIVE ORDNANCE DATABANK(U) NAVAL 1/1
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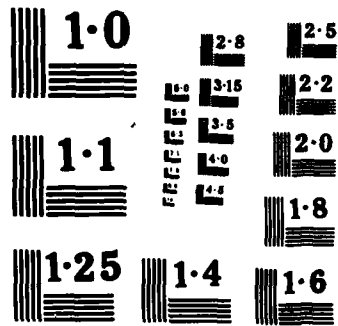
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**SAFEORD: SAFETY OF EXPLOSIVE
ORDNANCE DATABANK**

**BY
FRANK J. HANZEL
ENGINEERING DEPARTMENT**



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FOREWORD

The Safety of Explosive Ordnance Databank (SAFEORD) was conceived, designed, and developed by the Naval Surface Weapons Center (NSWC), System Safety Division (E50), Risk Assessment Branch (E52) under a task from the Naval Sea Systems Command (NAVSEA) Safety Division (SEA-06H). This document describes the restructuring of the SAFEORD system. NSWC/DL Technical Report TR-3192* gives a comprehensive description of the operation, contents, uses, and advantages of the system.

Released by



F. B. SANCHEZ, Head
Systems Safety Division
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* Frank J. Hanzel, SAFEORD: *Safety of Explosive Ordnance Databank*, NSWC/DL TR-3192 (Dahlgren, Va., September 1974).

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INTRODUCTION

The need for a centrally located databank to store and rapidly retrieve safety information pertaining to naval explosive ordnance, explosive materials, and weapon systems and components in the Fleet and under development is emphasized daily by urgent requests for this type of data. Instant availability of the necessary data can save lives, time, and money and prevent loss of fleet capability. The ability to obtain these data rapidly, accurately, and economically enhances tremendously the operational effectiveness of the fleet Navy Systems Commands.

Working under a NAVSEA Safety Division (SEA-06H) SEATASK, the System Safety Division (E50) developed a functional databank in 1969 capable of storing and providing rapid retrieval of naval explosive ordnance safety data. However, vastly increased demands for faster retrieval, greater simplicity of use, and faster rate of endowment resulted in a critical need for restructuring SAFEORD.

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DATABANK STORAGE AND RETRIEVAL EQUIPMENT

A review of available computer and microfiche equipment was conducted to determine their ability to meet the design requirements for restructuring SAFEORD. The NSWC CDC 6700 and CYBER 170/720 computers were selected for use with the databank because of their availability, economical operation, and capability to interface efficiently with ordnance safety data and microfiche equipment. After evaluating the capabilities of available commercial microfiche equipment, the 3M model 500 microfiche reader-printer was selected for use with the databank. Additional equipment used with the databank includes a Xerox model 400 telecopier, a dry process microfiche camera/processor, a dry process duplifice printer-developer, and a Silent 700 electronic data terminal.

RESTRUCTURING

EQUIPMENT

The original equipment provided SAFEORD users with a viable system for entering, storing, and retrieving weapon systems safety information. To meet demands for more rapid entry and retrieval of these data, a restructuring program was initiated. A dry process camera, fiche duplicator, and microfiche reader-printer units replaced the cumbersome wet process equipment. The new equipment: (1) significantly enhances entry and retrieval of data by reducing document photo-copying and fiche reproduction time, (2) reduces turnaround time required to reproduce documents from microfiche to hard-copy format, (3) is more cost-effective, and (4) eliminates hazards associated with the storing, handling (mixing), and disposing of chemicals required by the wet process photography operation. The addition of a CYBER 170/720 computer and a Silent 700 electronic data terminal significantly enhances SAFEORD data entry and retrieval capabilities by enabling its users to communicate directly with the computer.

