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From: Director, Naval Surface Warfare Center, Indian Head  
Division Detachment Picatinny

Subj: NAVSEA SW023-AH-WHM-010, EIGHTH REVISION, "HANDLING  
AMMUNITION AND EXPLOSIVES WITH INDUSTRIAL MATERIALS  
HANDLING EQUIPMENT (MHE)" OF 1 JULY 2011

Ref: (a) NAVSEA SW023-AH-WHM-010, Seventh Revision, of  
1 July 2009  
(b) Bureau of Medicine (BUMED), NAVMED P-117, Change 135  
of 30 October 2009  
(c) NAVSUP Publication 538, Sixth Revision, of 1 October  
2011

1. This letter officially issues NAVSEA SW023-AH-WHM-010,  
Eighth Revision, which supersedes reference (a).

2. The subject manual has been updated to incorporate  
regulations and procedures regarding the safe handling of  
ammunition and explosives with MHE afloat and ashore. The  
significant changes during this revision are:

a. Incorporates in paragraph 3-3.1 the latest medical  
examination regulations in compliance with reference (b),  
including the current Medical Examiner's Certificate (OPNAV Form  
8020/2), figure 3-1.

b. Revises the MHE Operator's License (figure 3-2) and  
supporting MHE Class Definitions (table 3-1).

c. Restricts the use of Mk 12 Mod 0 Fork Extension in table  
4-1 to only forks that are 2 inches thick by 6 inches wide and  
are less than 40 inches in length.

d. Changes ashore manual pallet designations in tables 5-2  
and 5-3 from type "HS" to "ORDNANCE" as documented in reference  
(c).

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e. Includes cylinders and frames in paragraph 6-5.3 as  
examples of load-bearing components requiring overload weight  
testing.

4. The Naval Packaging, Handling, Storage and Transportation  
(PHST) Center point of contact is Mr. Michael Kraynick, Code  
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K. H. ZIMMS  
By direction

Distribution:  
Explosives Safety Technical Manual (ESTM) DVD-ROM Distribution

**TECHNICAL MANUAL**

**HANDLING AMMUNITION AND  
EXPLOSIVES WITH INDUSTRIAL  
MATERIALS HANDLING EQUIPMENT (MHE)**



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**1 JULY 2011**

## NAVSEA SW023-AH-WHM-010 EIGHTH REVISION

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### LIST OF EFFECTIVE PAGES

The total number of pages in this manual is 88. They are all original Revision Eight pages. The date of issue for all pages in this manual is 1 July 2011. Change bars are included to assist the reader in identifying areas where changes to requirements/procedures have occurred.

**NAVSEA TECHNICAL MANUAL CERTIFICATION SHEET**

1 OF 1

CERTIFICATION APPLIES TO: NEW MANUAL      REVISION 8 CHANGE     

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PUBLICATION DATE (MO, DA, YR): 1 JULY 2011

READING GRADE LEVEL (RGL):     

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TMCR/TMSR/SPECIFICATION NO.:     

**CHANGES AND REVISIONS:**

**PURPOSE:** TO PROVIDE MANDATORY TECHNICAL DIRECTION AND PROCEDURES FOR THE SAFE HANDLING OF AMMUNITION AND EXPLOSIVES WITH INDUSTRIAL MATERIALS HANDLING EQUIPMENT (MHE)

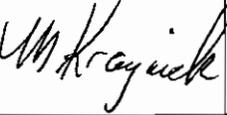
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## FOREWORD

1. This manual documents the safe use of industrial materials handling equipment (MHE) and approved attachments at [Department of the Navy \(DON\)](#) units ashore and afloat where ammunition and explosives are present.
2. This manual is not intended to supersede, contravene, or modify any federal, state, municipal, or local laws and their supplements. If any provision of this manual appears to conflict with any other published regulation, this fact should be reported in detail to the [Naval Ordnance Safety and Security Activity \(NOSSA\)](#) (N5).
3. Copies of this Explosives Safety Technical Manual (ESTM) DVD-ROM may be obtained from Naval Surface Warfare Center Indian Head Division Detachment Picatinny, [Naval Packaging, Handling, Storage and Transportation \(PHST\) Center](#), Code G13, Building 458, Whittemore Avenue, Picatinny Arsenal, NJ 07806-5000. Units afloat and ashore may reproduce hard copies of this manual or replicate additional DVDs.
4. This manual supersedes NAVSEA SW023-AH-WHM-010, Seventh Revision, dated 1 October 2009, which should be destroyed. Changes to this manual will be issued as required. Comments or suggestions relative to material to be included in such changes should be forwarded as specified in [chapter 1](#).

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TABLE OF CONTENTS

Chapter/Appendix/Paragraph	Page
List of Figures .....	iv
List of Tables .....	v
Safety Summary.....	vi
<b>1 INTRODUCTION .....</b>	<b>1-1</b>
1-1 Purpose .....	1-1
1-2 Scope .....	1-1
1-3 Command Responsibilities .....	1-1
1-4 Mandatory and Advisory Regulations .....	1-1
1-5 Organization of Manual .....	1-2
1-6 MHE Operator Training Course .....	1-2
1-7 Terms and Definitions .....	1-2
1-8 Reference Documents .....	1-2
1-9 MHE Modifications or Alterations .....	1-2
1-10 Reporting Deficiencies in Manual .....	1-2
1-11 Date of Manual .....	1-3
<b>2 TYPES OF INDUSTRIAL MATERIALS HANDLING EQUIPMENT .....</b>	<b>2-1</b>
2-1 General .....	2-1
2-1.1 Color .....	2-1
2-1.2 Markings .....	2-1
2-2 Approved Types of Industrial MHE .....	2-1
2-3 MHE Attachments .....	2-1
2-3.1 Mk 5 Mod 0 Forklift Boom .....	2-1
2-3.2 Mk 91 Mod 0 Hook Adapter .....	2-2
2-3.3 Mk 176 Mod 0 Hook Adapter .....	2-2
2-3.4 Mk 156 Mod 0 Endlift Adapter .....	2-4
<b>3 MATERIALS HANDLING EQUIPMENT LICENSING .....</b>	<b>3-1</b>
3-1 General .....	3-1
3-2 Avoidance of Duplicate Training .....	3-1
3-3 Qualifications .....	3-1
3-3.1 Medical. ....	3-1
3-3.2 Age. ....	3-2
3-3.3 Initial Operator Training .....	3-2
3-3.4 Refresher Operator Training .....	3-3
3-4 License .....	3-3
3-4.1 Navy Activities. ....	3-3
3-4.2 Marine Corps Activities. ....	3-4
3-4.3 Issuance .....	3-5
3-4.4 Evaluation .....	3-5
3-4.5 Renewal .....	3-5

TABLE OF CONTENTS (Continued)

Chapter/Appendix/Paragraph	Page	
3-4.6	Revocation . . . . .	3-5
3-5	Instructor Training . . . . .	3-5
<b>4</b>	<b>OPERATIONAL SAFETY REGULATIONS . . . . .</b>	<b>4-1</b>
4-1	General . . . . .	4-1
4-2	General Safety Regulations . . . . .	4-1
4-3	Personnel Safety . . . . .	4-1
4-4	Safety Devices . . . . .	4-1
4-5	Handling Safety . . . . .	4-1
4-5.1	Non-Standard Load Centers . . . . .	4-1
4-5.2	General Handling Safety Precautions . . . . .	4-2
4-5.3	Safety Precautions During Movements . . . . .	4-2
4-6	Safety During Fueling . . . . .	4-2
4-7	Battery Charging, Testing and Maintenance . . . . .	4-2
4-8	Incident and Mishap Reporting . . . . .	4-2
<b>5</b>	<b>REGULATIONS FOR USING MATERIALS HANDLING EQUIPMENT IN HAZARDOUS LOCATIONS . . . . .</b>	<b>5-1</b>
5-1	General . . . . .	5-1
5-2	MHE Approved Material Categories Afloat and Ashore . . . . .	5-1
5-2.1	Fuel Air Explosives/Hypergolics (FAE/HYP) . . . . .	5-1
5-2.2	Ammunition and Explosives (A&E) . . . . .	5-1
5-3	MHE Approved Operational Areas Afloat . . . . .	5-1
5-3.1	Below Deck . . . . .	5-1
5-3.2	Closed Lighters . . . . .	5-1
5-3.3	Top Side. . . . .	5-1
5-4	MHE Approved Operational Areas Ashore . . . . .	5-1
5-4.1	Closed . . . . .	5-2
5-4.2	Partial . . . . .	5-2
5-4.3	Open . . . . .	5-2
5-5	Temporary Parking . . . . .	5-3
5-6	Storage of MHE in Approved Operational Areas Ashore. . . . .	5-3
5-7	Stowage of MHE in Shipboard Magazines . . . . .	5-3
<b>6</b>	<b>INSPECTION, MAINTENANCE AND TEST PROGRAM . . . . .</b>	<b>6-1</b>
6-1	General . . . . .	6-1
6-2	Equipment History File. . . . .	6-1
6-3	General Inspection Criteria . . . . .	6-1
6-3.1	NEW or SLEP Equipment . . . . .	6-1
6-3.2	In-Service Equipment . . . . .	6-1
6-3.3	MHE Attachments . . . . .	6-1
6-4	Maintenance and Repairs . . . . .	6-2
6-5	Periodic Testing . . . . .	6-2
6-5.1	Periodic Weight Testing of Forklift Attachments . . . . .	6-2
6-5.2	Periodic Operational Testing of MHE . . . . .	6-3

