
TECHNICAL MANUAL

**PAINTING AND MARKING
OF ARMY AIRCRAFT**

This publication supersedes TB 746-93-2 10 August 1978, including all changes

HEADQUARTERS DEPARTMENT OF THE ARMY

12 JUNE 1986

TECHNICAL MANUAL

NO. 55-1600-345-23

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 12 June 1986

PAINTING AND MARKING OF ARMY AIRCRAFT

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: Commander, US Army Aviation and Missile Command, ATTN: AMSAM-MMC-LS-LP, Redstone Arsenal, AL 35898-5230. You may also submit your recommended changes by E-mail directly to ls-lp@redstone.army or by fax 256-842-6546/DSN 788-6546. A reply will be furnished directly to you. Instructions for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028.

TABLE OF CONTENTS

	<u>Paragraph</u>	<u>Page</u>
CHAPTER 1. GENERAL		
Section I. Purpose And Scope		
Purpose	1-1	1-1
Scope	1-2	1-1
Restrictions	1-3	1-1
Deviations	1-4	1-1
Section II. Responsibilities		
Organizational Activities	1-5	1-1
Depot Activities	1-6	1-2
International Standardization	1-7	1-2
Section III. Authorized Paint Schemes		
General	1-8	1-2
Tactical Aircraft Painting	1-9	1-2
Exceptions to Tactical Aircraft Painting	1-10	1-3
CHAPTER 2. SURFACE PREPARATION		
Section I. Cleaning		
General	2-1	2-1
Section II. Stripping		
General	2-2	2-1
Methods	2-3	2-2
Surfaces not to be Stripped	2-4	2-2
Protection of Surfaces not to be Stripped	2-5	2-3
General Preparations	2-6	2-3

Change 1 superseded TM 55-6600-200-20

TABLE OF CONTENTS - Continued

		<u>Paragraph</u>	<u>Page</u>
	Application of MIL-R-81294 & MIL-R-25134 Paint Removers.	2-7	2-4
	Stripping in Confined Locations.....	2-8	2-5
	Mechanical Removal from Metals	2-9	2-5
	Special Conditions.....	2-10	2-7
Section III.	Metal Conditioning		
	Metal Treatment	2-11	2-7
	Chemical Coatings (Conversion Coatings)	2-12	2-7
	Pretreatment and Sealing of Bare Metal Surfaces.....	2-13	2-8
CHAPTER 3	PAINTING - GENERAL		
Section I.	Painting Techniques		
	Storage of Painting Materials	3-1	3-1
	Safety and Health Aspects of Painting	3-2	3-2
	Atmospheric Conditions for Painting	3-3	3-3
	Surface Condition.....	3-4	3-4
	Mating Surfaces	3-5	3-4.1
	Masking	3-6	3-5
	Mixing	3-7	3-6
	Thinning.....	3-8	3-7
	Application Equipment.....	3-9	3-7
	Painting Difficulties and Remedies.....	3-11	3-11
	Film Thickness (Aircraft Surfaces)	3-12	3-12
Section II.	Primers		
	General.....	3-13	3-14
	Primers	3-14	3-15
Section III.	Finish Painting: General		
	MIL-C-46168	3-15	3-16
	MIL-C-83286, Gloss Urethane	3-16	3-16
	Inspection	3-17	3-17
	MIL-C-53039	3-18	3-17
	Touch Up of Conductive Coating on UH-60 Cockpit Door	3-19	3-29
CHAPTER 4	TACTICAL PAINT SCHEME		
Section I.	Helicopters		
	General.....	4-1	4-1
	External Areas not to be Painted.....	4-2	4-1
	Preparation of MIL-C-46168.....	4-3	4-2
	Procedures for Application of MIL-C-46168 Paint to Bare Metal Substrates.....	4-4	4-3

TABLE OF CONTENTS — Continued

	<u>Paragraph</u>	<u>Page</u>
Section II. Fixed Wing Aircraft		
General	4-5	4-3
Materials	4-6	4-3
Procedure	4-7	4-3
Section III. Markings		
General	4-8	4-4
Section IV. Propeller Assemblies and Blades		
General	4-9	4-4
Section V. Aircraft Components		
General	4-10	4-4
Section VI. Application to Previously Painted Surfaces		
General	4-11	4-4
Touch Up and Repair with MIL-C-46168	4-12	4-4
Touch Up and Repair with MIL-L-46159	4-13	4-5
Preparation of MIL-L-46159	4-14	4-5
Procedures for Application Over Properly Prepared Surfaces . . .	4-15	4-5

