NOTE: The document identifier and heading has been changed on this page to reflect that this is a performance specification. There are no other changes to this document. The document identifier on subsequent pages has not been changed, but will be changed the next time this document is revised.

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15 April 1988
SUPERSEDING
MIL-M-87158(USAF)
10 September 1982

PERFORMANCE SPECIFICATION

MANUALS, TECHNICAL: AIRCRAFT BATTLE DAMAGE ASSESSMENT AND REPAIR

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE.

1.1 Scope. This specification covers requirements for the preparation of technical manuals on aircraft battle damage assessment and repair (ABDAR) and quick repair instructions not included in TO 1-1H-39/NAVAIR 01-1A-39. Aircraft specific manuals will describe quick ABDAR procedures to be applied to the specific aircraft. Duplication of information contained in other maintenance manuals should be kept to a minimum in the specific ABDAR manual.

2. APPLICABLE DOCUMENTS.

2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified, the following specifications and standards of the issue listed in the Department of Defense Index of Specifications and Standards (DODISS) specified in the solicitation form a part of this document to the extent specified herein.

MILITARY SPECIFICATIONS

MIL-W-5088	Wiring, Aerospace Vehicle
MIL-A-87221	Aircraft Structures General Specification
MIL-M-38784	Manual, Technical: General Style and Format Requirements
MIL-P-38790	Printing Production of Technical Manuals, General Requirements for

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Beneficial comments, recommendations, additions, deletions and any pertinent data which may be of use in improving this document should be addressed to: AFALC/LSG, Wright Patterson AFB, OH 45433, by using the self-addressed Standardization document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC F6135 **AREA TMSS**

MILITARY STANDARDS

DOD-STD-100 Engineering Drawing Practices

DOD-STD-863 Wiring Data and System Schematics Diagrams, Preparation of

2.1.2 Other government documents, drawings, and publications. The following other government documents, drawings, and publications form a part of this specification to the extent specified herein, unless otherwise specified. The issue shall be those in effect on the date of the solicition.

TO 1-1H-39/NAVAIR 01-1A-39	General aircraft battle damage
ANSI Y14.3-1975	Multi and sectional view drawings

(Copies of specifications, standards, drawings and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer).

2.1.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Mandatory requirements. All requirements contained herein are considered mandatory when applicable, unless specifically identified as an optional requirement.

3.2 Manual preparation. The style and format of the specific ABDAR manual shall be in accordance with the requirements in MIL-M-38784. The manual shall be as brief as appropriate; however, each required system on the aircraft shall be described sufficiently so that personnel trained in other specific weapon systems, but untrained in this specific weapon system, could apply the repair procedures described. The specific ABDAR manual shall contain information necessary for maintenance personnel to determine the extent of damage to the aircraft and instructions to make deferrment/repair decisions. A cross reference between system components, subsystems, and critical components required to support a specific mission shall be included.

3.2.1. Illustrations. Illustrations shall be simple, clear, and contain only essential elements in accordance with MIL-M-38784.

3.2.2. Diagrams. Diagrams shall be furnished where applicable, to identify aircraft structural members and applicable systems/components (e.g., electrical, egress, fuel) essential for mission success. This includes internal and external structural members, panels and skin. The diagrams shall also identify the component materials. Vulnerability reduction features (armor, foam, etc.) should be noted. All wiring data and system schematics shall be prepared in accordance with DOD-STD-863.

3.3 Arrangement. The specific ABDAR manual shall be arranged in the following order and the chapters numbered consecutively:

Front Matter	
Chapter 1	General Information
Chapter 2	System Description
Chapter 3	Materials
Chapter 4	Support Equipment/Special Tools
Chapter 5	Abbreviated Functional Checks
Chapter 6	Typical Repairs
Chapter 7	Interchangeability Data
Chapter 8 thru n	Zone I thru xxx
Chapter n+1	Engines
Chapter n+2	Electrical Wiring/Harnesses (optional)

3.4 Front matter. Front matter will comply with MIL-M-38784.

3.4.1 Foreword. The foreword shall contain a brief explanation of the specific ABDAR manual and how it is to be applied. The following statement shall be included at the end of the foreword "The damage limits and repairs established in this manual shall only be applied in time of war. Under no circumstance shall this manual be used wholly or in part for peacetime maintenance of the aircraft. The criteria contained herein allow rotary wing/fixed wing aircraft to be flown with battle damage which exceeds peace time limits. Assessment of aircraft battle damage requires extreme care and diligence and strict adherence to the instructions and criteria contained in this manual. If at any stage of damage assessment, the assessor believes that oversights or errors have been made, the assessment shall be stopped at that point and repeated from the beginning. Under no circumstances shall the requirements of this manual be waived or circumvented without the expressed approval of the commander or designated representative."

3.5 Chapter 1, General information. This chapter shall provide general information relative to the specific weapons system and as a minimum shall contain the following sections:

Section I	General Information
Section II	Mission Identification
Section III	Damage Assessment
Section IV	Aircraft Zones

3.5.1 Section I, general information. Instructions on how to use the manual shall be provided for the assessor and technician. Structure analysis methods employed in generating the damage limits shall be provided for the ABDAR engineer who may be tasked to provide additional engineering assumptions and procedures which are not specified in the manual.

3.5.2 Section II, mission identification. This section shall identify each generic type mission as designated for that particular weapon system (e.g., air-to-air, air-to-ground, tanker support). Missions will be as identified by the flight manual or as identified by the acquiring activity.