TABLE OF CONTENTS (Continued)

Chapter/Appendix/Paragraph	Page
6-5.3	Overload Weight Testing of MHE . . . . . 6-3
6-5.4	Lifting Eyes Testing of MHE . . . . . 6-3
6-5.5	MHE Test Loads . . . . . 6-3
6-5.5.1	Marking of Test Loads. . . . . 6-3
6-6	General Periodic Tests for MHE . . . . . 6-3
6-6.1	Markings . . . . . 6-6
6-6.2	Fuel System . . . . . 6-6
6-6.2.1	Gasoline and Diesel. . . . . 6-6
6-6.2.2	Compressed Natural Gas (CNG) and Liquefied Petroleum Gas (LPG). . . . . 6-6
6-6.3	Neutral Start Switch (Fuel-Powered MHE Only) . . . . . 6-6
6-6.4	Warning Devices (Powered MHE Only) . . . . . 6-7
6-6.5	Spark Emission (All Powered MHE) . . . . . 6-7
6-6.6	Static Discharge Test (Type EE, EX, and HS/Ordnance MHE Only) . . . . . 6-7
6-6.7	Carriage Reach and Roller Inspection (Reach and Tier Trucks Only) . . . . . 6-7
6-6.8	Drive Control Test (Powered Pallet Trucks Only) . . . . . 6-7
6-6.9	Brake System Tests (Except Straddle Carriers and Manual Pallet Trucks) . . . . . 6-7
6-6.9.1	Brake Operation Test. . . . . 6-7
6-6.9.2	Parking Brake Test. . . . . 6-8
6-6.9.3	Safety/Disconnect System Test. . . . . 6-8
6-6.10	Brakes (Straddle Carriers Only) . . . . . 6-8
6-6.11	Operational Weight Test (All Forklift Trucks) . . . . . 6-8
6-6.12	Operational Weight Test (All Powered Pallet Trucks) . . . . . 6-10
6-6.13	King Pin (Straddle Carriers Only) . . . . . 6-10
6-6.14	Lifting Weight Test (Straddle Carriers Only) . . . . . 6-10
6-7	Overload Weight Testing of MHE (Except Pallet Trucks and Straddle Carriers) . . . . . 6-11
6-8	MHE Lifting Eyes Inspection and Test (Except Straddle Carriers) . . . . . 6-13
6-9	Certification of MHE (Except Type H Pallet Trucks) . . . . . 6-13
6-9.1	Certifying Official . . . . . 6-13
6-9.2	MHE Safety Certification Marking . . . . . 6-13
<b>A</b>	<b>MATERIALS HANDLING EQUIPMENT OPERATOR TRAINING COURSE . . . . . A-1</b>

# NAVSEA SW023-AH-WHM-010 EIGHTH REVISION

## LIST OF ILLUSTRATIONS

<b>Figures</b>	<b>Title</b>	<b>Page</b>
2-1	Mk 5 Mod 0 Forklift Truck Boom .....	2-2
2-2	Mk 91 Mod 0 Hook Adapter .....	2-3
2-3	Mk 176 Mod 0 Hook Adapter .....	2-3
2-4	Mk 156 Mod 0 Endlift Adapter .....	2-4
3-1	Medical Examiner's Certificate (OPNAV Form 8020/2) .....	3-2
3-2	MHE Operator's License (Navy Activities) .....	3-6
6-1	MHE Safety Certification Form .....	6-5
6-2	MHE Safety Certification Marking .....	6-14
A-1	Stability Triangle (Unloaded) .....	A-8
A-2	Stability Triangle (Loaded) .....	A-9
A-3	Straight Aisle Course .....	A-19
A-4	Weaving Obstacle Course .....	A-19
A-5	Alternate Shipboard Obstacle Course .....	A-27

LIST OF TABLES

Tables	Title	Page
3-1	MHE Class Definitions .....	3-7
4-1	Non-Standard Load Centers .....	4-3
5-1	Approved MHE Afloat .....	5-2
5-3	Approved MHE Ashore (Other).....	5-3
5-2	Approved MHE Ashore (Packaged) .....	5-3
6-1	Periodic Tests for MHE .....	6-4
6-2	Braking Distance Chart .....	6-11

## SAFETY SUMMARY

This manual contains instructions and regulations necessary for the safe usage of Materials Handling Equipment (MHE) at Department of Navy (DON) units ashore and afloat. While the entire content of this manual is a warning to the user, the following warnings appear in the text, and are repeated here for emphasis:

### **WARNING**

Type DS and DY MHE may be used in closed lighters afloat and closed operational areas ashore provided they meet federal, state and local regulations for air quality and noise pollution. Each activity must monitor the emissions in accordance with manufacturer's recommendations to ensure that the exhaust emissions do not exceed the personal exposure limits set forth by federal, state or local regulations. ([Page 5-2](#))

### **WARNING**

When the mast is fully raised, ensure the operator's hands are clear of controls and the person marking and verifying the height stands to the side of the MHE. An observer must ensure that all personnel are clear of the mast prior to raising the rated load. ([Page 6-9.](#))

## CHAPTER 1

### INTRODUCTION

#### 1-1. PURPOSE

The safety regulations prescribed in this manual apply to industrial Materials Handling Equipment (MHE) when handling ammunition and explosives at Department of Navy (DON) activities. It identifies the various types of industrial MHE and attachments approved for operational areas where ammunition and explosives are present; procedures to license operators; and procedures to safely operate, store, test and maintain MHE to appropriate specifications. This manual is a supplement to the general requirements commonly associated with Navy MHE, as documented in [Naval Supply Command Publication \(NAVSUP PUB\) 538](#), to establish a complete explosives safety prevention program. Similarly, it also serves as a supplement to Marine Corps Garrison Mobile Equipment documented in [Marine Corps Order \(MCO\) P11240.106 \(series\)](#). The content of this MCO and [NAVSUP PUB 538](#) do not apply to Marine Corps Tactical Engineering Equipment. Testing, operation and licensing requirements for Marine Corps Tactical Engineering Equipment is documented in [MCO P11262.2 \(series\)](#) and Technical Manual (TM) 11275-15/4 (series) (Tactical Engineering Equipment Licensing Manual). References, as appropriate, will be made throughout this manual to [NAVSUP PUB 538](#), the appropriate MCO/TM, and to other explosives safety technical manuals that must be completely understood and observed prior to any handling operation involving ammunition and explosives.

#### 1-2. SCOPE

This manual is applicable to all [DON](#) units ashore and afloat where ammunition and explosives are present, and to all personnel operating industrial MHE without regard to employer.

#### 1-3. COMMAND RESPONSIBILITIES

The responsible party for all authorized actions used throughout this manual is the Commanding Officer/Officer-in-Charge (CO/OIC). The CO/OIC may delegate authority to the lowest level of competence commensurate with the subordinate's assigned responsibilities and capabilities in accordance with [OPNAVINST 3120.32 \(series\)](#). For the purpose of this manual, the CO/OIC is defined as the title of the senior officer or responsible authority (e.g., resident director, senior contracting official) at activities ashore or the senior officer aboard ship who has the full responsibility for the operation and maintenance of the ship.

#### 1-4. MANDATORY AND ADVISORY REGULATIONS

The requirements in this manual that use the commands “shall,” “will,” or “must” are mandatory, unless they are specifically waived or exempted by the provisions in [OPNAVINST 8020.14/MCO P8020.11 \(series\)](#). Advisory requirements are those in which “may” or “should” are used. These advisory requirements shall be followed unless exceptions are authorized in writing by the CO/OIC.

## 1-5. ORGANIZATION OF MANUAL

Chapter 2 begins by identifying the various types and selected operational safety specifications of industrial MHE and associated attachments. Chapter 3 lists the processes to select training, license personnel as powered MHE operators, and authorize personnel as local instructors for the purpose of issuing a license for powered MHE operators. Chapter 4 provides all general, personnel, handling, movement, refueling and battery charging safety precautions. Chapter 5 defines and describes regulations for using MHE in operational and hazardous locations. Finally, chapter 6 concludes with the maintenance, testing and inspection programs required to be performed by operators and maintenance personnel concerned with operating, servicing and repairing MHE.

## 1-6. MHE OPERATOR TRAINING COURSE

Appendix A provides the training course established as the minimum requirements that DON personnel must successfully meet prior to being issued a powered industrial MHE license to handle ammunition and explosives.

## 1-7. TERMS AND DEFINITIONS

The definitions of terms and abbreviations commonly used in conjunction with MHE and other explosives safety requirements appears separately on this DVD-ROM. These definitions are intended to reduce ambiguity and to provide uniformity of description and interpretation of technical information throughout this manual.

## 1-8. REFERENCE DOCUMENTS

A list of documents that contains the technical information referenced throughout this manual and related to other explosives safety technical documentation is presented separately on this DVD-ROM. These documents are essential for complete understanding of MHE requirements contained within this manual.

