
Helicopter Rope Suspension Techniques (HRST) Operations



U.S. Marine Corps

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited

DEPARTMENT OF THE NAVY
Headquarters United States Marine Corps
Washington, D.C. 20380-1775

13 August 2003

FOREWORD

Helicopter rope suspension techniques (HRST) provide Marines with the ability to conduct helicopter insertions and extractions where helicopter landings are impractical. Marine Corps Reference Publication (MCRP) 3-11.4A, *Helicopter Rope Suspension Techniques (HRST) Operations*, establishes standards; serves as a guide for the realistic and safe training of Marines in HRST skills; and outlines the techniques, procedures, and equipment used to perform HRST. It is not intended to teach the basics of rope training or the basics of rappelling as they apply to cliff assault.

MCRP 3-11.4A applies to all Marines involved in HRST operations. It delineates responsibilities among aircrews and HRST personnel regarding the installation and maintenance of HRST equipment and the procedures required to conduct HRST operations. To enhance interoperability, the HRST rigging procedures for helicopters from other Services have been included in this publication.

This publication supersedes Fleet Marine Force Manual (FMFM) 7-40, *Helicopter Insertion/Extraction*, dated 11 May 1992.

Reviewed and approved this date.

BY DIRECTION OF THE COMMANDANT OF THE MARINE CORPS

EDWARD HANLON, JR.
Lieutenant General, U.S. Marine Corps
Commanding General
Marine Corps Combat Development Command

Publication Control Number: 144 000108 00

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

To Our Readers

Changes: Readers of this publication are encouraged to submit suggestions and changes that will improve it. Recommendations may be sent directly to Commanding General, Marine Corps Combat Development Command, Doctrine Division (C 42), 3300 Russell Road, Suite 318A, Quantico, VA 22134-5021 or by fax to 703-784-2917 (DSN 278-2917) or by E-mail to **morgann@mccdc.usmc.mil**. Recommendations should include the following information:

- Location of change
 - Publication number and title
 - Current page number
 - Paragraph number (if applicable)
 - Line number
 - Figure or table number (if applicable)
- Nature of change
 - Add, delete
 - Proposed new text, preferably double-spaced and typewritten
- Justification and/or source of change

Additional copies: A printed copy of this publication may be obtained from Marine Corps Logistics Base, Albany, GA 31704-5001, by following the instructions in MCBul 5600, *Marine Corps Doctrinal Publications Status*. An electronic copy may be obtained from the Doctrine Division, MCCDC, world wide web home page which is found at the following universal reference locator: **<http://www.doctrine.usmc.mil>**.

Unless otherwise stated, whenever the masculine gender is used, both men and women are included.

HELICOPTER ROPE SUSPENSION TECHNIQUES (HRST) OPERATIONS

Table of Contents

Chapter 1. Introduction

Personnel	1-1
Unit Commander	1-1
HRST Master	1-1
Safety Insert Officer	1-2
Aircraft Commander	1-3
Crew Chief	1-3
Crew Coordination	1-4
Briefings	1-4
Communications and HRST Commands	1-4
Safety	1-5
Environmental Factors	1-5
Night Factors	1-5
Helicopter Factors	1-5
Equipment and Clothing Safety	1-7
Accident Procedures	1-8

Chapter 2. Ropes, Equipment, and Knots

Ground Equipment	2-1
Rope Management	2-1
Grading a Rope	2-1
Removing a Rope From Service	2-2
Coiling a Rope	2-3
Rope and SPIE Equipment Stowage	2-3
Static Kernmantle Rope	2-4
Plimoor Fast Rope	2-4
SPIE Rope	2-4
SPIE Harness Assembly	2-4
Cargo Suspension Sling with Type IV Connector	2-6
Stubai 85 Carabiner	2-6
Omega 93 Carabiner	2-7
10K Locking Carabiner	2-7
G-12 Clevis	2-7
Rescue 8 Descender	2-8
Fast Rope Interface Kit	2-8
Leather Gloves	2-8
Sling Rope	2-9

Tape	2-9
Goggles	2-9
Rigid Handle Machete	2-9
Rope Storage Bat	2-9
Vario Sit Harness	2-9
Jacob's Ladder	2-9
Aviation Equipment	2-10
Schlomer Frame	2-10
Fast Rope Gantry	2-10
Fast Rope Anchor Bar	2-12
A-frame Fast Rope Attachment Bar Assembly	2-12
Knots	2-13
End of Rope Knots	2-13
Anchor Knots	2-14
Middle of the Rope Knot: Figure Eight Loop	2-15
Specialty Knots	2-15

Chapter 3. Tower Training

Training Phases	3-1
Safety Personnel and Equipment	3-1
Preparation	3-1
Rappel	3-1
Fast Rope	3-1
Inspection	3-1
Safety Procedures	3-2
Conduct of Training	3-2
Safety Brief	3-2
Demonstration	3-2
Tower Rappel Procedures	3-2
Tower Skid Rappel	3-3
Tower Fast Rope Procedures	3-3

Chapter 4. Helicopter Rappelling Operations

Familiarization	4-1
Safety	4-1
Required Personnel and Equipment	4-1
Rope Deployment Methods	4-1
Rigging/Hook Up	4-2
Rigging the UH-1N	4-2
Rigging the CH-46E	4-3
Rigging the CH-53D/E	4-4
Rigging the H-47 Helicopter	4-4