3.5.3 Section III, damage assessment. Damage limits, repair guidelines, instructions, and references to applicable publications which will enable an assessor to make the correct deferment/repair decisions must be provided. Previous data from damage levels on similar aircraft, vulnerability assessments, and system criticality information from failure modes and effects analysis on the specific aircraft shall be used as a guide in determining contents and scope of procedures to be addressed in the specific ABDAR manual. Information from the Survivability/Vulnerability Information Analysis Center, AFWL/FIES/SURVIAC, Wright-Patterson AFB, OH 45433, should be assessed for applicability. Flight operational limits shall be addressed after deferments/repairs assessments are made.

3.5.3.1 Fire and heat damage. Instructions shall be provided on how to determine the degradation of material properties caused by fire or heat. A chart shall be included to show conductivity values and hardness readings for materials used on the aircraft when exposed to damaging fire or heat. The chart shall include procedures for quick determination of the extent of damage to ferrous, nonferrous organic, and inorganic composite materials (See Figure 1). Identify those areas of the engine bays where the integrity of firewalls must be maintained to prevent excessive heat damage. Allowable damage limits shall be specified and any peculiar firewall repairs shall be included in the appropriate zone.

3.5.3.2 Weight and balance. Instructions for the assessor to determine the effects on weight and balance which significantly affects the center of gravity (CG) as a result of repairs on the aircraft, shall be provided.

3.5.3.3 Logic procedure. This section shall include an assessment logic tree applying to structure/system/components pertaining to the weapon system (See Figure 2).

3.5.4 Section IV, rotary wing/aircraft zones. This section shall provide a three-dimensional illustration identifying rotory wing/aircraft zones. A brief explanation of the selected rotary wing/aircraft zones shall be given. These zones shall be selected such that they are essentially repair-independent and physically distinct based on structural features/equipment commonality. When all the zones are put together, the results shall be a complete rotary wing/aircraft. The zones shall be identified by rotary wing/aircraft station numbers. Each zone section shall be started on a right hand page (See Figure 3 and 4 for an example of rotary wing/aircraft zones).

3.6 Chapter 2, system descriptions. This chapter shall contain a brief description (approximately one page or less) of the aircraft systems. This chapter shall also include diagrams, drawings, and schematic illustrations as necessary. Each description shall include a reference to the applicable maintenance manual.

EXAMPLE:

Section I	Airframe
Section II	Crew station
Section III	Landing gear system
Section IV	Flight control system
Section V	Power plant
Section VI	Engine starting system
Section VII	Electrical power supply
section VIII	Environmental control system
Section IX	Hydraulic and pneumatic system
Section X	Fuel system
Section XI	Flight instruments
Section XII	VHF communications
Section XIII	UHF communications
Section XIV	Interphone system
Section XV	Fire control system
Section XVI	Weapons delivery

3.7 Chapter 3, materials. Repairs should be designed using ABDAR Tool/Material Kit listings approved by the acquiring activity. Preferred material required for a specialized repair shall be specified. A consolidated listing by part number shall be included containing aircraft peculiar fasteners (types and dimensions) unique materials, sealants, parting agents, films, pads, solvents, cleaning materials, bonding materials, primers, honeycomb, and alternate materials for each. All items shall be identified using Military/Federal Specifications whenever possible. This chapter shall contain a table listing materials and suitable substitute materials not contained in ABDAR Tool/Material Kit Listing. Materials shall be grouped by Military/Federal Specification number and shall be in alpha-numeric sequence by part number and Contractor and Government Entity Code (CAGEC). A table shall be prepared in accordance with the following format:

PART NUMBER/CAGEC	NOMENCLATURE

3.8 Chapter 4, support equipment/special tools. This chapter shall contain a listing of support equipment/special tools not included in ABDAR tool/material kit listing. Special tools shall be grouped by part number/CAGEC. The number of tools shall be kept to a minimum and shall be of common type where possible.

3.9 Chapter 5, abbreviated functional checks. This chapter shall contain limited functional checks for those essential systems for which a full system operational check and support equipment is normally required. The checks shall be brief and shall contain only those items necessary to ensure mission capability.

3.10 Chapter 6, typical repairs. This chapter shall illustrate, describe, and give procedures for typical repairs that are common to two or more zones. Typical ABDAR repairs are all repairs which will provide full or partial mission capability (e.g., safing a nonessential system). Such typical repairs shall be provided for all aircraft systems, subsystems, and components, as applicable. Repair steps that affect survivability/vulnerability, hardness or Radar Cross Section (RCS) characteristics shall be identified. Typical repairs will not duplicate repairs covered in TO 1-1H-39/NAVAIR 01-1A-39.

3.11 Chapter 7, interchangeability data. Interchangeability data not already identified in the illustrated parts breakdown technical manual shall be provided, where applicable. Mission essential system components shall be identified in a consolidated list by CAGEC/Part number and nomenclature.

3.12 Chapters 8 through n. These chapters are to be numbered consecutively by aircraft zones and each chapter shall contain a description and illustration(s) of that zone. Each chapter shall include the following:

Section I	Structures assessment
Section II	System assessment

3.12.1 Safety factors. Analysis supporting ABDAR structural repairs will be based on ultimate strength. Repairs must have stiffness compatible with the original structure. However, service life, corrosion, and aesthetic considerations may be overlooked in exchange for a rapid repair procedure. Strength related calculations for unrepaired structure shall be made to obtain maximum utilization under wartime conditions and accommodate worst case contingencies. Calculations shall be made to determine the static strength of the damaged and unrepaired structure. Operation of the aircraft should be restricted to two-thirds of that strength or to restriction engendered by damage tolerance residual strength considerations, whichever is lower. Safety of flight primary structure shall provide for adequate residual strength in the presence of cracks from damage remaining in the structure. The size and types of remaining damage that are to be assumed shall be established for each primary structural member in each zone for each damage category. Structure with the assumed remaining damage should be capable of sustaining limit load or 1.2 times that maximum load associated with any operating restriction. Care will be exercised to assure that deformation that would degrade the load carrying or operating capability will not occur at the operational restriction.