## 1-9. MHE MODIFICATIONS OR ALTERATIONS

MHE may only be modified or altered under the provisions specified in NAVSUP PUB 538.

## 1-10. REPORTING DEFICIENCIES IN MANUAL

Ships, training activities, supply points, depots, naval shipyards, supervisors of shipbuilding, and other shore activities are requested to arrange for the maximum practical use and evaluation of NAVSEA technical manuals. All errors, omissions, discrepancies, and suggestions for improvement to NAVSEA technical manuals shall be reported to Commander, Naval Surface Warfare Center, Port Hueneme Division (NSWC/PHD), Naval Sea System Data Support Activity (NSDSA), 4363 Missile Way, Port Hueneme, CA 93043-4307 on NAVSEA Technical Manual Deficiency/Evaluation Report (TMDER), NAVSEA Form 4160/1. A copy of NAVSEA TMDER Form 4160/1 is included at the end of this manual. For activities with internet access, this form may also be completed and processed by using the NSDSA website: <https://nsdsa.nmci.navy.mil>. To expedite, also send as an email to [michael.kraynick@navy.mil](mailto:michael.kraynick@navy.mil). All feedback comments shall be thoroughly investigated and originators will be advised of TMDER resolution. If you prefer to submit a TMDER using a word file, click here.



**1-11. DATE OF MANUAL**

The date of this technical manual, and its revisions and changes, as shown on the title page, is the estimated date the manual is to be distributed. However, the manual, revision or change is effective upon receipt, regardless of the date shown on the title page.

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## CHAPTER 2

### TYPES OF INDUSTRIAL MATERIALS HANDLING EQUIPMENT

#### 2-1. GENERAL

The various types and selected operational safety specifications of industrial Materials Handling Equipment (MHE) and associated attachments are described in this chapter.

2-1.1. COLOR. MHE shall be painted in accordance with the provisions of [Naval Supply Command Publication \(NAVSUP PUB\) 538](#).

2-1.2. MARKINGS. MHE shall be marked, as applicable, in accordance with the marking requirements described in [NAVSUP PUB 538](#).

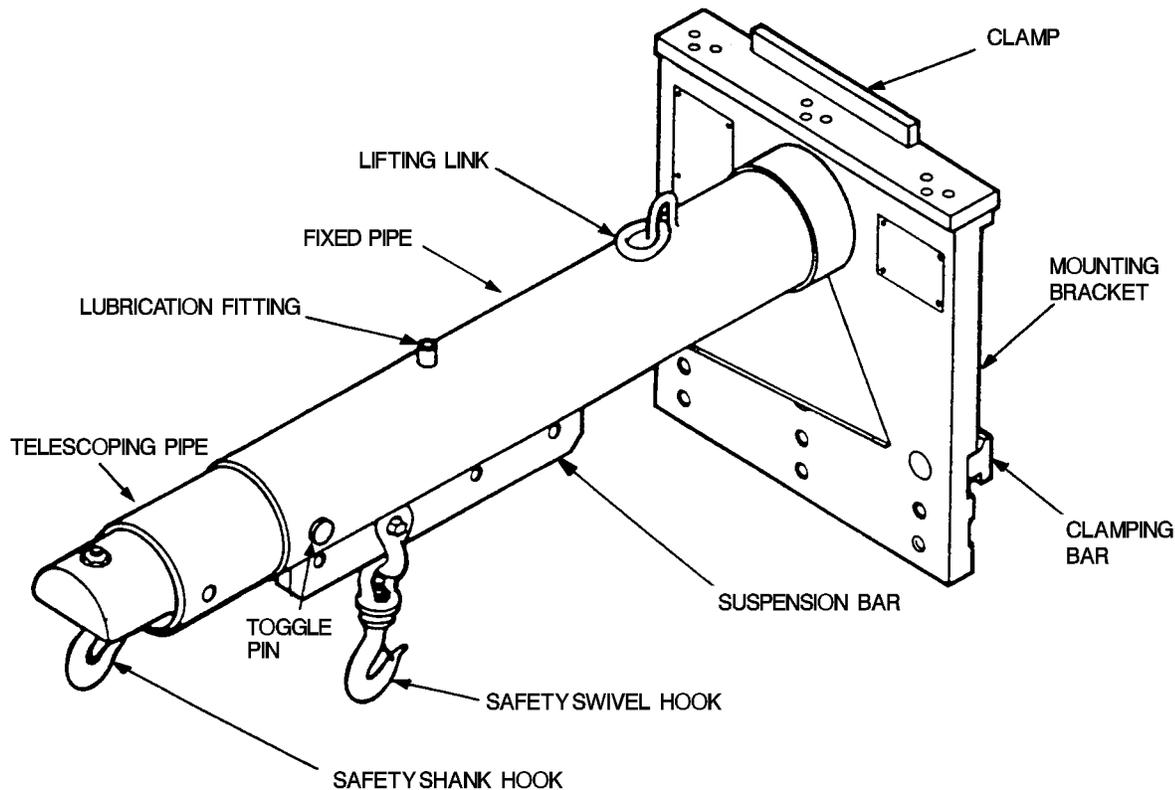
#### 2-2. APPROVED TYPES OF INDUSTRIAL MHE

The approved types of industrial MHE used by Department of the Navy (DON) activities, ashore and afloat, are identified and described in [NAVSUP PUB 538](#).

#### 2-3. MHE ATTACHMENTS

Attachments may be installed onto MHE in order to perform specific handling operations. Only attachments identified in [NAVSEA OP 2173/NAVAIR 19-100-1](#) are approved for use and are not considered an alteration to the MHE. Therefore, approval is not required from the original manufacturer, Naval Surface Warfare Center (NAVSURFWARCEN) Indian Head Division Detachment Picatinny, [Naval Packaging, Handling, Storage and Transportation \(PHST\) Center \(Code G13\)](#), or [NAVSUP Weapon Systems Support \(WSS\) \[Naval Inventory Control Point \(NAVICP\) Mechanicsburg\] \(Code 8341\)](#). A description and illustration of the common approved types of MHE attachments is provided in [NAVSUP PUB 538](#). In addition to these attachments, the following forklift and electric pallet truck attachments are specifically designed and approved to handle ammunition and explosives.

2-3.1. MK 5 MOD 0 FORKLIFT BOOM. Standard forklift trucks can be converted into boom trucks by removing the forks and installing the Mk 5 Mod 0 Forklift Truck Boom. Once the boom is properly installed and complies with the weight test periodicity requirements of [paragraph 6-5.1](#), no additional weight testing is required for such a conversion. The boom is a steel weldment consisting of a fixed pipe welded to a mounting bracket and a telescoping pipe with a safety shank hook. The mounting bracket attaches to the faceplate of various 4,000- and 6,000-pound SWL forklift trucks, after the forks have been removed. The Mk 5 Mod 0 Forklift Truck Boom is used in conjunction with slings and carriers to handle ordnance, especially in low overhead areas with narrow passageways. Refer to [paragraph 4-5.1](#) for safe working loads (SWL's) at non-standard load centers. [Figure 2-1](#) illustrates the Mk 5 Mod 0 Forklift Truck Boom.



**FIGURE 2-1. Mk 5 Mod 0 Forklift Truck Boom**

2-3.2. **MK 91 MOD 0 HOOK ADAPTER.** Used for a quick conversion to a boom truck, the Mk 91 Mod 0 Hook Adapter consists of a welded steel beam with fork pockets, and two clamping screws to permit attachment to the forks. A swivel safety hook is attached to the beam for lifting and transporting various loads. See [paragraph 4-5.1](#) for specific SWL's at non-standard load centers. The Mk 91 Mod 0 Hook Adapter is to be used for lifting only. [Figure 2-2](#) illustrates the Mk 91 Mod 0 Hook Adapter.

2-3.3. **MK 176 MOD 0 HOOK ADAPTER.** Used for a quick conversion to a boom truck, the Mk 176 Mod 0 Hook Adapter consists of a welded steel beam with fork pockets, and two clamping screws to permit attachment to the forks. A swivel safety hook is attached to the beam for lifting and transporting Capsule Launching System (CLS) or Composite Capsule Launching System (CCLS) TOMAHAWK All-Up Rounds (AUR's). See [paragraph 4-5.1](#) for specific SWL's at non-standard load centers. The hook adapter is to be used for lifting only. [Figure 2-3](#) illustrates the Mk 176 Mod 0 Hook Adapter.