SOFTWARE

The original SAFEORD computer software programs were designed to identify the number and location of each microfiche card containing specific safety information related to a unique weapon system, component, subcomponent, explosive, propellant, safety test, etc. The numbers of microfiche cards containing these data are published in the SAFEORD Weapon System Dictionary and/or Ship and Shore Dictionary. Users had to proofread (hand-massage) each microfiche card to identify the specific document(s) containing the desired information. This *modus operandi*, though effective, had to be improved to enhance rapid retrieval. Thus the software was restructured to provide the users with the following capabilities:

1. Documents can be located via the Log File Dictionaries. For example, Log File Dictionary No. 5 contains a chronological listing of all documents by date (Figure 1), while Log File Dictionary No. 6 contains an alphanumeric listing of all documents by file (author of source) (Figure 2). Headline entries in these dictionaries include the
 - a. Seven alphanumeric microfiche number in the left margin, which identifies the microfiche containing the document;
 - b. Document data
 - c. File (author-source)
 - d. Subject of the document under NARRATIVE.

SAFEORD LOG FILE

FICHE	DOCUMENT FILE DATE	NARRATIVE
ZU7534K	15AUG58	AEROJET SOLID PROPELLANT FORMULATION IDENTITY, ANP-2542 EP
SUB155J	19AUG58	USE OF HEARING AIDS IN AREAS OF EXPLOS PRODUCTION & HANDLING, COMMENT
BO1614J	21AUG58	NON-METALLIC FUZE SEAT LINER STUDY OF
BUT282F	25AUG58	HAZARD CLASSIFICATION FOR 14-A5-1000 JATO
BUI2191J	00SEP58	RATE OF REACTION OF GASEOUS FLOURINE WITH WATER VAPOR AT 35C
DU6123F	00SEP58	SAFETY MANUAL FOR SITTING EXPLOSIVES AND EQUIPPING PIER AND WHARF
		FACILITIES FOR HANDLING EXPLOSIVES AND AMMUNITION
		RF ELECTROMAGNETIC RADIATION SURVEY AT ATOMIC UNDERWATER WARFARE
		BLDG NAS BRUNSWICK MAINE
SC6861E	00SEP58	SURFACE-TO-AIR MISSILE SFTY TEST COMPARTMENT SPRINKLER SYS FOR
		AUTHORITY TO REMOVE DELUGE AND SPRINKLER SYSTEMS FROM H E CAST
BUB805K	15SEP58	LOADING PLANTS REQUEST FOR
SC6921K	24SEP58	DISCUSSION AND AGREEMENTS AT TARTAR NEWS MEETING RKT SPLINTER
		CONFERENCE AT BUORD SEPT 24 1958
ZC7055H	26SEP58	ARCON MOTOR VIBRATION TESTS
		AIRCRAFT PROTECTION FROM ATMOSPHERIC ELECTRICAL HAZARDS
		DEVELOPMENT OF PROPELLANT CHARGES FOR THE XC-9 HIGH LOW CATAPULT
		HAZARD OF ELECTROMAGNETIC RADIATION TO ORDNANCE
ZC7014A	00OCT58	REPORT ON IGNITER PALLETS
SC6953E	02OCT58	FINAL RPT GROUND AND HIGH SPEED FLIGHT TST OF BOMB, CHEMICAL, 500LB
ZC7012A	17OCT58	LOW DRAG M094/000
BC3611K	20OCT58	TARTAR AGC RKT MTR EXPL HAZ CLASSIFICATION REQUEST CLARIFICATION OF
		TERRIER READY SERVICE MAGAZINES SPRINKLING SYS DETECTION DEVICES
ZC7055G	28OCT58	COMMENTS ON
BUB803L	05NOV58	AEROJET SOLID PROPELLANT FORMULATION IDENTITY, ANP-2696 MH
		INVESTIGATION OF HERO HAZ TO POGO-HI MISSILE ON USS HAZELWOOD D0531
ZU7541J	06NOV58	AEROJET SOLID PROPELLANT FORMULATION IDENTITY, ANP-2699 MH
WC0062L	14NOV58	PILOT PRODUCTION EVAL OF CONTINUOUS ROD WARHEAD FOR SPARROW III GM
ZU7541K	17NOV58	SFTY FIRING OF COMPOSITION B-LOADED 175MM T203E3 HIGH EXPL SHELL
BC7985G	26NOV58	HAZARD CLASSIFICATION TST OF 5/38 INCH PROJECTILES M049/000
BC7313L	00DEC58	HAZARD CLASSIFICATION TST OF 3/50INCH CARTRIDGES M033/001
BC7765F	00DEC58	SENSITIVITY OF EXPL TO SETBACK PRESSURE
BC7924H	00DEC58	HAZ CLASS TST 5/38 PROJECTILE M049/000
DU1441J	00DEC58	HAZ CLASS TST 3/50 CARTRIDGES M033/001
		BOMPA
ZC1864K	00DEC58	METRIOL TRINITRATE ICC HAZ ARD CLASSIFICATION
ZC1865F	00DEC58	MK10 TERRIER READY SERVICE HANDLING SYS DELETION OF AUTOMATIC CO2
ZU7024A	01DEC58	SYS
ZU7345E	01DEC58	MILITARY SPECIFICATION BOX COMPOSITION CH-6
BUB804A	02DEC58	MINES M027/002-003, HBA-3 LOADING OF EXPLOSIVE SECTIONS
		AEROJET SOLID PROPELLANT FORMULATION IDENTITY, ANP-2729 MH
		CC(N)9 REQUEST FOR CHANGE TO SPECIFICATION
		CVA(N)69 REQUEST FOR CHANGE TO SPECIFICATION
		DLG9 CLASS REQUEST FOR CHANGE TO SPECIFICATION
		TALOS BOOSTER VENTING STDY RECOMMENDATIONS
		HEAT RESISTANT EXPLOSIVE III 1,3-DIAMINO-2,4,6-TRINITROBENZENE, DATB,
		FROM 1,3-DIMETHOXYBENZENE
		OPERATIONAL NECESSITY WAIVER FOR OPERATION OF ANMO WHARF HOTEL
		REQUEST FOR
DU7454I	04DEC58	
ZU3573G	04DEC58	
ZU7542B	09DEC58	
BUB804B	11DEC58	
BUB804C	11DEC58	
BUB804D	11DEC58	
BC4853C	15DEC58	
ZC2341D	15DEC58	
SUB8632G	18DEC58	COMNAVFOR MARIANAS/92