3.12.2 Section I, structures assessment. This section shall contain a brief description of the structure and shall include illustrations of external and internal members in each zone.

3.12.2.1. Categories. Five separate categories shall be used to categorize all external and internal structural members as follows (see Figure 5).

3.12.2.1.1 Category I, structure. These are primary airframe structural members which are absolutely essential to maintain aircraft structural integrity. These members would include, but not be limited to: main longerons, bulkheads, spars and ribs; structural torque boxes in highly stressed areas; stress panels which serve to stabilize tension and

compression loads between primary load carrying members; any group of structural members in which a single failure may result in the immediate loss of an aircraft at the maximum expected load. These members are of primary significance of structural integrity. Any repair to these members requires retention of some minimum value of structural strength and stiffness consistent with the original design parameters and fabricated structural repairs for them are possible. These members are to receive first and foremost consideration from the assessor. For this category, limits will be listed for all three damage classes.

3.12.2.1.2 Category II, structure. This is secondary structure which serves to transfer aerodynamic and other loads to the primary structural members. This structure primarily consists of external skin panels that are not considered primary stress panels, intermediate ribs, stringers, and formers which only serve to transfer loads to primary members. Repair of these structural members does not require restoration of original design strength and stiffness within the content of a wartime environment. For this category, limits will be listed for all three damage classes.

3.12.2.1.3 Category III, structure. Nonessential structure such as doors, panels, tips, fairings, etc., which may be extensively damaged or completely missing and no repair or replacement is required to maintain the air worthiness or mission capability.

3.12.2.1.4 Category IV, structure. These are special structures which are non-structural, but essential for safe flight and aircraft performance. Repair requirements for these structure are based upon considerations other than strength; such as aerodynamics, pressurization or engine performance. For this category, limits will be listed for all three damage classes.

3.12.2.1.5 Category V, structure. These structures are not feasible to repair under battle damage repair restraints due to design and shape. These structures include all complex machined or forged parts and irregular shaped extrusion, channels or angles, etc. These structures are not feasible to replace or local manufacture without depot support. The only repairs consist of minor nick, dent and scratch removal. For this category, limits will be listed for A and C damage classes. The three groups shown below are examples of Category V structure.

(1) Group 1. Complex machined and forged components used in construction of the airframe. Components such as splice plates, attachments, and irregular shaped segments of Category I structures. Fracture and fatigue critical areas shall be identified for these components.

(2) Group 2. Attachment fittings, supports, etc., that transmit high loads onto primary structural members, especially attachment fittings that transmit high vibration loads such as engine vibration or vibration loads.

(3) Group 3. All essential mechanical systems required for airworthiness, machined or forged: gears, screw jackets, actuators, etc., and all nonrepairable bell cranks, gear casing and component mounting plates.

3.12.2.2 Damage classes. The classes referenced in the above categories are defined as follows:

3.12.2.2.1 Class A, degraded capability. Limits for damage that result in establishing operational restrictions when repair is not accomplished. The only purpose of this damage class is to permit restricted use of the aircraft when time to repair is an operationally critical factor.

3.12.2.2.2 Class B, repairable damage. Limits for damage which permit structural repair within 24 hours or less per single repair. Repairs to restore static strength and stiffness of the damaged component for Category I, II, and IV structures shall restore full operational capability of the aircraft for at lease one more flight.

3.12.2.2.3 Class C, acceptable damage. Limits of damage which do not impose any operational restrictions on the aircraft when structural repair is not performed. Minimal cleanup of damage may be required (e.g., stop drill, stress reduction, etc.)

3.12.2.3 Illustrations and tables. Each structural illustration shall consist of a coded orthographic view drawing and table depicting index number, nomenclature, material, damage class limitations, reference for repair, and remarks. The code shall include an index number and category numbers identifying each item as required. In conjunction with category number, external illustrations should use shading as indicated. Internal structural illustrations may use shading if it does not detract from or obscure details (see Figure 5). In order to simplify tables, nonessential (Category III) members need not be addressed.

3.12.2.4 Damage limitations. Damage limitations shall be given for all Category I, II, IV, and V structures. The limitations shall include the size and location for classes A, B, and C, damage up to which repairs can be made under ABDAR constraints. The maximum number of repairs and the limits for the proximity of multiple damage to a given structural component shall be included. Guidelines, instructions and illustrations for accomplishing repair shall be provided in the zone chapter. Specific weapon system typical repairs not covered by the General ABDAR TO 1-1H-39/NAVAIR 01-1A-39 shall be developed and included in Chapter 6, using applicable illustrations/tables.

3.12.2.5 Category/class. Each category/class of damage shall be clearly defined for each component of the major structural groups within the zone chapter of the manual.

3.12.3 Section II system assessment. This section shall contain the following requirements for each system assessment:

a. System serviceability criteria for the specific ABDAR manual shall be classified as fully capable (FC), degraded performance (DP), and not required (NR), as related to minimum essential systems, subsystems, and components required for a desiginated mission. Systems, subsystems, and components coded NR shall be noted in the zone chapter, but shall not be discussed in text except when a maintenance action is required to safe/disable the system to prevent futher damage or interfere with other required operational systems. This criteria will be illustrated in a table which will include system/subsystem, mission serviceability criteria and remarks (see Figure 6).

b. A brief description and damage assessment of each mission essential system, subsystem, and component in the zone, shall be included.

c. Orthographic view drawing(s) showing location of mission essential system components in the zone, shall be included.

d. Tables shall be developed to include index number, nomenclature, acceptable damage, maintenance action/repair reference, functional checks, and effects/restrictions, if applicable (See Figure 7).

e. Specialized repair procedures shall be developed for aircraft systems, subsystems/components that are unique to that zone and included in the zone chapter. Instructions outlining recommended procedures for locating and disabling/capping off damaged system lines not required, shall be included in the zone chapter. Specialized repairs shall be developed for fuel tank areas, flight controls, radomes, transparencies, as appropriate. Changes to vulnerability reduction features such as armor, foam, electromagnetic pulse, should be addressed if repair or deactivation is necessary. Repair procedures should be provided for line replaceable units to restore to a serviceable condition if applicable. These repairs will be addressed in each applicable zone.