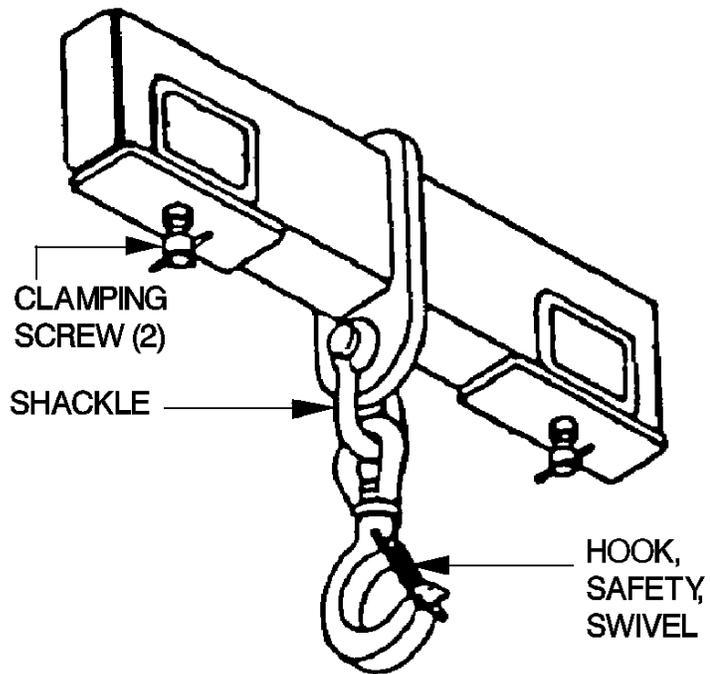


FIGURE 2-2. Mk 91 Mod 0 Hook Adapter

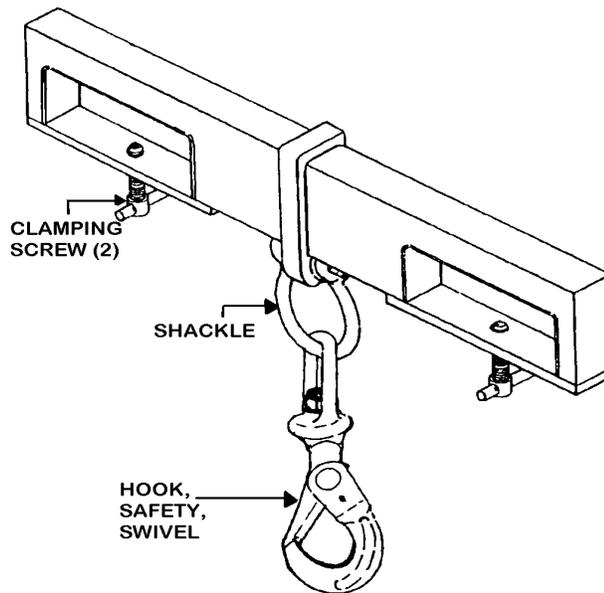
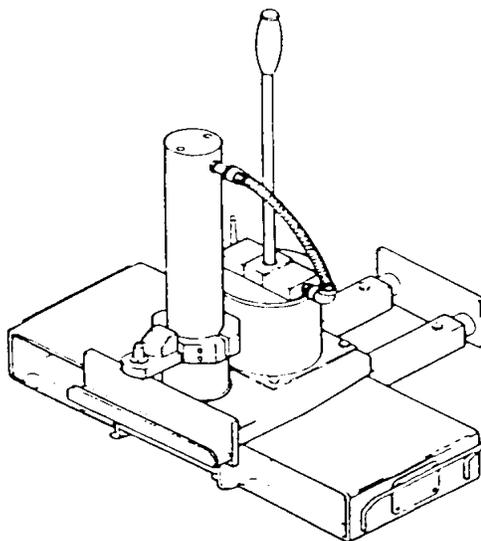


FIGURE 2-3. Mk 176 Mod 0 Hook Adapter

2-3.4. **MK 156 MOD 0 ENDLIFT ADAPTER.** The Mk 156 Mod 0 Endlift Adapter is used as an interface between pallet trucks only and the end of weapon containers and canisters. The other end of the container or canister is maneuvered by another pallet truck with an Mk 156 Mod 0 Endlift Adapter or a Mk 45 Mod 2 Handlift Truck. Refer to [NAVSEA OP 2173/NAVAIR 19-100-1](#) for Mk 45 Mod 2 Handlift Truck description and applications. The endlift adapter consists of a hydraulic pump and cylinder assembly, lift angle, and an adjustable bumper. The lift angle is manually lowered and mated with the end fittings of various weapon containers and canisters. The bumper can be adjusted to accommodate varying pallet truck fork lengths. [Figure 2-4](#) illustrates the Mk 156 Mod 0 Endlift Adapter.



**FIGURE 2-4. Mk 156 Mod 0 Endlift Adapter**

## CHAPTER 3

### MATERIALS HANDLING EQUIPMENT LICENSING

#### 3-1. GENERAL

This chapter lists the processes to train and license personnel as powered Materials Handling Equipment (MHE) operators and to authorize personnel as local instructors for the purpose of issuing a license for powered MHE operators. The possession of a valid MHE license, in and of itself, does not authorize an individual to operate MHE to handle ammunition and explosives. Local qualification and certification requirements must be satisfied prior to any handling of ammunition and explosives.

#### 3-2. AVOIDANCE OF DUPLICATE TRAINING

If an MHE operator has received training and is licensed to handle ammunition and explosives as specified in this manual, the operator is authorized to handle general supplies and hazardous materials (HAZMAT), as described in [Naval Supply Command Publication \(NAVSUP PUB\) 538](#), without additional training provided the following requirements are met:

- a. The same MHE classes and lift codes, safe working loads (SWL's), type designations (e.g., EE, DS, etc.), and working conditions are encountered.
- b. The operator is familiar with the potential safety hazards associated with the HAZMAT being handled [e.g., understanding the Material Safety Data Sheet (MSDS)] and is aware of local HAZMAT regulations involving fire fighting, emergency response, and containment/clean-up procedures.
- c. The operator has been evaluated and found competent to operate the MHE safely.

#### 3-3. QUALIFICATIONS

The following minimum qualification requirements must be satisfied to issue a license to individuals as MHE explosives operators.

3-3.1. **MEDICAL.** Every five years until age 60 and annually thereafter, all operators (civilian-employee, contractor and subcontractor or military - active and reserve) shall comply with the medical surveillance/certification requirements listed in Program 721 (Explosives Handler) Navy and Marine Corps Public Health Center - Technical Manual, Occupational Medicine NMCPHC-TM OM 6260 (series). These examinations shall be performed by an independent medical provider [i.e., Navy Independent Duty Corpsmen (IDC), Physicians (MD or DO), Physician Assistants (PA), or Nurse Practitioners (NP)]. Each MHE operator must hold a current "Handler Only" Medical Examiner's Certificate ([OPNAV 8020/2 Form](#)), [figure 3-1](#). This certificate is issued by the Occupational Health Clinic where the examination is conducted. For contractor employees, the Navy's Occupational Health department will review a copy of the completed Program 721 examination conducted by the contractor's independent medical provider to confirm the employee meets program requirements, and once in compliance the certificate will be issued. Waivers from medical standards or physical requirements with endorsements from safety, medical and legal, as appropriate are granted at the command level. As stated

## NAVSEA SW023-AH-WHM-010 EIGHTH REVISION

in [paragraph 3-4.1.c](#), this certificate shall either be in the possession of the operator or retained by the operator's medical department.

OPNAVINST 8023.24	<b>MEDICAL EXAMINER'S CERTIFICATE</b>	OPNAV 8020/2	
DEPARTMENT OF THE NAVY EXPLOSIVE HANDLER OR FORKLIFT OPERATOR			
I certify that I have examined _____ in accordance with			
(check all that apply)			
<input type="checkbox"/>	NAVSEA OP 5 & NAVMED P-117 (Explosive Material Handler, Program 721)		
<input type="checkbox"/>	NAVSUP Pub 538 & NAVFAC P-300 (Forklift Operator, Program 710)		
and with knowledge of the worker's position duties, I find this person			
<input type="checkbox"/>	Qualified without restrictions	<input type="checkbox"/>	Qualified with the following restrictions:
_____			
Signature of Independent Medical Provider	<input type="checkbox"/>	MD/DO	_____
_____	<input type="checkbox"/>	PA	Exam Date
Independent Medical Provider Name (print)	<input type="checkbox"/>	ANP	_____
_____	<input type="checkbox"/>	IDC	Expiration Date
Clinic and Location of Independent Medical Provider	A copy of this examination is on file in my office		Phone
_____	_____		_____
Signature of Handler / Operator	Handler / Operator Date of Birth		
_____	_____		

[Click Here to reproduce and annotate this certificate](#)

**FIGURE 3-1. Medical Examiner's Certificate (OPNAV Form 8020/2)**

3-3.2. **AGE.** The Fair Labor Standard Act (FLSA), the Occupational Safety and Health Administration (OSHA), and the Office of Personnel Management (OPM) require civilians to be 18 years of age or older to operate MHE. The minimum induction age requirement applies to military personnel to operate MHE.

3-3.3. **INITIAL OPERATOR TRAINING.** [29 CFR 1910.178](#) requires that all MHE operators be trained to a competency level, not a defined number of hours, and allows flexibility in how training is accomplished. To satisfy this requirement, within the scope of this manual, a comprehensive MHE operator licensing course is contained in [appendix A](#). The following requirements must be followed:

a. The Commanding Officer (CO) or Officer-in-Charge (OIC) shall ensure that [appendix A](#) is employed to train MHE operators, regardless of personnel employer. Contractor and other non-Government employees employed under their command must also satisfy the operator training course specified in [appendix A](#).

b. The CO/OIC shall verify that positive administrative controls are in place that will keep MHE operators informed of changes to this manual that could affect the safety of MHE operations.