CHAPTER 5. NON-TACTICAL PAINT SCHEMES

Section I. General		
Scope	5-1	5-1
Authority	5-2	5-1
Funds for Non-Tactical Paint Schemes	5-3	5-1
When to Paint Non-Tactical Paint Schemes	5-4	5-1
Paint Identification	5-5	5-2
Shade Numbers	5-6	5-2
Finishing System	5-7	5-2
Section II. Specific		
Rotor Blades and Propeller Assemblies	5-8	5-2
Markings	5-9	5-2
Training Aircraft	5-10	5-2
Aircraft in Congested Areas.. . . .	5-11	5-3
Aircraft for Arctic and Desert.. . . .	5-12	5-3
Test Support Aircraft	5-13	5-3
Medical Research & Geodetic Aircraft	5-14	5-3
Greenland Icecap Aircraft	5-15	5-3
Medical Service Aircraft	5-16	5-3
Military Assistance Program Aircraft	5-17	5-3
Staff Transport (VIP) Aircraft	5-18	5-3
Research & Development Aircraft	5-19	5-4

TABLE OF CONTENTS — Continued

	<u>Paragraph</u>	<u>Page</u>
CHAPTER 6. FINISHES FOR SPECIFIC APPLICATIONS		
Section I. General		
Aircraft Finishes	6-1	6-1
Surface Preparation	6-2	6-1
Application	6-3	6-1
Colors	6-4	6-1
Decals	6-5	6-1
Section II. Propeller Assemblies and Rotor Blades		
General	6-6	6-2
Propellers	6-7	6-3
Main Rotor Blades	6-8	6-4
Tail Rotor Blades	6-9	6-4
Section III. Aircraft Exterior Landing Gear & Wheels		
Landing Gear	6-10	6-5
Wheels	6-11	6-5
Section IV. Walkway Coatings		
Walkways	6-12	6-5
Anti-Glare Coatings	6-13	6-12
Battery Compartments	6-14	6-12
High Temp Areas	6-15	6-13
Rubber	6-16	6-13
Antennas and Radomes.	6-17	6-13
Section V. Interior Painting		
General	6-18	6-14.1
MIL-C-46168 Aircraft Black #37038 Polyurethane Paint, Crewstation Surfaces	6-19	6-14.1
MIL-C-22750 Epoxy Paint, Interior Surfaces other than Crewstation	6-20	6-15
MIL-C-46168 Interior Aircraft Gray #36231	6-21	6-15
Procedures	6-22	6-15
Application	6-23	6-16
Application with Spray Equipment	6-24	6-16
Application with Brush or Rollers	6-25	6-17
Typical Aircraft Interior Areas To Be Painted	6-26	6-17
Typical Aircraft Interior Areas Not To Be Painted	6-27	6-17
Decals, Placards, Markings, Labeling in Cockpit Area (When Used)	6-28	6-17
Emergency Exit Markings	6-29	6-19

TABLE OF CONTENTS — Continued

	<u>Paragraph</u>	<u>Page</u>
Section VI. Protective Coatings		
Coatings for Fiber Laminate Materials	6-30	6-20
Protective Coatings for Rain Erosion	6-31	6-20
Preparation of Surface	6-32	6-21
Application of Primer and Coating	6-33	6-21
Patching or Retouching Damaged Coating	6-34	6-22
Removal of Coatings	6-35	6-22
Removal of Paint from Radomes.	6-36	6-23
Protective Coating for the Canopy Egress System	6-37	6-23
 CHAPTER 7. LETTERING AND MARKING		
Section I. Markings		
General	7-1	7-1
Section II. insignia: General		
Lettering and Marking Materials.. . . .	7-2	7-1
General	7-3	7-1
Colors	7-4	7-2
Applications	7-5	7-2
Fixed Wing Aircraft	7-6	7-2
Helicopters	7-7	7-3
Section III. Medical Insignia		
Aircraft	7-8	7-3
Aircraft First Aid Kits and Litters	7-9	7-3
Section IV. Command and Organizational Insignia and Name		
General	7-10	7-4
Color, Location, and Size...	7-11	7-4
Section V. Identification Lettering		
General	7-12	7-6
Fixed Wing Non-Tactical	7-13	7-6
Helicopters, Non-Tactical.. . . .	7-14	7-6
Section VI. Warning Stripes and Signs		
Propeller and Rotor Blade Warnings, Non-Tactical Aircraft	7-15	7-7
DELETED.	7-16	7-7
Noise Hazard Labels and Stencils	7-17	7-7
Section VII. Radio Call Numbers and Prefixes		
Radio Call Numbers...	7-18	7-9