3.12.3.1 Avionic/electrical system assessment. This system assessment shall contain the requirements of 3.12.3. If wire/harness identification for the specific aircraft vary from that of general ABDAR T.O. 1-1H-39/NAVAIR 01-1A-39 and MIL-W-5088, clarification shall be provided. Warnings concerning maxium power/voltage usable for systems checks shall be specified, if applicable, to preclude inadvertent system operations (e.g., munitions).

3.12.3.2 Mechanical system assessment. This system assessment shall contain the requirements of 3.12.3. Schematics or figures shall be developed to define pertinent limitations/dimensions between bellcranks, actuators and pivot points. Rotary wing aircraft components such as main and intermediate tail gear boxes, also main and tail rotory blades shall be included. Pressure/volumes/travel limits shall be specified, if applicable.

3.12.3.2.1 Cable system. Identify locations where cables are used and describe any peculiar repairs. Instructions outlining recommended procedures for disabling secondary flight control systems which are desirable, but not essential shall be included. Cable systems should include cable tension, travel limits, and special tools.

3.12.3.3 Pneudraulics system assessment. This system assessment shall contain the requirements of 3.12.3. Pressures/volumes/travel limits shall be specified, if applicable. Pneudraulic system lines shall be classified by temperature, if appropriate, and pressure to correspond with pressure ranges specified in appropriate aircraft pneudraulic technical orders/manuals. Allowable leak rates for each system shall be specified.

3.12.3.4 Fuel system assessment. This system assessment shall contain the requirements of 3.12.3. Illustrations shall include isolation points, access covers, single point receptables, typical fuel tank arrangements, and fuel tank components and plumbing locations. Distinction shall be made between fuel leaks that constitute a flight safety hazard and those that do not. Alternate settings or modifications to fuel control panel which will permit isolations of various tanks shall be included. Weight and balance implications due to these actions shall be addressed. Any specialized fuel tank sealing instructions shall be provided.

3.12.3.5 Armament system assessment. This system assessment shall contain the requirements of 3.12.3 The minimum/maximum power and voltage requirements needed for operation of each armament system shall be included. Warnings concerning maximum power/voltage usable for system checks shall be specified to preclude inadverent system operations (e.g., munitions). Quick repair methods such as "hot-wiring" around inoperative black boxes in order to operate the armament shall be included. Armament limitations shall be specified for operations of system regardless of gear/wing positions.

3.12.3.6 Landing gear system assessment. This assessment catagory shall contain the requirements of 3.12.3. Pressures/volumes/travel limits shall be specified, if applicable.

3.12.3.7 Egress system assessment. This system assessment shall contain the requirements of 3.12.3. Repair of damaged egress systems shall be restricted to direct replacement of components or minor acceptable repair to hoses, tubing, cables, wiring and crew ejection systems. Acceptable repair limits such as size, location of damage, and minimum distance between repairs shall be specified. Repair procedures shall be developed for each seat type rather than for aircraft type.

3.13 Chapter (n+1) engines. This section shall contain a brief description and illustration showing location of mission essential engine system/components within this chapter.

3.13.1 Illustrations. Each illustration shall consist of a orthographic view drawing of the engine system components within that zone.

3.13.2 Tables. There shall be a minimum of two tables. Table 1 shall include system/subsystem, mission serviceability criteria, and remarks (See Figure 6). Table 2 shall include index number, nomenclature, acceptable damage, maintenance action/repair reference, functional checks, and effects/restrictions (See Figure 7). Pressure/volumes/travel limits shall be specified if applicable. Minimum required functional capabilities will be described for appropriate components. Allowable limited repairs will be included. Any repairs to propellers of prop-driven aircraft shall be included. A table shall be included to outline the engine minimum power requirements and functional checks. Full and partial aircraft operational capabilities shall be defined per mission requirements.

3.14 Chapter (n+2) peculiar and special mission equipment wiring. A list of essential wiring by zone, harness number, connector number, pin number, wire tie number and location, ground point and location, system and aircraft effectivity by mission, shall be provided in this chapter with specialized repair, if applicable. The electrical wiring/harness data may be organized by harness number, location, or other method as required (See Figure 8).

4. QUALITY ASSURANCE.

4.1 Quality assurance provisions. Quality assurance provisions shall be in accordance with MIL-M-38784 and MIL-P-38790.

5. PACKAGING.

5.1 Packaging. Packaging, packing, and marking for shipment shall be in accordance with MIL-M-38784 and MIL-P-38790.

6. NOTES.

6.1 Intended use. The manuals prepared in accordance with this specification are intended to provide instructions and guidance for personnel in battle damage assessment and repair of aircraft.

6.2 Ordering data. Procurement document should specify title, number, and date of this specification.

6.3 Definitions. The following unique terms and acronyms are used throughout this military specification:

6.3.1 Aircraft battle damage assessment and repair (ABDAR). Maintenance actions taken in wartime to quickly return battle damaged aircraft to some degree of mission capability, through effective use of maintenance resources to assess, defer repair, repair, or cannibalize those aircraft.