3-3.4. REFRESHER OPERATOR TRAINING. The CO/OIC is responsible for the content, duration and documentation of refresher training. An MHE operator shall attend refresher training whenever:

- a. The operator has been observed to operate MHE in an unsafe manner.
- b. The operator has been involved in an accident or near-miss incident.
- c. The operator has received an evaluation that reveals that the operator is not operating the MHE safely.
- d. The operator has not operated MHE within the past 12 months to verify that job skills have not degenerated.
- e. The operator is assigned to drive a different MHE classes and lift codes, SWL's, type designations (e.g., EE, DS, etc.) or different working conditions are encountered.
- f. A condition in the workplace changes in a manner that could affect safe operation of the MHE.

### 3-4. LICENSE

A license is required for all powered MHE operators. A license is not required for manually-powered MHE operators. A state motor vehicle driver's license is not a requirement for an MHE Operator's License, unless required by local command policy.

#### NOTE

The "MHE Operator License," [figure 3-2](#), apply to Navy Activities, while "U.S. Government Motor Vehicles Operator's Identification Card," Form OF 346, apply to Marine Corps activities for the purpose of issuing a license to MHE operators under the provisions of [paragraphs 3-4.1 and 3-4.2](#), respectively. These licenses shall be issued to MHE operators who have satisfactorily completed the initial operator training ([appendix A](#)) and to current licensed operators.

3-4.1. NAVY ACTIVITIES. The "MHE Operator's License," [figure 3-2](#), shall serve as the Navy's official license and is valid for 3 years provided the medical examination certificate has not expired. Additional licenses may be issued, as required, when all related information cannot be annotated on one license. No other equipment, vehicles, etc., shall be annotated on the license. Individuals holding a valid license shall always have it on their person when operating MHE. The license for an explosives MHE operator shall indicate:

- a. All restrictions imposed (e.g., corrective lenses required, daytime operations only, requires hearing aids, etc.).

## NAVSEA SW023-AH-WHM-010 EIGHTH REVISION

b. "Yes" is marked in the "EXPLOSIVES AUTHORIZED" field. Likewise, "YES" shall be marked in the "GENERAL SUPPLY AUTHORIZED" field, provided the provisions of [paragraph 3-2](#) have been met.

c. The Medical Examiner's Certificate, [OPNAV 8020/2 Form \(figure 3-1\)](#), is either "ON FILE" or "ON PERSON".

d. The month and year appears on the "DATE ISSUED" and "DATE EXPIRES" fields.

e. The MHE classes and lift codes, the safe working loads (SWL's) and the type designations (e.g., EE, DS, etc.) the license is valid for. An example of an operator trained and licensed to handle 4,000- and 6,000-pound sit-down counterbalanced solid tire rider electric forklift trucks would be: Class/Lift Code is "1/5", SWL is either "4K & 6K" or "up to 6K" (where K denotes thousands), and the Type Designation is "EE".

[Table 3-1](#) defines the seven classes and the assigned lift codes for powered industrial MHE, as defined by the Industrial Truck Association, according to their individual characteristics. Each of the different types of powered MHE in a given class has its own characteristics and some inherent hazards (i.e., different control operations or steering capabilities). For example, on some rough terrain forklift trucks (class 7, lift code 1) the frame articulates (moves and rotates) for traversing and turning, while on others the front and rear wheels articulate. To be most effective, training must address these unique characteristics to the specific types of MHE the operator is trained to operate. Therefore, an operator must be trained and evaluated in the safe operation for the types of MHE that the operator will be assigned to operate in the workplace.

For example, if an operator is assigned to operate a sit-down counterbalanced solid tire rider electric truck (class 1, lift code 5), then the operator must be trained and evaluated in the safe operation for that type of MHE. If the same operator is now assigned to operate a stand-up counterbalanced front/sideloader truck (class 2, lift code 4), or a rough terrain forklift truck (class 7, lift code 1), then the operator must be trained and evaluated in the safe operation for those types of MHE as well. Operators who have successfully completed the training and evaluation for each specific type of MHE would not need additional training when they are assigned to operate the same type of MHE made by a different manufacturer. However, operators would need additional training if the applicable truck-related and workplace-related topics, as listed in [29 CFR 1910.178\(1\)\(3\)](#), are different for that truck.

### NOTE

A field on the MHE Operator's License, [figure 3-2](#), is provided entitled, "Other Local Requirements," which may be used to annotate additional licensing requirements beyond the scope of this publication, but may be required by local directives/instructions such as annotating a person's valid state driver's license number.

**3-4.2. MARINE CORPS ACTIVITIES.** The "U.S. Government Motor Vehicle Operator's Identification Card", Form OF 346, shall serve as the Marine Corps official license and is valid for 3 years provided the medical examination certificate has not expired. Individuals holding a valid license

shall always have it on their person when operating MHE. In addition to the proper completion of the front of the license, the back of the license for an explosives MHE operator shall indicate:

- a. "EXPLOSIVE OPERATOR MHE" annotated on the license.
- b. "MUST HOLD CURRENT MEDICAL CERTIFICATE" documented on the license.

**3-4.3. ISSUANCE.** The CO/OIC shall designate in writing the responsible party authorized to issue licenses. This party is also authorized to upgrade a valid MHE license to indicate other classes, types and capacities of MHE based on the operator's satisfactory demonstration of practical operating skills. Upgraded MHE licenses shall be documented and maintained in each operator's training certificate as shown in [appendix A](#).

**3-4.4. EVALUATION.** In accordance with [29 CFR 1910.178](#), licensed operators must be periodically evaluated (at least once every 3 years) while they operate MHE in the workplace to ensure that their skills remain at a high level and must receive refresher training whenever there is a demonstrated need for it. The evaluator(s) must be familiar with the respective MHE features and operation, and with the workplace conditions/environment. However, they do not need to be licensed as an MHE operator. The CO/OIC will ensure that a process is documented to evaluate MHE operators. An evaluation of an operator's performance shall be determined by an observation of the employee operating the MHE or an interview, and written documentation of previous training or a performance test. Evaluations shall be documented and maintained in each operator's training certificate as shown in [appendix A](#). An unsatisfactory evaluation shall warrant the operator attend the MHE refresher operator training.

**3-4.5. RENEWAL.** The CO/OIC will verify that a process is documented to renew the license. The renewal process shall include documentation attesting to the demonstration of the operator's proficiency.

**3-4.6. REVOCATION.** The license may be revoked in writing by the CO/OIC. The reasons for the revocation of and the process required to reissue the license shall be documented.

### **3-5. INSTRUCTOR TRAINING**

Local activity instructors shall be authorized in writing by the CO/OIC to provide MHE operator training. Authorization should address the following qualifications:

- a. Completion of a course providing training to become proficient as a workspace trainer (WST)/instructor. Training shall be accomplished by accessing the following Continuous Navy Learning (CNL) courses under the [Navy Knowledge Online \(NKO\) website](#): the required CNL Instructional Delivery Continuum Apprentice (CNL-IDC-AP-1) course and the optional Journeyman (CNL-IDC-JIT-000R and CNL-IDC-JIT-0010) courses. The CO/OIC may accept other equivalent training provided it's documented in the instructor's training record.

- b. Possession of the appropriate MHE operator's license.

- c. All training and evaluations must be conducted by persons with the necessary knowledge, training and experience to train industrial MHE operators and evaluate their competence. An example of a qualified trainer would be a person who, by possession of a recognized degree, certificate, or

**NAVSEA SW023-AH-WHM-010 EIGHTH REVISION**

professional standing, or who by extensive knowledge, training, and experience has demonstrated the ability to train and evaluate powered industrial MHE operators.

<b>MHE OPERATOR'S LICENSE</b>				Physical Restrictions ( <i>e.g., requires corrective lenses, day-time operations only, requires hearing aid, etc.</i> )		
Issuing Activity's Name						
Operator's Name			Sex			
Date of Birth		Local Card Number				
Height	Weight	Hair	Eyes	Other Local Requirements		
Date Issued	Date Expires					
<b>LICENSED TO OPERATE</b>						
General Supply Authorized		YES	<input type="checkbox"/>	Class/ Lift	SWL	Type Designations
Explosives Authorized		YES	<input type="checkbox"/>			
Flight Deck Scrubber Authorized		YES	<input type="checkbox"/>			
Power/Pressure Washer Authorized		YES	<input type="checkbox"/>			
Issuing Authority's Signature						
Operator's Signature						
Medical Certificate:		On File	<input type="checkbox"/>			
		On Person	<input type="checkbox"/>			

**FIGURE 3-2. MHE Operator's License (Navy Activities)**

[CLICK HERE TO REPRODUCE AND ANNOTATE LICENSES FOR ISSUANCE.](#)

**Table 3-1. MHE Class Definitions**

<b>Class</b>	<b>Lift Code</b>	<b>Description</b>
1	1	Electric, Counterbalanced Rider-Type, Stand Up
	4	Three Wheel Electric Truck, Sit Down
	5	Electric, Counterbalanced Rider, Solid Tires, Sit Down
	6	Electric, Counterbalanced Rider, Pneumatic Tires, Sit Down
2	1	High Lift Straddle
	2	Order Picker
	3	Reach Type Outrigger (e.g., Reaching and Tiering)
	4	Sideloader, Turret Trucks, Swingmast and Convertible Turret/Stock Pickers
	6	Low Lift, Electric Pallet and Platform Truck (Rider)
3	1	Low Lift, Electric Walkie Platform Truck
	2	Low Lift, Electric Walkie Pallet Truck
4	3	Internal Combustion, Counterbalanced Forklift Truck (Solid Tires)
5	4	Internal Combustion, Counterbalanced Forklift Truck (Pneumatic Tires)
6	1	Electric or Internal Combustion, Sit Down Rider Tractor (Solid and Pneumatic Tires)
7	1	Rough Terrain Forklift Truck (Pneumatic Tires)
AWP		Shipboard Aerial Work Platforms
FDS		Flight Deck Scrubber (SMSE)
PW		Power/Pressure Washer (SMSE)

**NOTE**

Refer to [NAVSUP PUB 538](#) for definitions of MHE type designations. MHE Class definitions for AWP, FDS and PW are not related to the scope of this manual affecting explosives safety.