TABLE OF CONTENTS – Continued

	<u>Paragraph</u>	<u>P a g e</u>
Section VIII. Serial Number and Fuel Specification		
Fuselage	7-19	7-10
Markings	7-20	7-10
Section IX. Markings for Emergency Entry or Exit		
General	7-21	7-11
Secondary Openings	7-22	7-11
Relocation	7-23	7-11
Escape Panels -Internal Markings	7-24	7-11
Escape Panels -External Markings (Non-Tactical Aircraft)	7-25	7-12
Section X. Miscellaneous Markings		
General	7-26	7-12
Bilingual Markings	7-27	7-12
Markings for Tank Areas and Internal Station Markings	7-28	7-12
Oxygen Outlets	7-29	7-13
Lift Points	7-30	7-13
Strut Numbers	7-31	7-13
Electrical Connections	7-32	7-13
Walkways	7-33	7-13
NATO Symbol Markings of Aircraft Servicing Points	7-34	7-13
Aircraft Plates for General Officers	7-35	7-14
Jettisonable Components	7-36	7-14
Fluid Line Identification	7-37	7-14
Storage Batteries	7-38	7-14
American Flag Decals	7-39	7-15
Description of Exterior Paint System	7-40	7-15
Section XI. Marking of Instruments		
General	7-41	7-16
Method of Marking	7-42	7-18
Application of Marking	7-43	7-18
Marking for Reciprocating Engine Aircraft..	7-44	7-20
Marking for Jet Engine Aircraft..	7-45	7-23
Marking for Helicopters	7-46	7-24
Marking for All Aircraft	7-47	7-25

TABLE OF CONTENTS — Continued

	<u>Paragraph</u>	<u>Page</u>
CHAPTER 8. MISCELLANEOUS TABLES AND ILLUSTRATIONS . .		8-1
CHAPTER 9. HELICOPTER ILLUSTRATIONS		9-1
Section I. AH-1 Illustrations		9-1
Section II. AH-64 Illustrations		9-13
Section III. CH-47 Illustrations		9-33
Section IV. CH-54 Illustrations		9-85
Section V. OH-6 Illustrations		9-101
Section VI. OH-58 Illustrations		9-109
Section VII. TH-55 Illustrations		9-127
Section VIII. UH-1 Illustrations		9-128
Section IX. UH-60 Illustrations		9-178
CHAPTER 10. FIXED WING AIRCRAFT ILLUSTRATIONS		
Section I. General		10-1
Section II. C-12 and RC-12 Illustrations		10-2
Section III. DELETED		
Section IV. T-41 Illustrations		10-56
Section V. T-42 Illustrations		10-64
Section VI. DELETED.		
Section VII. DELETED.		
Section VIII. U-21 and RU-21 Illustrations		10-89

LIST OF TABLES

	<u>Page</u>
Table 3-1	Spray Coating Troubles, Possible Causes and Remedies 3-18
Table 6-1	Typical Aircraft interior Areas to be Painted (5 sheets) 6-6
Table 6-2	Typical Aircraft Interior Areas Not to be Painted (6 sheets) 6-9
Table 8-1	Technical Manuals, Technical Bulletins, and ARs 8-1
Table 8-2	Standards 8-1
Table 8-3	Consumable Items List 8-2
Table 8-4	State Abbreviations 8-8
Table 8-5	Definitions of Common Paint Terms 8-9
Table 8-6	Ventilation and Respirator Requirements for Application of Paints 8-16
Table 8-7	Current Safety Guidelines for Application of MIL-C-46168B Paint 8-17
Table 8-8	Recommended Respiratory Protection Guidelines for Spray Finishing Operations 8-18
Table 8-9	Occupational Health Protection Requirements for Paint Spray Workers Using MIL-E-52798A Alkyd Enamel and MIL-C-46168B Polyurethane Coating 8-19

LIST OF ILLUSTRATIONS

<u>Figure</u>	<u>Title</u>	<u>Page</u>
1-1	MIL-C-46168 Identifier Symbol	1-3
3-1	Right and Wrong Methods of Spraying	3-9
3-2	Cross-Coating	3-10
3-3	Fifty Percent Overlap	3-10
3-4	Setting Spray Pattern	3-12
3-5	Faulty Patterns and Suggested Corrections	3-13
3-6	Excessive Spray Fog	3-24
3-7	Paint Leaks from Spray Gun	3-24
3-8	Gun Sputters Constantly	3-24
3-9	Orange Peel	3-25
3-10	Sandpaper Finish	3-25
3-11	Wrinkling	3-25
3-12	Crazing	3-26
3-13	Checking	3-26
3-14	Blistering	3-26
3-15	Fish-Eyes and Poor Wetting, Crawling, Poor Flowout	3-27
3-16	Lifting	3-27
3-17	Pitting or Cupping	3-27
7-1	Command and Organizational Insignia and Name	7-5
7-2	Size and Wording of Stencil	7-8
7-3	Sample Markings	7-17
7-4	Method of Marking	7-18
7-5	Mixture Control Quadrant	7-19
7-6	Typical Manifold Pressure Gage, Tachometer, Cylinder Head Temperature Gage, and Air Temperature Gage Markings	7-21
7-7	Typical Coolant Temperature Gage and Torquemeter Markings	7-22
7-8	Typical Tachometer and Engine Exhaust Temperature Gage Markings	7-23
7-9	Typical Dual Tachometer Markings	7-24
7-10	Typical Oil Pressure Gage, Oil Temperature Gage, and Airspeed Indicator Markings	7-26
7-11	Typical Accelerometer, Hydraulic Pressure Gage, Deicer Gage, and Fuel Pressure Gage Markings	7-27
7-12	Fuel Nozzle Grounding Dimensions	7-29
8-1	National Star Insignia	8-20
8-2	Wing and Fuselage Marking (Typical)	8-22
8-3	NATO Marking Symbols	8-23
8-4	Sidedraft Paint Booths	8-27
8-5	Downdraft Paint Booths	8-28
8-6	Typical Compartment Markings	8-29
8-7	First Aid Kit	8-29
8-8	Optimum High Visibility Paint Scheme, Two Blades, Exposed Hub	8-30
8-9	Optimum High Visibility Paint Scheme, Two Blades, Helicopter Tail Rotor Only ...	8-31
8-10	Optimum High Visibility Paint Scheme, Two Blades with Spinner	8-32
8-11	Optimum High Visibility Paint Scheme, Three Blades, Exposed Hub	8-33
8-12	Optimum High Visibility Paint Scheme, Three Blades, With Spinner	8-34
8-13	Optimum High Visibility Paint Scheme, Four Blades, Exposed Hub	8-35
8-14	Optimum High Visibility Paint Scheme, Four Blades, Helicopter Tail Rotor only	8-36
9-1	Tactical Paint Scheme, AH-1	9-1
9-2	Exterior Markings, AH-1	9-2