6.3.2 Assessor. Personnel from aircraft maintenance career fields who have been trained to evaluate the extent of battle damage, determine repair, deferrability, estimate repair times, specify repair to be accomplished, and estimate the resultant capability of the aircraft.

6.3.3 Coded. Shading and cross hatching of structural drawings indicating category of structure as per example shown (See Figure 5.)

6.3.4 Degradation. The reduction in systems/subsystems/components performance capability that are required for a designated mission or system operation.

6.3.5 Essential. Those systems/subsystems/components that are required for a designated mission or system operation.

6.3.6 Flight safety hazard. An existing or potential condition that can result in a flight mishap.

6.3.7 Full capability (FC). Those systems/subsystems/components that are required, as originally designed, for full mission operation.

6.3.8 Not required (NR). Those systems/subsystems/components that are not required for a designated mission.

6.3.9 Degraded performance (DP). Identifies those systems/subsystems/components that can basically fulfill the requirements of a designated mission while operating at less than their normal level.

6.3.10 Interchangeability. Defined in this specification as above, the scope of classic interchangeability. The intent/purpose of this specification is to allow fully innovative fixes/repairs to the aircraft. This includes minor modifications that can be made to achieve interchangeability.

6.3.11 Leak Rate. The speed or rate of flow of accidental escape of fluid or gas from a system which is caused by damage processes. The leak rate is influenced by such factors as the hole size, internal/external pressures, fluid level.

6.3.12 Orthographic view drawing. As outlined in ANSI Y14.3-1975.

6.3.13 Survivability/vulnerability information analysis center (SURVIAC). The central repository and data dissemination center for combat, combat related, operational, and test data which can be utilized in aircraft, ship, and ground vehicle survivability, vulnerability, maintenance, logistics, and military operations studies.

6.3.14 Load limit. The design load for unrestricted operations, and/or the equivalent of a designated condition for the load envelope cases consistent with any aircraft operational restrictions.

6.4 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

MATERIAL AND CONDITION	ULTIMATE TENSILE STRENGTH (UTS)	REDUCED STRENGTH (80%)	HARDNESS	CONDUCTIVITY (ALUM ONLY)	MIN. TEMP TO AFFECT UTS
	(KSI)	(KSI)	(ROCKWELL)	(% IACS)(1)	(°F)
4130	100	80	86-93Rb	-	1250
	120	96	93-100Rb	-	1050
	140	112	21-28Rc	-	925
	160	128	27-35Rc	-	850
4340	120	96	91-101Rb	-	1200
	140	112	21-28Rc	-	1100
	160	128	27-35Rc	-	1050
D6ac	180	144	32-37Rc	-	1100
	200	160	35-39Rc	-	1050
	220	176	39-44Rc	-	1000
	260	208	44-49Rc	-	550
HY-180 (10 Nickel)	180	144	32-40Rc	-	950
300M	270	216	45-52Rc	-	550
301 - A	110	88	91-98Rb	-	1850
1/4H	125	100	95-102Rb	-	200
1/2H	150	120	24-30Rc	-	200
3/4H	175	140	30-5-36Rc	-	200
H	185	148	33-40Rc	-	200

NOTES:

(1) On aluminum alloys, conductivity measurements should be compared to known undamaged areas to identify the general area of heat damage. Hardness is a more reliable measurement of property degradation.

(2) At temperature exposures slightly above 385°F, strength and hardness may actually increase but corrosion resistance will deteriorate. For short-term use, material in this condition may be used without repair.

(3) Approximate hardness only. Significantly higher hardness may indicate embrittlement.

Figure 1. Example of degradation of material properties.