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## CHAPTER 4

### OPERATIONAL SAFETY REGULATIONS

#### 4-1. GENERAL

Materials Handling Equipment (MHE) is approved for use based on design parameters that allow for the safe and efficient handling of ammunition and explosives in specific operational areas. Careless or improper operation of MHE may result in personnel injury or property damage even if the approved MHE is used. Therefore, it is imperative that all safety precautions and regulations pertaining to the operation of MHE detailed in this chapter are applied and strictly enforced.

#### 4-2. GENERAL SAFETY REGULATIONS

Operators shall perform a daily pre-operational and post-operational safety inspection on the MHE as detailed in [Naval Supply Command Publication \(NAVSUP PUB\) 538](#). Likewise, they shall observe the applicable general safety regulations documented in [NAVSUP PUB 538](#) to ensure the MHE is safe to operate. Additionally, in order to maintain consistency during handling procedures, inert ammunition components should be handled as if they were live ammunition, as prescribed in [NAVSEA OP 5](#).

#### 4-3. PERSONNEL SAFETY

Operators shall observe the applicable personnel safety requirements of [NAVSUP PUB 538](#) prior to operating MHE.

#### 4-4. SAFETY DEVICES

Several kinds of safety devices, depending on the MHE type, are provided to ensure its safe and efficient operation. Refer to [NAVSUP PUB 538](#) for the specific types of safety devices associated with MHE to ensure its safe and efficient operation.

#### 4-5. HANDLING SAFETY

4-5.1. NON-STANDARD LOAD CENTERS. The majority of forklift trucks are rated at a 24-inch load center to full lift height. Consult the manufacturer's data plate for the actual standard load center. All loads shall be placed against the fork heel or fork stops (if used). Loads with load centers greater than the typical 24 inch load center may be encountered. Greater load centers are allowable, subject to the weight limitations provided on the manufacturer's data plate. When non-standard load centers are not provided by the manufacturer, table 4-1 provides calculations of SWL's when load centers are greater than 24 inches. The maximum weights listed in this table are equal to or less than the manufacturer's rating. Do not carry non-standard loads up and down steep inclines or in rough sea conditions. If the load center of the item to be carried falls between the load centers stated in [table 4-1](#), use the next highest

## NAVSEA SW023-AH-WHM-010 EIGHTH REVISION

load center to determine the maximum weight that can be safely carried. For example, if an item with a 32-inch load center is to be carried on a 4,000-pound safe working load (SWL) counterbalanced forklift truck, the maximum allowable weight of that item is determined by looking up the maximum allowable weight for a 36-inch load center item. In this case, the maximum allowable weight that can be safely carried is 2,667 pounds.

**4-5.2. GENERAL HANDLING SAFETY PRECAUTIONS.** The general safety precautions identified in [NAVSUP PUB 538](#) must be observed during all handling operations.

**4-5.3. SAFETY PRECAUTIONS DURING MOVEMENTS.** Prior to any MHE movement operation, the safety precautions identified in [NAVSUP PUB 538](#) must be followed. Additionally, when using a warehouse tractor, never exceed its rated towing capacity. The maximum number of trailers permitted in a trailer train shall be determined by the local Commanding Officer/Officer-in-Charge (CO/OIC), except for the following:

- a. Three is the maximum number of loaded trailers permitted to be stowed when ascending or descending ramps.
- b. Never tow more than four bombs and/or torpedo trailers in a train.

### **4-6. SAFETY DURING FUELING**

All safety precautions, afloat and ashore, documented in [NAVSUP PUB 538](#) shall be observed during all MHE fueling operations.

### **4-7. BATTERY CHARGING, TESTING AND MAINTENANCE**

All regulations, afloat and ashore, documented in [NAVSUP PUB 538](#) shall be observed with regard to battery charging, testing and maintenance operations.

### **4-8. INCIDENT AND MISHAP REPORTING**

Any accident, incident or explosion mishap shall be reported in accordance with [OPNAVINST 5102.1/MCO 5102.1 \(series\)](#). Found defects (e.g., holes in containers, leakage, etc.) regardless of cause or origin shall be immediately reported to the supervisor. Fires at shore activities shall be reported in accordance with [OPNAVINST 11320.25 \(series\)](#).

Table 4-1. Non-Standard Load Centers

TYPICAL NON-STANDARD LOAD CENTERS		
Truck Safe Working Load (Pounds)	Load Center (inches)	Maximum Weight (pounds)
4,000	24 (rated)	4,000
	30	3,200
	36	2,667
	42	2,286
	48	2,000
4,500	24 (rated)	4,500
	30	3,600
	36	3,000
	42	2,571
	48	2,250
6,000	24 (rated)	6,000
	30	4,800
	36*	4,000
	42*	3,429
	48*	3,000
8,000	24 (rated)	8,000
	30	6,400
	36*	5,333
	42*	4,571
	48*	4,000
10,000	24 (rated)	10,000
	30	8,000
	36	6,667
	42	5,714
	48	5,000
15,000	24 (rated)	15,000
	30	12,000
	36	10,000
	42	8,571
	48	7,500
20,000	24 (rated)	20,000
	30	16,000
	36	13,333
	42	11,429
	48	10,000

\*Install the Mk 12 Mod 0 Fork Extensions (only on forks that are 2 inches thick by 6 inches wide and are less than 40 inches in length) to achieve the 36-inch, 42-inch and 48-inch non-standard load center.

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## CHAPTER 5

### REGULATIONS FOR USING MATERIALS HANDLING EQUIPMENT IN HAZARDOUS LOCATIONS

#### 5-1. GENERAL

Selection of the specific type of Materials Handling Equipment (MHE) approved for an operating area is based on the hazardous classification in the area in which the MHE is being operated (e.g., possible presence of explosive vapors/dusts in the areas), the hazards of the materials being handled (e.g., palletized load of 5-inch projectiles), and the hazards associated with the MHE (e.g., carbon monoxide exhaust fumes or propane fuel tank leaks). The improper assessment of either hazard or the use of unapproved MHE may result in an incident.

#### 5-2. MHE APPROVED MATERIAL CATEGORIES AFLOAT AND ASHORE

5-2.1. FUEL AIR EXPLOSIVES/HYPERGOLICS (FAE/HYP). Conventional ordnance that contains a FAE or both ingredients of a hypergolic fuel system.

5-2.2. AMMUNITION AND EXPLOSIVES (A&E). All other conventional ordnance, ammunition, explosives, or explosive material/item/device/hazardous waste classified or being developed to be classified as a Hazard Class 1, Divisions 1 through 6 item.

#### 5-3. MHE APPROVED OPERATIONAL AREAS AFLOAT

[Table 5-1](#) identifies the approved MHE afloat for the specific materials to be handled in a given operational area.

5-3.1. BELOW DECK. All magazines and stowage compartments within the skin of the vessel. Stowage of containerized FAE/HYP ordnance shall be only in a certified magazine, as described in NAVSEA S9000-AB-GTP-010.

5-3.2. CLOSED LIGHTERS. Yard service craft (YFN) and modified YFN lighters.

5-3.3. TOP SIDE. All open decks, hangar decks, decks with forced air or flow through ventilation, and open lighters.

#### 5-4. MHE APPROVED OPERATIONAL AREAS ASHORE

The Commanding Officer/Officer-in-Charge (CO/OIC) is responsible for determining the hazardous classified environment of each operating area where MHE will be used, as specified in the [National Fire Protection Association \(NFPA\) 70](#), Article 500. Due to the numerous types of floor and ramp conditions

## NAVSEA SW023-AH-WHM-010 EIGHTH REVISION

that may be encountered, the MHE approved for use in [tables 5-2](#) and [5-3](#) requires CO/OIC authorization as documented in the appropriate local operating procedures. If an activity desires to use MHE not identified in either [tables 5-2](#) or [5-3](#), they are permitted to do so provided a hazards analysis is performed and maintained, and the activity complies with the provisions of [NFPA 505](#), [29 CFR 1910.178](#) and [OPNAVINST 5100.23 \(series\)](#).

### NOTE

The use of powered MHE is forbidden in areas where dust vapors are known to, or can reasonably be expected to, reach explosive limits during routine operations (i.e., mixing, bulk weighing, screening, etc.)