FIGURE 1. SAMPLE FROM LOG FILE DICTIONARY NO. 5: DOCUMENTS BY DATE

SAFEORD LOG FILE

FIGHNE	DOCUMENT DATE	FILE	NARRATIVE
TU6412B	03FEB76	HDQTRUSMC WASHINGTON/LMG/RM	RENEWAL OF WAIVERS REQUEST FOR
TU6661A	06AUG81	HDQTRUSMC WASHINGTON/LMG/RM/ADB	MUNITIONS STORAGE AREA REQUEST FOR EXEMPTION
TU5124C	31MAR80	HDQTRUSMC WASHINGTON/LMG/RM	WAIVER OF SECURITY HINGE BRACKETS FOR MAGAZINE ACCESS DOORS REQUEST
TU6474K	01APR81	HDQTRUSMC WASHINGTON/LMG/RM	WAIVER REQUEST AND PROPOSED STORAGE PLAN FOR THE CAMP MEMOKO MARINE AMMO STORAGE AREA
TU6885G	27OCT81	HDQTRUSMC WASHINGTON/LMG/RM	MUNITIONS STORAGE REQUEST FOR WAIVER
TU5891D	10OCT80	HDQTRUSMC WASHINGTON/LMG/RM	PHYSICAL SECURITY WAIVER REQUEST FOR
TU5761C	03NOV80	HDQTRUSMC WASHINGTON/LMG/RM	DEMOLITION AREA REQUEST FOR
TU6473B	01JUN81	HDQTRUSMC WASHINGTON/LMG/50	ORDNANCE STRIPPING AND INERTING
SU9601D	26FEB76	HDQTRUSMC WASHINGTON/MP'S-21-1C	TECHNICAL SECURITY EVAL OF MARINE CORPS ACTIVITIES
YU5005F	NONE	HDQTRUSMC WASHINGTON	MAINTENANCE INSTRUCTIONS FOR THE M58 LINE CHARGE TRAILER-MOUNTED SYS
TU5532A	08SEP80	HDQTRUSMC WASHINGTON/LFF-1-TMR	ESTABLISHMENT OF ANTENNA SITES APPROVAL OF
BU2551I	00MAY65	HEALTH AND SAFETY LAB	CONTROL OF LIQUID HYDROGEN HAZARDS AT EXPERIMENTAL FACILITIES
ZU4575C	12SEP74	HEALTH PHYSICS ASSOCL LTD	60 CO USED IN NARROW BEAM CONDITION, ENERGY AND BEAM CONFIGURATION CORRECTION FACTORS
SUB861A	09JAN75	HEDSUPPACT TAIPEI/35/CDC	DOESB VISIT
TU2533I	24JAN78	HEDSUPPACT TAIPEI/35/SUB	EXPLOSIVE SAFETY SURVEY OF HEADQUARTERS SUPPORT ACTIVITY TAIPEI
AU1714F	08NOV68	HERCULES INC	CHANGE PROPOSAL TALOS M011/Q05
AU1714I	27SEP68	HERCULES INC	TALOS BOOSTER M011/Q05 EXTINGUISHER
AU1723F	00SEP68	HERCULES INC	TALOS BOOSTER APPLIED ENGINEERING SUPPORT MONTHLY RPT
AU1945A	01NOV71	HERCULES INC	CONTRACT N-00017-69-C-4315
8C4795H	16OCT59	HERCULES INC	TALOS BOOSTER ENGINEERING SUPPORT FINAL RPT