ASSESSMENT LOGIC & REPAIR DISPOSITION

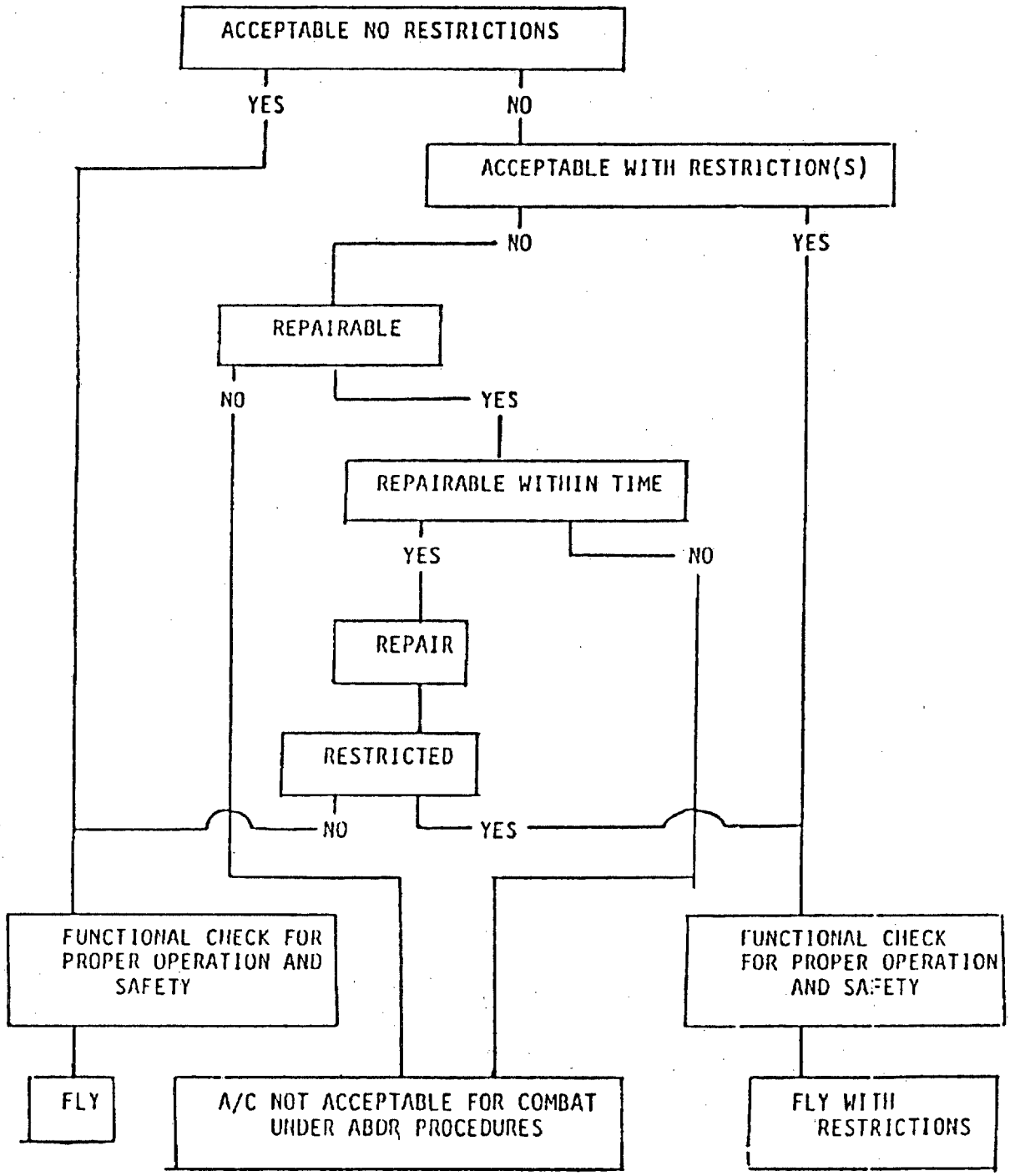


Figure 2. Repair assessment logic.

ZONE	TITLE
1.	COCKPIT
2.	CABIN
3.	MAIN ROTOR PYLON
4.	REAR FUSELAGE
5.	TAIL CONE
6.	TAIL ROTOR PYLON
7.	STABILATOR

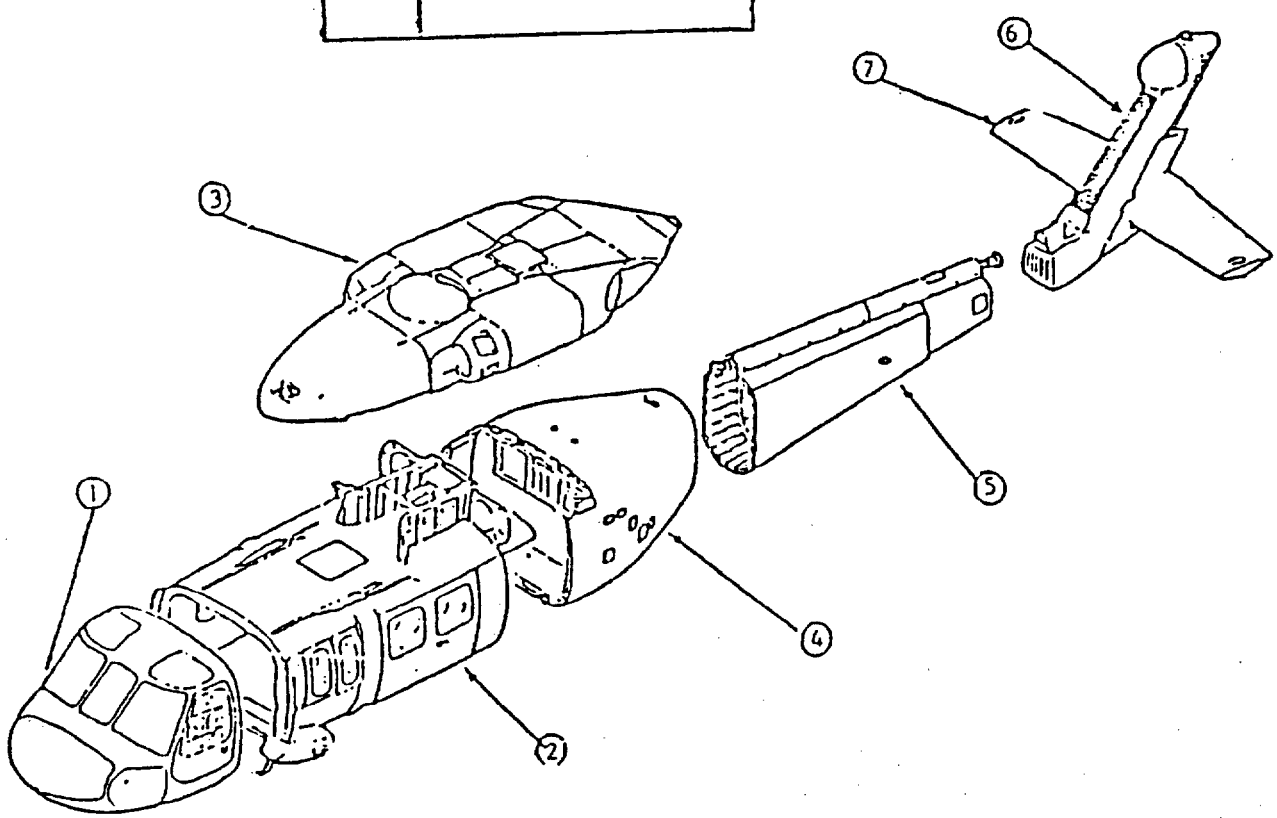


Figure 3. Example of rotary wing aircraft zone breakout.