Certain types of MHE, as identified in Naval Supply Command Publication (NAVSUP PUB) 538, used in closed or partial operational areas ashore require the installation of gas/vapor/carbon monoxide detection systems in these areas to monitor the concentration of expelled fuel vapors/combustion products. For MHE not listed in [tables 5-2](#) and [5-3](#), refer to [29 CFR 1910.178](#). Dual-fueled forklift trucks, (e.g., GS/LPS or GS/CNS) shall only be used in areas authorized by the most restrictive designation.

5-4.1. **CLOSED.** Buildings, structures, magazines, internal rooms and bays, etc., that have restricted ventilation that could allow the formation of a hazardous environment.

5-4.2. **PARTIAL.** Buildings, structures, magazines, internal rooms and bays, railcars, motor vehicles, loading ramps, platforms, etc., that have relatively unrestricted ventilation but could allow the formation of a hazardous environment.

5-4.3. **OPEN.** Piers, wharves, areas or structures that may have a roof but has no walls that would not restrict ventilation nor allow the formation of a hazardous environment.

### WARNING

Type DS and DY MHE may be used in closed lighters afloat and partial operational areas ashore to handle ammunition and explosives provided they meet federal, state and local regulations for air quality and noise pollution. Each activity must monitor the emissions in accordance with manufacturer's recommendations to ensure that the exhaust emissions do not exceed the personal exposure limits set forth by federal, state or local regulations.

**Table 5-1. Approved MHE Afloat**

Material	Operational Area		
	Below Deck	Closed Lighters	Top Side
FAE/HYP	EX, HS	EX, HS	DS, DY, EE, EX, HS
A&E	EE, EX, HS	DS, DY, EE, EX, HS	DS, DY, EE, EX, HS

**Table 5-2. Approved MHE Ashore (Packaged)\***

Material	Operational Area		
	Closed	Partial	Open
FAE/HYP	EE, EX, ORDNANCE	EE, EX, ORDNANCE	CNS, DS, DY, EE, EX, GS, ORDNANCE, LPS, GS/CNS, GS/LPS
A&E	EE, EX, ORDNANCE	DS, DY, EE, EX, ORDNANCE	CNS, DS, DY, EE, EX, GS, ORDNANCE, LPS, GS/CNS, GS/LPS

\*This table is only valid when the explosive materials are prevented from contacting the ambient environment, i.e., containerized/palletized according to the applicable military standard (MIL-STD), all-up-rounds, raw materials in the original shipping container, or sealed component parts.

**Table 5-3. Approved MHE Ashore (Other)\***

Material	Operational Area		
	Closed	Partial	Open
FAE/HYP	EX, ORDNANCE	EX, ORDNANCE	EX, ORDNANCE
A&E	EX, ORDNANCE	EX, ORDNANCE	EX, ORDNANCE

\*This table is valid when the explosive materials may be exposed to the ambient environment as a part of normal operations.

**5-5. TEMPORARY PARKING**

MHE shall be considered temporarily parked as defined in [NAVSUP PUB 538](#).

**5-6. STORAGE OF MHE IN APPROVED OPERATIONAL AREAS ASHORE.**

MHE shall be stored in approved operational areas as described in [NAVSUP PUB 538](#). Additionally the following shall be observed:

- a. Only electric and manually powered MHE are authorized to be stored with ammunition and explosives in closed areas. The MHE shall be stored as far away from the ammunition and explosives as practical.
- b. All types of MHE identified in [tables 5-2](#) and [5-3](#) are approved for storage with ammunition and explosives in partial and open areas. The MHE shall be stored as far away from the ammunition and explosives as practical.

**5-7. STOWAGE OF MHE IN SHIPBOARD MAGAZINES**

When ammunition and explosives are present, stowage of MHE types, approved in [table 5-1](#), is permitted under the conditions described in [NAVSUP PUB 538](#).

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## CHAPTER 6

### INSPECTION, MAINTENANCE AND TEST PROGRAM

#### 6-1. GENERAL

Inspection, maintenance and tests are crucial elements involved in the safe operation of Materials Handling Equipment (MHE) that will improve the overall condition of the equipment and lessen the possibility of accidents. The requirements of this chapter, along with the preventive maintenance provisions of [Naval Supply Command Publication \(NAVSUP PUB\) 538](#), shall be observed by operators and maintenance personnel, as applicable, concerned with inspecting, operating, servicing and repairing MHE.

#### 6-2. EQUIPMENT HISTORY FILE.

An equipment history file shall be initiated and maintained in accordance with the requirements of [NAVSUP PUB 538](#).

#### 6-3. GENERAL INSPECTION CRITERIA

The following are general inspection criteria pertaining to new or overhauled [through the Service Life Extension Program (SLEP)] MHE, in-service MHE, and approved MHE attachments.

6-3.1. NEW OR SLEP EQUIPMENT. All new equipment from direct vendor delivery or a SLEP unit from a SLEP facility must receive an initial inspection and servicing using the [MHE Initial Receipt Inspection Form](#) described in [NAVSUP PUB 538](#).

6-3.2. IN-SERVICE EQUIPMENT. All powered MHE operators shall conduct a daily pre-operational and post-operational safety inspection of the MHE using the [MHE Inspection Form](#) and the supporting inspection criteria procedures described in [NAVSUP PUB 538](#). Operators of non-powered MHE are not required to complete the [MHE Inspection Form](#), but are required to conduct inspections and functional tests in accordance with the applicable Maintenance Requirement Cards (MRC's) (afloat) or manufacturer's technical manuals (ashore). Likewise, forks shall be inspected at intervals of not more than 12 months or whenever any defect or permanent deformation is detected using the [Fork Maintenance Inspection Form](#) with supporting inspection procedures and requirements described in [NAVSUP PUB 538](#).

6-3.3. MHE ATTACHMENTS. In-service MHE attachments, identified in [NAVSUP PUB 538](#) and in [paragraph 2-3](#) of this manual, shall be inspected, maintained, and tested as required in the Maintenance Material Management (3M) System as delineated by [OPNAVINST 4790.4 \(series\)](#). Shipboard maintenance will be accomplished using the Navy's Planned Maintenance System (PMS) consisting of Maintenance Index Pages (MIP's) and associated Maintenance Requirement Cards (MRC's). Shore activities will use MIP's and MRC's, when available, or equivalent documentation. MIP's provide information on maintenance intervals and identify the applicable MRC's that provide detailed descriptions of visual inspections, maintenance tasks and intervals, manpower and tooling requirements

## NAVSEA SW023-AH-WHM-010 EIGHTH REVISION

for routine and preventive maintenance to assure the MHE is operational. MRC's are arranged sequentially by work area and system. MRC's do not include repairs. MIP's and MRC's are available on the Navy Force Revision PMS DVD's and can be obtained by contacting Commanding Officer, Naval Sea Logistics Center (NAVSEALOGCEN) Detachment San Diego, Code 05316, 4755 Railroad Way, San Diego, CA 92136-5503.

### 6-4. MAINTENANCE AND REPAIRS

All maintenance operations and repairs to MHE must comply with the provisions of [NAVSUP PUB 538](#) to maintain its safe integrity and to avoid compromising the unit's safety rating.

### 6-5. PERIODIC TESTING

#### NOTE

Using the testing arrangements found in [NAVSEA SG420-AP-MMA-010](#) and the requirements of [paragraph 6-6](#), written operating procedures are required for periodic weight testing operations of forklift attachments and MHE, respectively.

6-5.1. PERIODIC WEIGHT TESTING OF FORKLIFT ATTACHMENTS. Each Mk 5 Mod 0 Forklift Truck Boom and Mk 91 Mod 0 and Mk 176 Mod 0 Hook Adapters, as identified in [paragraph 2-3](#), shall be subjected to a periodic weight test whenever one of the following conditions occur:

- a. Every 48 months (afloat or ashore) after the handling equipment is initially put into service.
- b. Less than 48 months when it is necessary to coincide with the ship's deployment.
- c. After the handling equipment has undergone repairs affecting the load bearing components.

Periodic weight testing shall be conducted by authorized intermediate or depot levels of maintenance in accordance with [NAVSEA SG420-AP-MMA-010](#). Ordnance handling equipment (OHE) passing periodic weight testing must indicate the following information on the equipment:

TEST FACILITY: \_\_\_\_\_  
(testing activity name)

TEST EXPIRATION DATE: \_\_\_\_\_  
(month/year)

SAFE WORKING LOAD: \_\_\_\_\_ POUNDS  
(number)

New marking/test tag information must be applied as the equipment is periodically tested or at the time the test tag is changed upon receipt of new equipment as detailed in [NAVSEA OP 5](#) or [NAVSEA OP 4](#).

No periodic weight testing is required for the Mk 12 Mod 0 Fork Extension and the Fork Stop which are described in [NAVSUP PUB 538](#).

6-5.2. PERIODIC OPERATIONAL TESTING OF MHE. Periodic operational testing of MHE shall be conducted in accordance with [paragraph 6-6](#) whenever one of the following conditions occur:

**NOTE**

Periodic operational testing is not required for MHE that are solely used with inert loads for training demonstrations. They must be maintained in accordance with [NAVSUP PUB 538](#) and the applicable manufacturer's technical manual.