LIST OF ILLUSTRATIONS-Continued

<u>Figure</u>	<u>Title</u>	<u>Page</u>
9-3	Station Diagram, AH-1	9-12
9-4	Tactical Paint Schemes, AH-64	9-13
9-5	Exterior and Interior Markings, AH-64	9-14
9-6	Station Diagram AH-64	9-32
9-7	Tactical Paint Scheme, CH-47	9-33
9-8	Non-Tactical Arctic/Desert Paint Scheme, CH-47	9-34
9-9	Interior Markings CH-47	9-35
9-10	Exterior Markings, CH-47	9-55
9-11	Station Diagram, CH-47	9-84
9-12	Tactical Paint Scheme, CH-54	9-85
9-13	Non-Tactical Arctic/Desert Paint Scheme, CH-54	9-86
9-14	Exterior and Interior Markings, CH-54	9-87
9-15	Interior Markings, CH-54 Universal Pod	9-94
9-16	Exterior Markings, CH-54 Universal Pod	9-97
9-17	Tactical Paint Scheme, OH-6	9-101
9-18	Non-Tactical Arctic/Desert Paint Scheme, OH-6	9-102
9-19	Exterior Markings, OH-6	9-103
9-20	Station Diagram. OH-6	9-108
9-21	Tactical Paint Scheme, OH-58	9-109
9-22	Non-Tactical Arctic/Desert Paint Scheme, OH-58	9-110
9-23	Interior and Exterior Markings, OH-58	9-111
9-24	Interior Requirements to be Stenciled on the Back of Pilot's and Co-Pilot's Seat Backs, OH-58A/C	9-124
9-25	Station Diagram, OH-58	9-126
9-26	High Visibility Markings TH-55	9-127
9-27	Tactical Paint Scheme, UH-1C/M	9-128
9-28	Non-Tactical Arctic/Desert Paint Scheme, UH-1C/M	9-129
9-29	Interior Markings, UH-1C and UH-1M	9-130
9-30	Exterior Markings, UH-1C and UH-1M	9-134
9-31	Station Diagram, UH-1C and UH-1M	9-152
9-32	Tactical Paint Scheme, UH-1 H/V	9-153
9-33	Non-Tactical Arctic/Desert Paint Scheme, UH-1H/V	9-154
9-34	Staff Transport UH-1D/H	9-155
9-35	Army Medical Service (Ambulance) UH-1D/H	9-156
9-36	Interior Markings, UH-1D and UH-1H	9-157
9-37	Exterior Markings, UH-1D and UH-1H	9-161
9-38	Station Diagram, UH-1D and UH-1H	9-177
9-39	Tactical Paint Scheme, UH-60	9-178
9-40	Non-Tactical Arctic/Desert Paint Scheme, UH-60	9-179
9-41	Exterior and Interior Markings, UH-60	9-180
9-42	Army Medical Service (Ambulance), UH-60	9-181
9-43	Station Locations; UH-60	9-201
10-1	Exterior Markings, C-12	10-2
10-2	Station Diagram, C-12	10-24
10-3	DELETED.	
10-4	DELETED.	
10-5	DELETED.	