8C6754J	00APR68	HERCULES INC	STATIC FIRING RECORDS AND DATA SHEETS (SIX X239 B2)
8C6783G	00SEP68	HERCULES INC	SPARROW III AIM-7F PRE-FLIGHT RATING TST(PFRT) RPT VOL I
BU2932K	27MAR78	HERCULES INC	SPARROW III AIM-7F QUALIFICATION TST VOL I
BU2935J	12APR79	HERCULES INC	TEST RPT FOR OUT OF LINE INITIATOR MK36 SIDEWINDER RKT MTR
800423A	31MAR80	HERCULES INC	S+A IGNITION ASSEMBLY FOR AIM-9L SIDEWINDER MK 36 RKT MTR TEST RPT
800423B	00FEB80	HERCULES INC	ENCLOSED BROCHURE DESCRIBES TATB FACILITY
800435B	31MAR80	HERCULES INC	TECHNICAL CAPABILITIES + FACILITIES OF TATB
800435C	00FEB80	HERCULES INC	HERCULES-MCGREGOR CAPABILITIES FOR PRODUCING TATB
800853K	14APR78	HERCULES INC	HERCULES-MCGREGOR CAPABILITIES FOR PRODUCING TATB
800961F	16NOV81	HERCULES INC	HAZ TSTING OF WATER-WET HMX IN FROZEN CONDITION PROJ 688
800961H	20AUG78	HERCULES INC	NITROCELLULOSE
800961J	07AUG79	HERCULES INC	VALUE ENGINEERING CHANGE PROPSAL FOR ELIMINATION OF DRYING CELLULOSE COTTON PRIOR TO THE NITRATION PROCESS
800961K	00AUG77	HERCULES INC	DELETE THE REQUIREMENT TO DRY THE COTTON LINTERS BEFORE BEGINNING THE NITRATION PROCESS
DU2465G	30JUN66	HERCULES INC	SUPPLEMENTAL DATA FOR REQUEST FOR DEVIATION/WAIVER OR ENGINEERING CHANGE PROPSAL
5C7063B	29JUN74	HERCULES INC	SIX-MONTH SHELF LIFE TSTS ON THIRD PRODUCTION RUN M013/000 GAS GEN
SU1351D	21DEC70	HERCULES INC	FINAL REPORT POLARIS A3 SECOND STAGE MOTOR PROPELLANT SAFETY DATA
SU1501F	29JUN72	HERCULES INC	WAIVER NO 3 0-D SEPARATION OF MAGAZINES 173 AND 169
SU1532C	02NOV70	HERCULES INC	WAIVER RENEWAL & CANCELLATION
SU1534G	15OCT70	HERCULES INC	EXPLOSIVE SAFETY SURVEY 23-26 JUN 70
SU1952K	01JUN72	HERCULES INC	WAIVERS/EXEMPTIONS OF SAFETY REGULATIONS FOR AMMO, EXPLOS + RELATED DANGEROUS MATERIAL
SU6572L	15APR70	HERCULES INC	EXEMPTION REQUEST NO 9
SU6573L	28JUL69	HERCULES INC	EXPLO SAFETY SURVEY, HERCULES INC BY J F GREEN, NOSSOP SAFETY DIRCTR