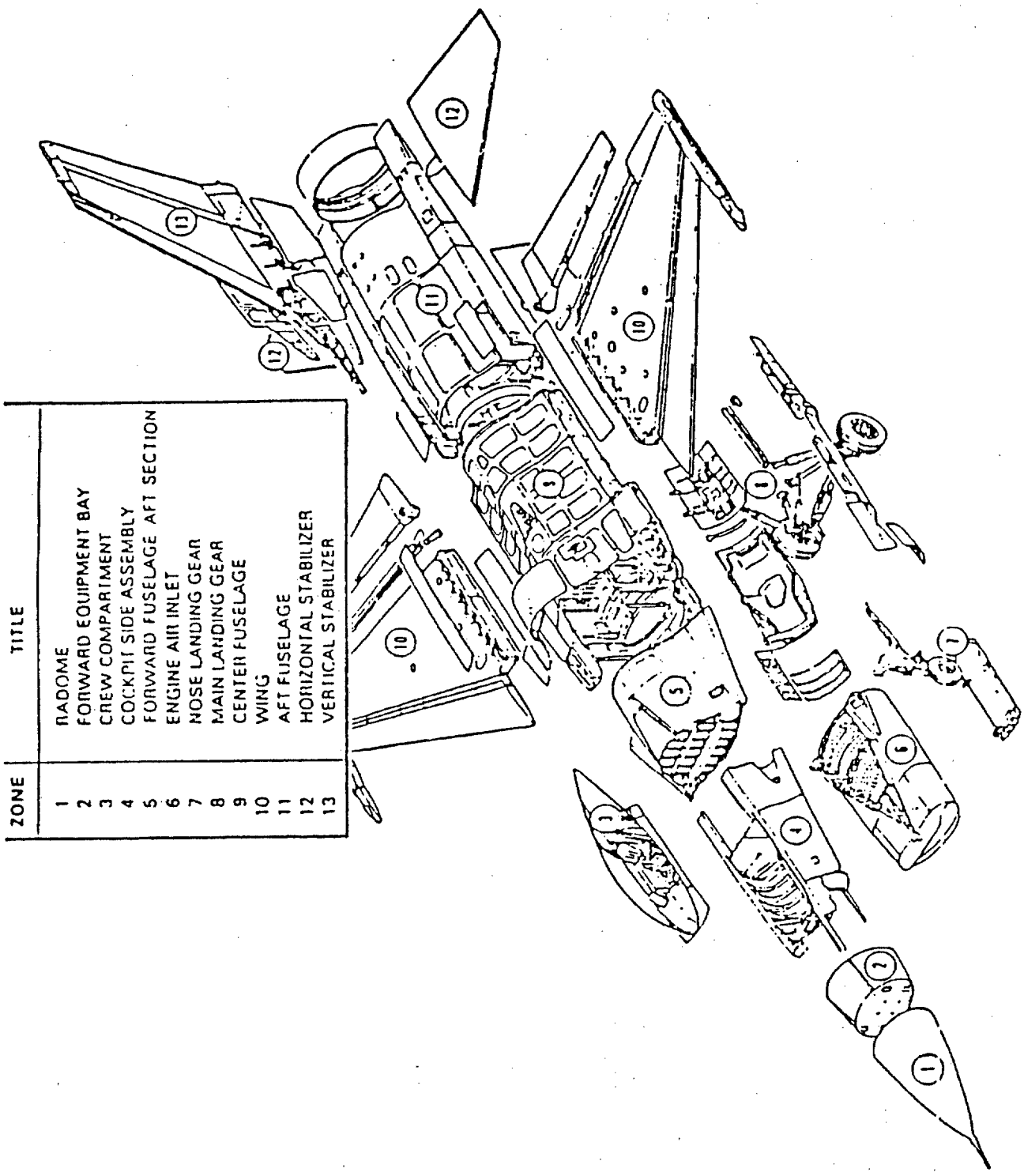
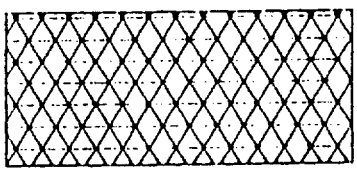


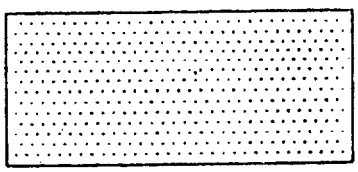
Figure 4. Example of fixed wing aircraft zone breakout.

CATEGORY CODES



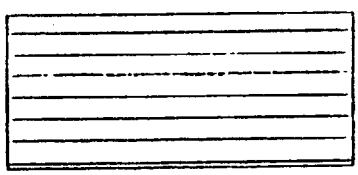
CATEGORY 1

FULL STRENGTH
NET 3



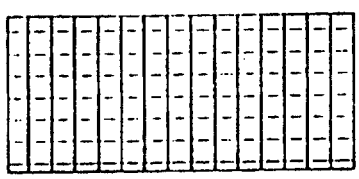
CATEGORY 2

PARTIAL STRENGTH
DOTS



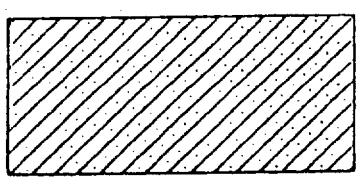
CATEGORY 3

NO REPAIR REQUIRED
LINF



CATEGORY 4

SPECIAL REQUIREMENTS
NET



CATEGORY 5

REPAIRS NOT ALLOWED
SACNCR

NOTE: CROSSHATCH PATTERNS CAN BE ROTATED.

Figure 5. Examples of category codes.