LIST OF ILLUSTRATIONS – Continued

<u>Figure</u>	<u>Title</u>	<u>Page</u>
10-6	DELETED.....	
10-7	DELETED.....	
10-8	DELETED.....	
10-9	Exterior Markings, T-41B	10-57
10-10	Station Diagram, T-41B	10-63
10-11	Exterior Markings, T-42	10-64
10-12	Station Diagram, T-42	10-66
10-13	DELETED	
10-14	DELETED	
10-15	DELETED	
10-16	DELETED	
10-17	DELETED	
10-18	Tactical Paint Scheme, RU-21	10-89
10-19	Non-Tactical Paint Scheme, U-21.....	10-91
10-20	Non-Tactical. High Visibility Paint Scheme,U-21.....	10-95
10-21	Interior Markings, U-21 and RU-21.....	10-97
10-22	Exterior Markings, U-21 and RU-21.....	10-102
10-23	Station Diagram, U-21 and RU-21.....	10-115

CHAPTER 1

GENERAL

Section I. PURPOSE AND SCOPE

1-1. PURPOSE. This manual provides instructions and procedures for the painting and marking of all Army aircraft, including standard approved materials, application and maintenance of coatings, finishing materials, special purpose coatings and markings, insignia, and identification markings.

NOTE

Paragraph 7-34 should be consulted prior to painting and marking of all aircraft, in order to assure compliance with NATO STANDARDIZATION AGREEMENT (STANAG) No. 3109 ABC AIR STD 5 1/2 AND STANAG 3230.

1-2. SCOPE. The paint schemes and materials prescribed by this TM are mandatory for all Army aircraft whether assigned for active service, storage, under procurement, or involved in research and development. This TM is applicable to all Army Reserve National Guard, and major Army field commands as defined in AR 10-5, Section III. Commencing Oct 85, "New procurements and those assets that require depot maintenance will include polyurethane (MIL-C-46168) and/or MILC22750, Epoxy as noted in this publication."

1-3. RESTRICTIONS. Satisfactory protective coatings applied prior to the issuance of this TM will not be altered solely for the purpose of conformity to current painting and marking requirements. Complete painting will be accomplished only when the existing finish has been obsoleted or deteriorated to the extent that it fails to protect the underlying surfaces or the finish must be changed for policy reasons as authorized by higher authority.

1-4. DEVIATIONS. Deviations from the provisions of this technical manual must be approved by Department of the Army. Request for deviation or change will be supported by justification (such as safety, mission requirement, cost reductions etc.) and forwarded to U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL. 35898-5230. Wherever the instructions in this technical manual conflict with the instructions in the publications referenced herein, the instructions in this technical manual will be followed.

Section II. RESPONSIBILITIES

1-5. ORGANIZATIONAL ACTIVITIES.

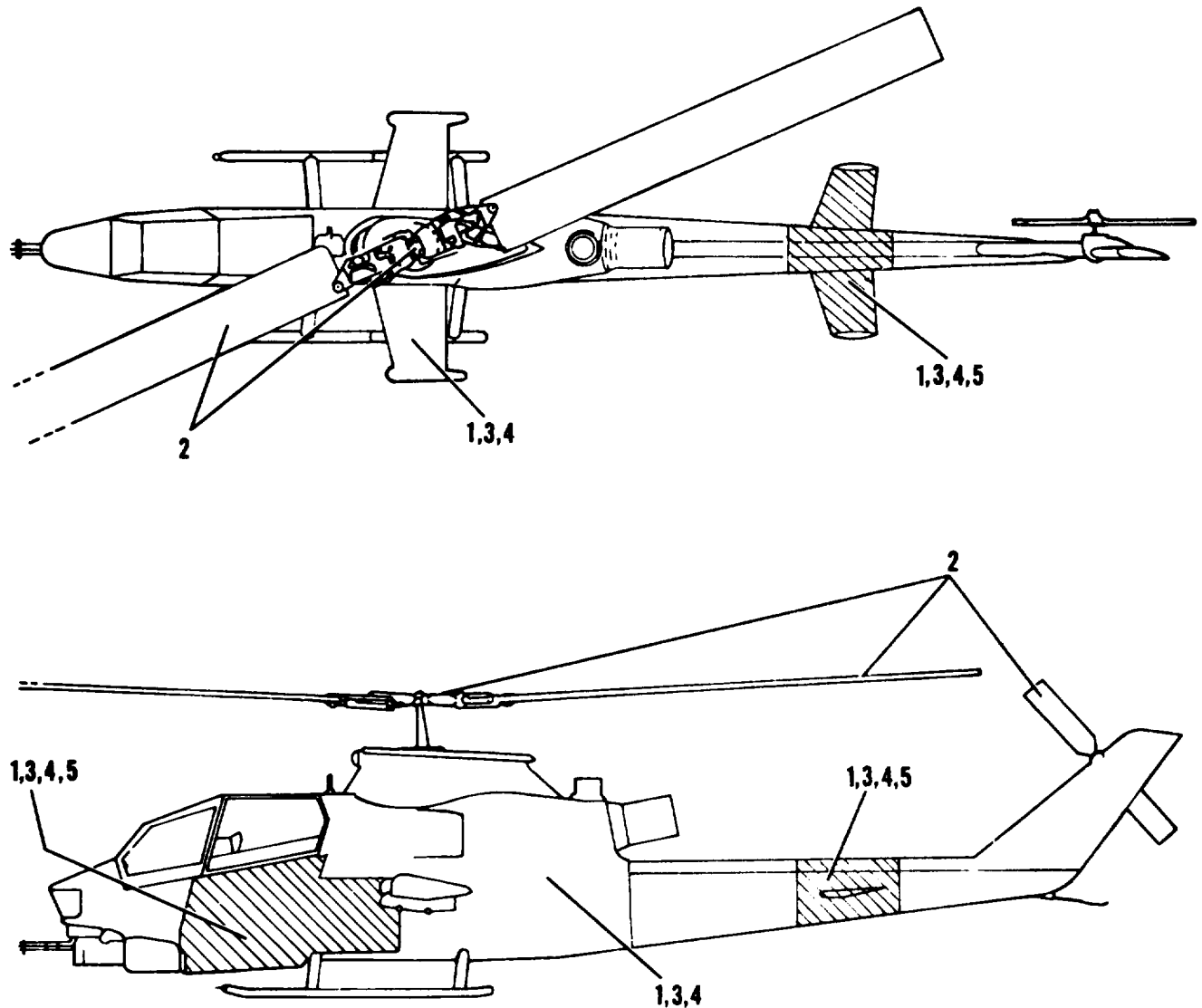
a. Aviation Unit Maintenance (AVUM). Responsible for surface preparation and minor touch-up (spot painting) of aircraft surfaces. Touch-up is defined as minor repainting of the painted aircraft surface, i.e., light scratches, chipping, crazing, small wear spots around doors, cowling, areas where there is heavy foot traffic, towing points, minor sheet metal repairs and necessary blanding to improve appearance. Touch-up for coating, aliphatic polyurethane per MIL-C-46168, see para 4-12; for lacquer, acrylic, per MIL-L-46159, see para 4-13.