FIGURE 2. SAMPLE FROM LOG FILE DICTIONARY NO. 6: DOCUMENTS BY FILE (AUTHOR OR SOURCE)

A schematic of the retrieval modus operendi by document date and/or author-source is shown in Figure 3.

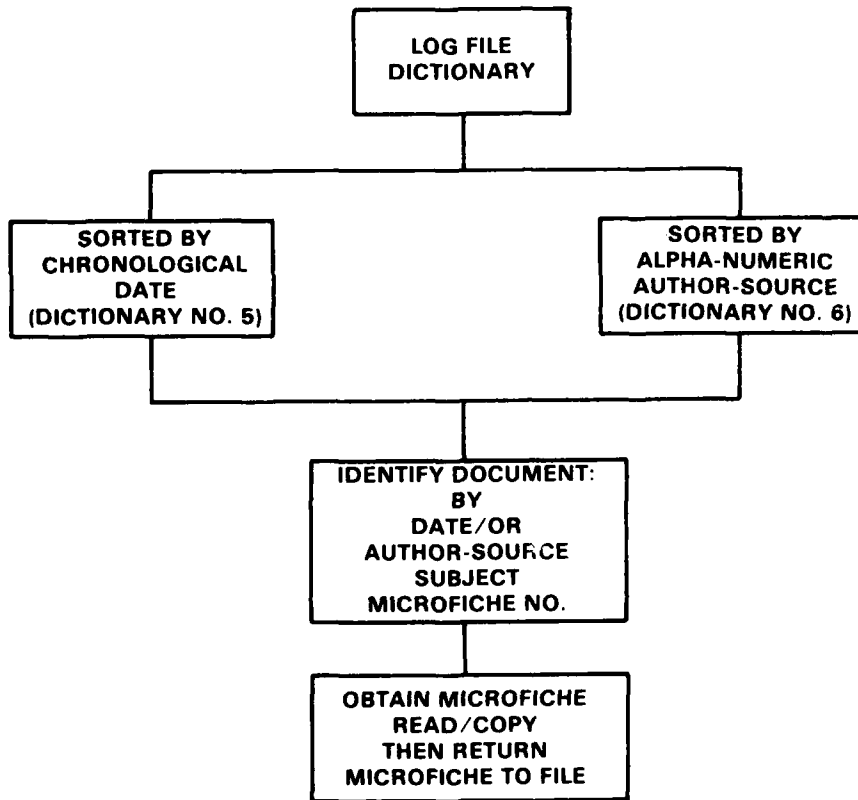


FIGURE 3. SCHEMATIC OF THE MODUS OPERENDI FOR DOCUMENT RETRIEVAL VIA LOG FILE DICTIONARY

2. The Log File Dictionaries can be customized. The following customized Dictionaries exist: NAVSEA-06H Selected Files, HARPOON, HERO, Laser, Marine Corps Weapons, TOMAHAWK, and VLS.

3. Weapon systems safety test data can be instantaneously retrieved in a matrix format. (This software modification required the addition of the CYBER 170/720 computer and the Silent 700 electronic terminal.) An example of this matrix output is shown in Figure 4. The headline entries for this format are self-explanatory.