Rigging the H-60 Helicopter	4-4
Hook Up	4-8
Roper Responsibilities	4-9
Sequence of Events	4-9
CH-46E and CH-53E Hell Hole Rappel	4-9
CH-46E, CH-53D/E, and H-47 Ramp Rappel	4-10
CH-46E, CH-53D, and H-47 Crew Door Rappel	4-11
UH-1N and H-60 Rappel	4-12
Emergency Procedures	4-13
Helicopter Emergency	4-13
Unsafe Drift of Premature Lift Off	4-13
Lost Communications/ICS Failure	4-13
Hung Roper	4-14
Fouled Rope	4-14

Chapter 5. Fast Rope Operations

Familiarization	5-1
Safety	5-1
Required Personnel and Equipment	5-1
Precautions	5-2
Rope Requirements	5-2
Restrictions	5-2
Rigging	5-3
Rigging the UH-1N	5-3
Rigging the CH-46E	5-4
Rigging the CH-53D	5-5
Rigging the CH-53E	5-5
Rigging the H-47 Helicopter	5-6
Rigging the H-60 Helicopter	5-7
Roper Responsibilities	5-8
Sequence of Events	5-9
CH-46E, CH-53D, CH-53D/E Hell Hole, and H-47 Ramp/Crew Door Fast Rope	5-9
UH-1N and H-60 Fast Rope	5-10
Emergency Procedures	5-10
Helicopter Emergency	5-10
Unsafe Drift of Premature Lift Off	5-11
Lost Communications/ICS Failure	5-11
Fouled Rope	5-11

Chapter 6. Special Patrol Insertion and Extraction Operations

Familiarization	6-1
Safety	6-1

Required Personnel and Equipment	6-1
Communications	6-1
Airspeed	6-1
Altitude	6-1
Hell Hole	6-2
Rigging/Donning Equipment	6-2
Rigging the UH-1N	6-2
Rigging the CH-46E and CH-53D/E	6-4
Rigging the H-60 Helicopter	6-4
Donning Equipment	6-4
Roper's Responsibilities	6-7
Hook Up and Dismounting	6-8
Sequence of Events	6-9
CH-46E and CH-53D/E SPIE	6-9
UH-1N and H-60 SPIE	6-11
Emergency Procedures	6-12
Aircraft Emergency	6-12
Hung Roper	6-12
Fouled Rope	6-12

Chapter 7. Jacob's Ladder Operations

Familiarization	7-1
Safety	7-1
Required Personnel and Equipment	7-1
Rigging	7-1
Climber Responsibilities	7-2
Sequence of Events	7-2
Emergency Procedures	7-3
Aircraft Emergency	7-3
Hung Climber	7-4
Fouled Ladder	7-4
Unsafe Drift or Premature Lift Off	7-4

Appendices

A. HRST Mission Briefs to HRST Participants	A-1
B. HRST Brief to Aircrew	B-1
C. HRST Commands	C-1
D. Rappel Rope Log	D-1
E. Rappel Tower Inspection	E-1
F. Tower Safety Brief	F-1
G. Glossary	G-1
H. References and Related Publications	H-1

CHAPTER 1

INTRODUCTION

Helicopter rope suspension techniques (HRST) is a high-risk operation that can be conducted safely if the contents of this publication are adhered to and current directives are followed. Noncompliance with this publication or current directives and any unauthorized modifications or installation of unauthorized HRST equipment can result in injury or death to personnel and/or damage to equipment.

Note: This term, HRST, modifies the existing term and is approved for inclusion in the next edition of Marine Corps Reference Publication (MCRP) 5-12C, *Marine Corps Supplement to the Department of Defense Dictionary of Military and Associated Terms*.

Throughout this publication, the HRST master's commands are in bold italic text. All other commands are in italic text.

Personnel

A safe HRST evolution is the responsibility of all participants, from the unit commander to the individual roper. To ensure a safe training evolution and to provide a dynamic environment for HRST operations, a clear understanding of the responsibilities of all those involved is required. This chapter tasks and defines specific responsibilities associated with HRST operations.

Unit Commander

A unit commander's primary responsibility is to ensure that all HRST is accomplished in a safe manner and in accordance with this publication and Marine Corps Order (MCO) 3500.42, *Marine Corps HRST Policy and Program Administration*. Additional responsibilities include, but are not limited to, the following:

- Ensuring that HRST within the unit is conducted and supervised by an HRST master and safety insert officer (SIO) who are certified and current in accordance with MCO 3500.42.
- Ensuring that all HRST certifications and currency dates are properly recorded (i.e., in a service record book, officer qualification record, and/or training record) in accordance with MCO 3500.42.
- Ensuring that all personnel conducting HRST from a helicopter have successfully completed static tower training within the parameters established in MCO 3500.42.
- Ensuring that all HRST equipment assigned on the unit's table of equipment is properly maintained, inspected, and stowed after use.

HRST Master

The HRST master's primary responsibility is the overall safety of all ropers and the conduct and safety of the HRST operation. Therefore, the HRST master must know and understand this publication and all current HRST policies and directives. Once planning begins, the HRST master oversees safety and continues to monitor safety throughout the entire HRST evolution. HRST equipment serviceability and safety is also the responsibility of the HRST master (see chap. 2).

Descent and extraction authority is the sole responsibility of the HRST master. However, the aircraft commander may abort or cancel a descent/extraction if conditions are considered unsafe. During special patrol insertion and extraction (SPIE), the HRST master informs the aircraft commander when the ropers are connected and ready to lift. The crew chief checks for obstacles and clears the aircraft commander for lift and transition to forward flight. During fast roping