b. Aviation Intermediate Maintenance (AVIM). Responsible for repainting deteriorated aircraft painted surfaces that are beyond the capabilities authorized for AVUM. Repainting is defined as stripping paint down to the bare substrate, inspecting for corrosion, pretreatment for corrosion, priming and topcoating of large areas of aircraft painted surfaces. Repainting will only be done if equipment and facilities indicated in Chapter 3 are available

CHAPTER 9

HELICOPTER ILLUSTRATIONS

Section 1. AH-1 Illustrations



1. MI1-C-46168, aircraft green (entire aircraft, except as noted).
2. MI1-C-46168, aircraft black.
3. MI1-C-46168, dark sand (entire aircraft or high conspicuous color scheme when authorized, desert operations only). See Paragraph 5-11.
4. MI1-C-46168, aircraft white (entire aircraft or high conspicuous color scheme when authorized, arctic operations only). See Paragraph 5-11.
5. MI1-P-21600, fluorescent red-orange. ANA #633 (training aircraft-high visibility, only where authorized).

Figure 9-1. Tactical Paint Scheme, AH-1

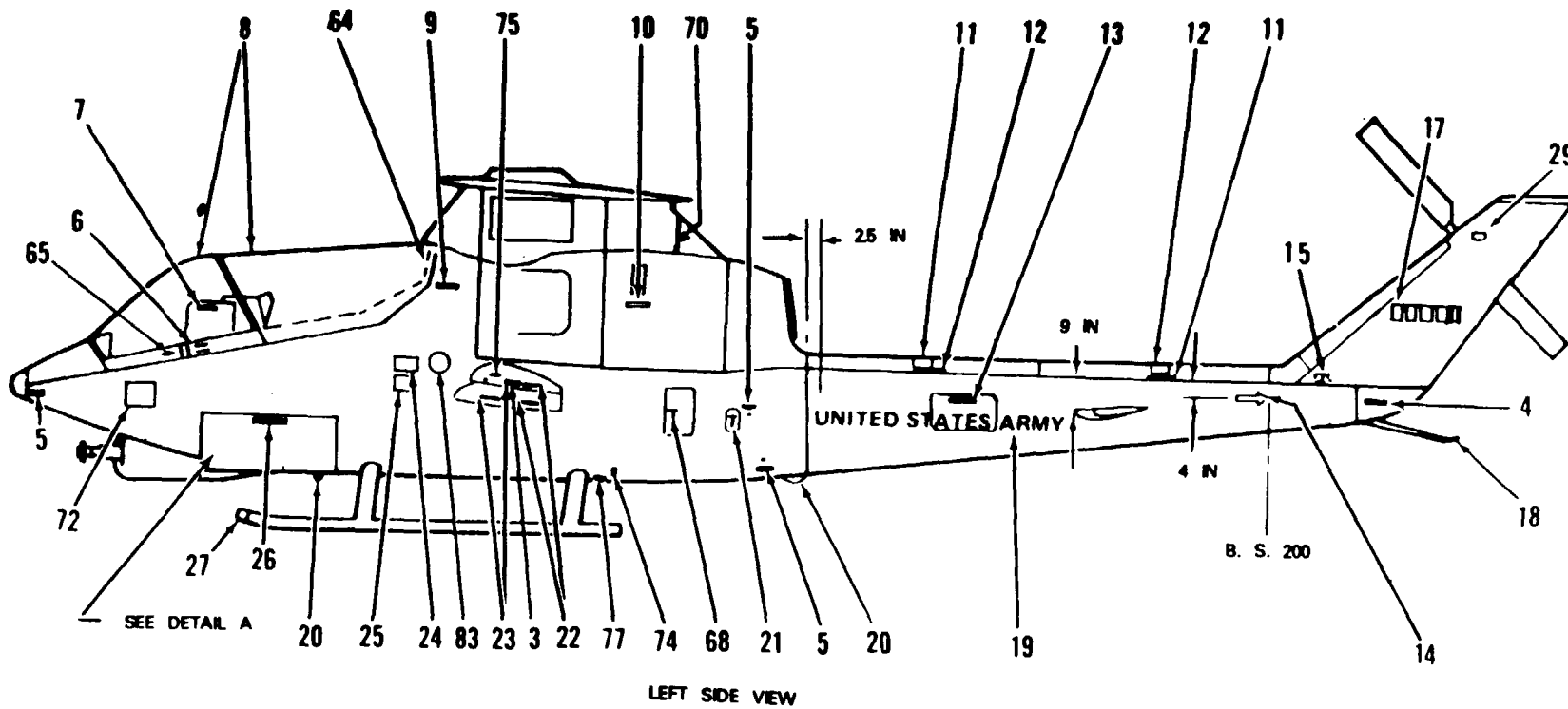


Figure 9-2. Exterior Marking, AH-1 (Sheet 1 of 10).