MISSION
SERVICEABILITY CRITERIA

SYSTEM/SUBSYSTEM	FERRY	LOGISTICS	REMARKS	PAGE
Logistics Rail System	NR	DP	Refer to FORWARD LOADING SYSTEM DAMAGE ASSESSMENT	8-76
Toes	NR	FC	Refer to FORWARD LOADING SYSTEM DAMAGE ASSESSMENT	8-77
LANDING GEAR SYSTEM				
NLG Control System				
Extension/Retraction System	DP	DP	Refer to LANDING GEAR DAMAGE ASSESSMENT	8-77
Emergency Electrical Override System	NR	NR		
Kneeling System	NR	DP	Refer to LANDING GEAR DAMAGE ASSESSMENT	8-78
NLG Steering System	DP	DP	Refer to LANDING GEAR DAMAGE ASSESSMENT	8-72
NLG Fiber Optic Scope	FC	FC	Refer to LANDING GEAR DAMAGE ASSESSMENT	8-78
FLIGHT CONTROL SYSTEM				
Aileron System	FC	FC	Refer to FLIGHT CONTROLS DAMAGE ASSESSMENT	8-79
Elevator System	FC	FC	Refer to FLIGHT CONTROLS DAMAGE ASSESSMENT	8-79

Figure 6. Mission Serviceability Criteria.

INDEX	NOMENCLATURE	ACCEPTABLE DAMAGE	MAINTENANCE ACTION/ REPAIR REFERENCE	FUNCTIONAL CHECK	EFFECTS RESTRICTIONS

Figure 7. System assessment.

Table 20-86. Electrical Harness H160W355

MISSION	FROM H160W	THRU ZONE	THRU CONNECTOR	THRU PIN	VIA WIRE	VIA GA	THRU CONNECTOR	THRU PIN	THRU ZONE	TO H160W	CRITERIA		SYSTEM
			H160W355-13 Eff:										
A-G	555	4	9153P309	11	019	22	9471P403	17	4	9471A1	FC		94
	153	5	3238P501A	5	022	26	9471P402	41	4	9471A1	FC		94
	153	5	3238P501A	6	023	26	9471P402	42	4	9471A1	FC		94
	153	5	3238P501A	17	027	22	9471P403	15	4	9471A1	FC		94
	153	5	3238P501A	18	028	22	9471P403	6	4	9471A1	FC		94
	555	4	9153P309	18	201	26-1	9471P403	26	4	9471A1	FC		94
	555	4	9153P309	19	201	26-2	9471P403	11	4	9471A1	FC		94
	355	4	9153P309	8	201	99SH	9471P403	8	4	355	FC		94
	555	4	9153P309	3	203	26-1	9483P552A	1	4	146	DP	NOTE 3(A)	94
	555	4	9153P309	4	203	26-2	9483P552A	2	4	146	DP	NOTE 3(A)	94
	355	4	9153P309	8	203	99SH	9483P552A	8	4	355	DP	NOTE 3(A)	94
	555	4	9153P309	14	204	26-1	9483P551A	1	4	146	DP	NOTE 3(B)	94
	555	4	9153P309	15	204	26-2	9483P551A	2	4	146	DP	NOTE 3(B)	94
	355	4	9153P309	8	204	99SH	9483P551A	8	4	355	DP	NOTE 3(B)	94
	9471A1	4	9471P403	40	207	26-1	9483P552A	5	4	146	DP	NOTE 3(A)	94
	9471A1	4	9471P403	41	207	26-2	9483P552A	6	4	146	DP	NOTE 3(A)	94
	355	4	9471P403	8	207	99SH	9483P552A	8	4	355	DP	NOTE 3(A)	94
	9471A1	4	9471P402	30	208	26-1	9483P551A	5	4	146	DP	NOTE 3(B)	94
	9471A1	4	9471P402	49	208	26-2	9483P551A	6	4	146	DP	NOTE 3(B)	94
	355	4	9471P402	8	208	99SH	9483P551A	8	4	355	DP	NOTE 3(B)	94
	555	4	9153P309	9	209	26-1	9483P551A	7	4	146	DP	NOTE 3(B)	94
	555	4	9153P309	10	209	26-2	9483P551A	8	4	146	DP	NOTE 3(B)	94
	355	4	9153P309	8	209	99SH	9483P551A	8	4	355	DP	NOTE 3(B)	94
A-A	153	5	3238P501A	10	210	26-1	9471P402	27	4	9471A1	FC		94
A-G	153	5	3238P501A	10	210	26-1	9471P402	27	4	9471A1	DP	NOTE 5	94
A-A	153	5	3238P501A	11	210	26-2	9471P402	28	4	9471A1	FC		94
A-G	153	5	3238P501A	11	210	26-2	9471P402	28	4	9471A1	DP	NOTE 5	94
	555	4	9153P309	7	215	26-1	9483P551A	3	4	146	DP	NOTE 3(B)	94
	555	4	9153P309	8	215	26-2	9483P551A	4	4	146	DP	NOTE 3(B)	94
	355	4	9153P309	8	215	99SH	9483P551A	8	4	355	DP	NOTE 3(B)	94
A-G	153	5	3238P501A	9	300	26-1	9471P402	24	4	9471A1	DP	NOTE 5	94
A-G	153	5	3238P501A	8	300	26-2	9471P402	25	4	9471A1	DP	NOTE 5	94
A-G	153	5	3238P501A	7	300	26-3	9471P402	11	4	9471A1	DP	NOTE 5	94

Figure 8. Examples of electrical harness with pin location.

INDEX

Custodian:
Air Force - 16
Army - TM
Navy - AS

Review Activities:
Air Force - 11, 99
Army - AV
Navy-NATSF - 122

Preparing Activity:
Air Force - 16

(Project TMSS-0278)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ VENDOR ☐ USER ☐ MANUFACTURER ☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

DD FORM 82 MAR 1426

PREVIOUS EDITION IS OBSOLETE.