SEQNUM C WEAPON SYSTEM CODE = A	COMPONENT	SAFEQRO DATA BASE COMPONENT ID CONTENTS	TEST TYPE	TEST RESULTS	REMARKS	YR FICNUM
000301 A 3048	WHD	4K82/2,3	COOKFAST	12:42 EXP *	AVCD	72 A08344J
000305 A 3048	WHD	4K82/	COOKFAST	4:07 DET *	CECD INTUMESC	70 A08351A
000306 A 3048	WHD	4K82/	COOKFAST	5:12 DEF *	CECD INTUMESC	70 A08351A
000307 A 3048	WHD	4K82/	COOKFAST	11:37 15:11*	AVCD PFIZE UM	70 A08352D
000308 A 3048	WHD	4K82/2	COOKFAST	3:35 BURM		73 A08352H
000309 A 3048	FZ	M904/	COOKFAST	22:48 DET *		71 A08362J
000310 A 3048	FZ	M904/	COOKFAST	PASS		70 A08362A
000312 A 3048 SHAKKEY	FZ	M990/	COOKFAST	22:48 DET		71 A08362A
000313 A 3048	PRIMER	4K45/1	VIB	PASS		73 A08362A
000314 A 3048	PRIMER	4K45/1	JOLT	PASS		73 A08362A
000315 A 3048	WHD	4K82/	COOKFAST	5:55 DEF	CECD INTUMESC	73 A08362D
000316 A 3048	WHD	4K82/	COOKFAST	7:18 DEF	PFIZER	73 A08362E
000317 A 3048	WHD	4K82/	COOKFAST	9:12 DEF	AVCD	73 A08362E
000318 A 3048	WHD	4K82/	COOKFAST	4:58 DEF	HOT MELT	73 A08362F
000319 A 3048	WHD	4K82/	COOKFAST	2:01 EXP	PLASTISOL	73 A08362F
000320 A 3048	WHD	4K82/	COOKFAST	2:12 EXP	A/C WING	70 A08362G
000321 A 3048	WHD	4K81/	COOKFAST	2:05 EXP		73 A08362G
000322 A 3048	WHD	4K82/	COOKFAST	2:08 EXP		A08362G
000324 A 3ULLPUP	WHD	4K19/0	COOKFAST	1:55 DEF		73 A08362H
000325 A 3ULLPUP	WHD	4K19/0	COOKFAST	1:09 1:53		73 A08362H
000326 A 3048	FZ	4990/	COOKFAST	19:30 23:12		73 A08362J
000328 A 3048	WHD	4K82/	COOKFAST	14:12 DEF	AVCD	12 A08362J
000329 A 3048	WHD	4990	COOKFAST	17:14	PFIZER	A08362J
000330 A 3048	FZ	4K82/	COOKFAST	31:55 24:11	CONICAL FIN	70 A08362J
000331 A 3048	WHD	4K82/	COOKFAST	17:02 DEF	PFIZER	A08362K
000332 A 3048	WHD	4K19/0	COOKFAST	12:45 DEF	AVCD	A08362K
000333 A 3ULLPUP	WHD	4K19/0	COOKFAST	2:43 EXP		A08362L
000335 A 3048	WHD	8LU26	COOKFAST	0:48 1:37 DEF	PARTIAL DET	A08362L
000338 A 3048	FZ	4K30/5	JOLT	PASS		A08365G

FIGURE 4. WEAPON SYSTEM SAFETY TEST DATA MATRIX

SAFEORD STATUS

In approximately 14 years of operation, SAFEORD has been endowed with over 700,000 sets of safety data on over 12,000 film cards related to (approximately) 8000 systems. These data represent over 90,000 documents of 1-225 pages in length. Over 16,000 descriptions and data codes are being used to enter data into SAFEORD.

The restructuring of SAFEORD to handle this volume has resulted in the following benefits:

1. The replacement of the wet process equipment with a dry photography system has resulted in a more rapid and cost-effective operation and the elimination of the health hazards associated with the chemicals required for the wet process.
2. Instantaneous retrieval of weapon systems safety test information is now possible by direct communication with the CYBER 170/720 computer via the Silent 700 electronic data terminal.
3. Immediate retrieval of safety documents by chronological data and/or document author-source is realized and customized SAFEORD Log File Dictionaries have been generated and published.
4. The capability now exists for users to instantaneously retrieve weapon systems safety test data in a matrix format.

The demand by SAFEORD users for faster safety data retrieval, greater simplicity of use, and more rapid data entry has been accomplished by the restructuring reported in this document.

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