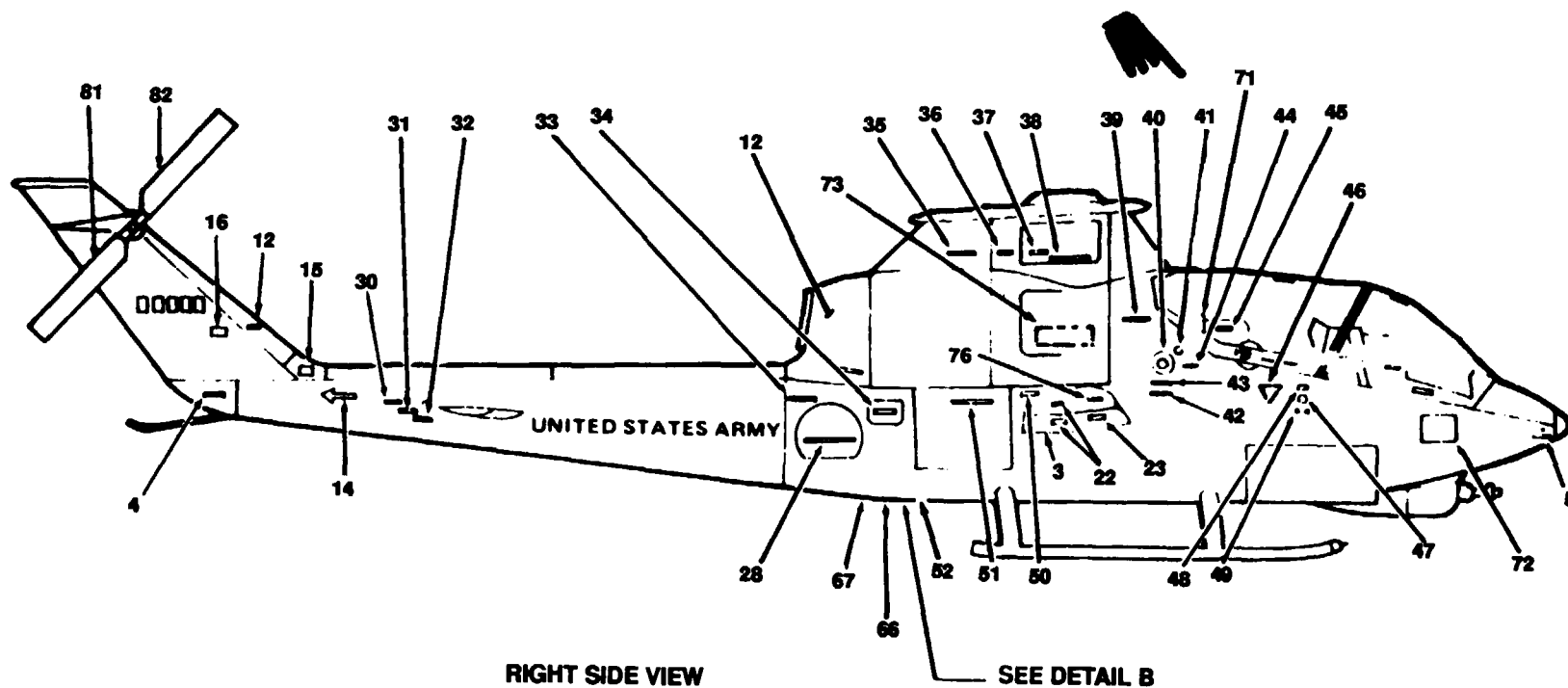


Figure 9-2. Exterior Markings, AH-1 (Sheet 2 of 10).

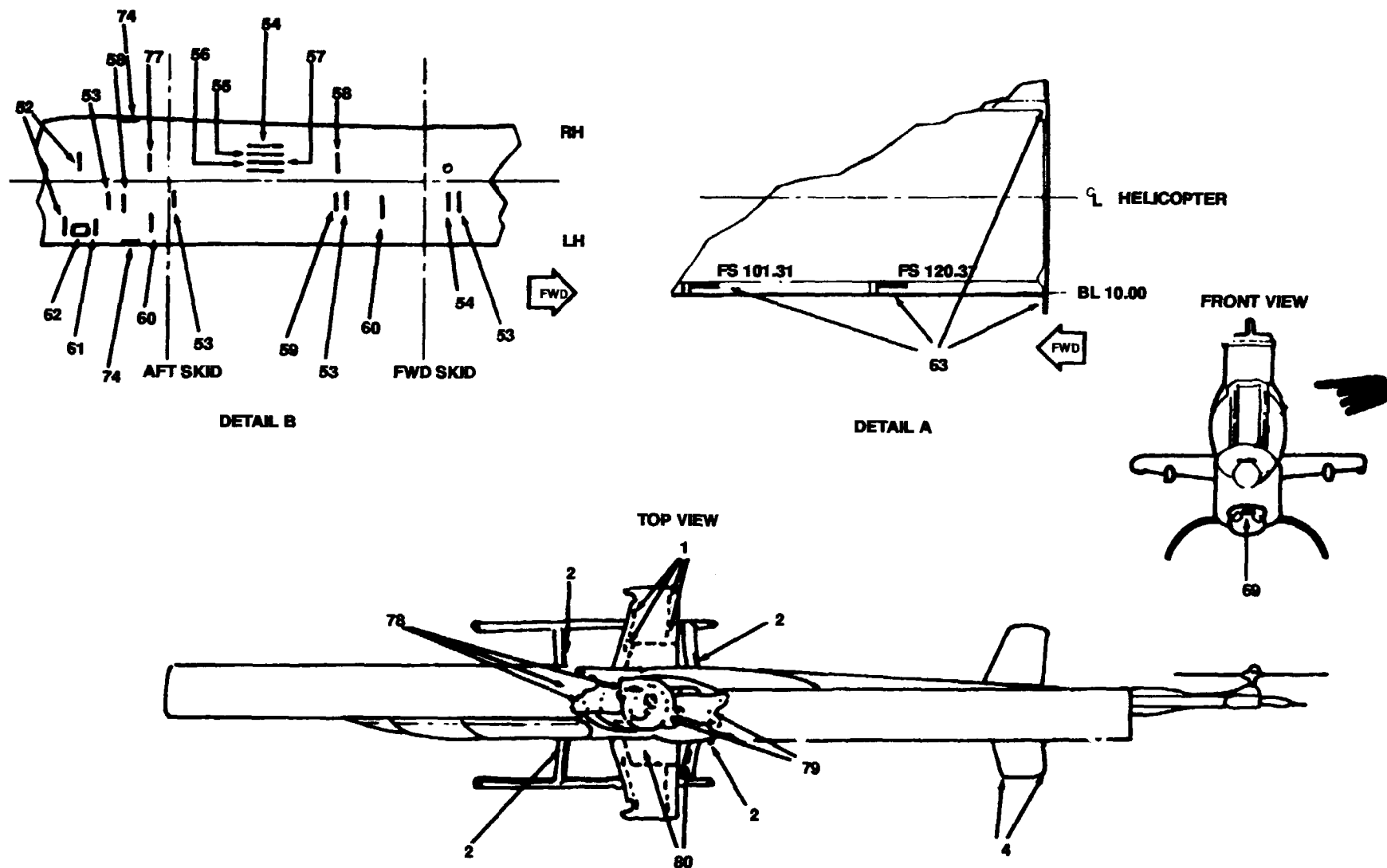


Figure 9-2. Exterior Markings, AH-1 (Sheet 3 of 10).