- a. Prior to being placed into service and every 18 months thereafter.
- b. Less than 18 months when it is necessary to coincide with the ship's deployment.

6-5.3. OVERLOAD WEIGHT TESTING OF MHE. Overload weight testing of MHE, with the exception of pallet trucks and straddle carriers, shall be conducted whenever the MHE has undergone repairs or modifications affecting the load-bearing components. Examples of load-bearing components are forks, fork carriage, cylinders, frame or mast. Refer to [paragraph 6-7](#) for overload test procedures.

**NOTE**

Overload testing is not required when replacing seals, packing material, wiping components, tires and rims, fittings or hydraulic hoses. Instead, the MHE shall be tested at 100% load capacity for potential leaks.

6-5.4. LIFTING EYES TESTING OF MHE. Lifting eyes testing of MHE, with the exception of straddle carriers, shall be conducted whenever they have been repaired or replaced. Refer to [paragraph 6-8](#) for inspections and test procedures.

6-5.5. MHE TEST LOADS. Known values of test weights shall be used for testing. Dynamometers, or other recording equipment, are not permitted in lieu of dead weights. The assembled test load, including rigging, shall be accurate within +5/-0 percent of the nominal test load. The weights shall be measured using calibrated equipment with a minimum accuracy of  $\pm 2$  percent (of scale) traceable to the National Institute of Standards and Technology.

6-5.5.1. Marking of Test Loads. The test weight(s) shall be marked (e.g., steel stamping, etching, engraving, raised metal deposit, or stenciling) with a unique identification number and the weight in pounds.

**6-6. GENERAL PERIODIC TESTS FOR MHE**

[Table 6-1](#) denotes the applicable 18-month periodic tests for each type of MHE. Reference should be made to this table prior to conducting any periodic tests. The following pages describe what tests must be conducted for certification of each piece of MHE. The MHE Safety Certification Form ([figure 6-1](#)) or a Commanding Officer/Officer-in-Charge (CO/OIC) approved equivalent shall be completed and maintained in the MHE history file until the next scheduled test. Certification shall be based on the conditions in specifications and tests prescribed. Upon completion of the required tests, refer to [paragraph 6-9](#) for MHE certification information.

Table 6-1. Periodic Tests for MHE

Test	Forklift/ Swingmast (Electric)*	Forklift/ Swingmast (Fuel)**	Rough Terrain (Fuel)**	Sideloader (Electric)*	Reach & Tier (Electric)*	Pallet Truck (Electric* or Manual)	Straddle Carrier (Fuel)**
Markings (6-6.1)	X	X	X	X	X	X	X
Fuel System (6-6.2)		X	X				X
Neutral Start Switch (6-6.3)		X	X				X
Warning Devices (6-6.4)	X	X	X	X	X	X Electric only	X
Spark Emission (6-6.5)	X	X	X	X	X	X Electric only	X
Static Discharge Test (6-6.6)	X			X	X	X HS/Ordnance and Electric only	
Carriage Reach and Roller Inspection (6-6.7)					X		
Drive Control Test (6-6.8)						X Electric only	
Brake Tests (6-6.9)	X	X	X	X	X	X Electric only	
Brakes (6-6.10)							X
Operational Weight Test (6-6.11)	X	X	X	X	X		
Operational Weight Test (6-6.12)						X Electric only	
King Pin (6-6.13)							X
Lifting Weight Test (6-6.14)							X
Overload Weight Testing (See Note and 6-7)	X	X	X	X	X		
Lifting Eyes Test (See Note and 6-8)	X	X	X	X	X	X	

Note: Overload weight testing shall only be conducted whenever MHE has undergone repairs or modifications affecting load-bearing components.

\*Electric-powered MHE contain designations E, EE, or EX.

\*\*Fuel-powered MHE contain designations CN, CNS, D, DS, DY, G, G/CN, GS, GS/CNS, LP, LPS, G/LP, or GS/LPS.

**NAVSEA SW023-AH-WHM-010 EIGHTH REVISION**

USN/MSC REGISTRATION NO.	MHE CLASS/LIFT CODE/TYPE	SWL	HOUR READER METER	DATE	
TEST	PARAGRAPH	PROCEDURE	RESULTS		
MARKINGS	6-6.1	VISUAL INSPECTION:	ACCEPT	REJECT	
FUEL SYSTEM	6-6.2	LEAK INSPECTION:	ACCEPT	REJECT	N/A
NEUTRAL START SWITCH (Fueled MHE)	6-6.3	OPERATIONAL INSPECTION:	ACCEPT	REJECT	N/A
WARNING DEVICES (Powered MHE)	6-6.4	OPERATIONAL INSPECTION:	ACCEPT	REJECT	N/A
SPARK EMISSION (Powered MHE)	6-6.5	VISUAL INSPECTION:	ACCEPT	REJECT	N/A
STATIC DISCHARGE (Electric and HS/Ordnance Pallet Truck)	6-6.6	CONDUCTOR TYPE:	TIRES	STRAPS	N/A
		RESISTANCE READING:	LEFT ___ OHMS	RIGHT ___ OHMS	N/A
CARRIAGE REACH & ROLLER (Reach & Tier)	6-6.7	OPERATIONAL INSPECTION:	ACCEPT	REJECT	N/A
DRIVE CONTROL (Powered Pallet Trucks)	6-6.8	OPERATIONAL INSPECTION:	ACCEPT	REJECT	N/A
BRAKE (Except Straddle Carriers and Manual Pallet Trucks)	6-6.9.1	TRAVEL DISTANCE (TABLE 6-2): _____ FEET	ACCEPT	REJECT	N/A
		PEDAL FEEL:	ACCEPT	REJECT	N/A
	6-6.9.2	PARKING BRAKE:	ACCEPT	REJECT	N/A
	6-6.9.3	SAFETY BRAKING/DISCONNECT SYSTEM:	ACCEPT	REJECT	N/A
BRAKE (Straddle Carrier)	6-6.10	OPERATIONAL INSPECTION:	ACCEPT	REJECT	N/A
OPERATIONAL WEIGHT TEST (Forklift Trucks)	6-6.11	100% RATED LOAD HELD FOR 2 MINUTES:	ACCEPT	REJECT	N/A
OPERATIONAL WEIGHT TEST (Powered Pallet Trucks)	6-6.12	100% RATED LOAD HELD FOR 2 MINUTES:	ACCEPT	REJECT	N/A
KING PIN (Straddle Carrier)	6-6.13	VISUAL INSPECTION:	ACCEPT	REJECT	N/A
LIFTING WEIGHT TEST (Straddle Carrier)	6-6.14	100% RATED LOAD:	ACCEPT	REJECT	N/A
OVERLOAD WEIGHT TEST (Except Pallet Trucks and Straddle Carriers)	6-5.3	AFTER REPAIRS/MODIFICATIONS AFFECTING LOAD-BEARING COMPONENTS	YES	NO	N/A
	6-7	100% LOAD HELD FOR 2 MINUTES:	ACCEPT	REJECT	N/A
		150% LOAD HELD FOR 2 MINUTES:	ACCEPT	REJECT	N/A
LIFT EYES (Except Straddle Carriers)	6-5.4	AFTER REPAIR/REPLACEMENT	YES	NO	N/A
	6-8	150% WEIGHT OF MHE HELD FOR 2 MINUTES:	ACCEPT	REJECT	N/A
THIS IS TO CERTIFY THAT THE ABOVE MHE WAS INSPECTED AND TESTED IN ACCORDANCE WITH NAVSEA SW023-AH-WHM-010.					
MECHANIC/MAINTENANCE PROVIDER:					
_____ PRINT FULL NAME		_____ SIGNATURE		_____ DATE	
CERTIFIED BY:					
_____ PRINT FULL NAME		_____ SIGNATURE		_____ DATE	
THIS 18 MONTH CERTIFICATION EXPIRES ON: _____ MONTH/YEAR					

**FIGURE 6-1. MHE Safety Certification Form**

[Click Here to reproduce and annotate this form](#)

## NAVSEA SW023-AH-WHM-010 EIGHTH REVISION

6-6.1. **MARKINGS.** For all MHE, visually inspect to ensure that the applicable markings as described in [NAVSUP PUB 538](#) are present, correct, legible and valid. Particular emphasis shall be placed on inspecting the following mandatory markings:

- a. Safe working load (SWL) and vehicle weight (VW) on both sides. Except for all pallet trucks, both markings must also be located directly in front and in clear view of the operator. On electrical pallet trucks, the SWL and VW markings shall appear across the back of the unit (normally on the top of the back cover).
- b. Operator controls, except for manual pallet trucks.
- c. Manufacturer's nameplate/label.
- d. Accredited laboratory certification identification, such as [Underwriter's Laboratory \(UL\)](#) or [Factory Mutual \(FM\)](#), except for manual pallet trucks.
- e. Except for type H or General Supply pallet trucks, MHE safety certification marking ([figure 6-2](#)) in a location that is visible to the operator upon mounting the MHE. This information found on this marking may be on a label or stenciled onto the MHE.

All required markings that are invalid, illegible, incorrect or missing shall be recorded on the MHE Safety Certification Form, [figure 6-1](#), and re-marked prior to release for use.

### 6-6.2. FUEL SYSTEM.

6-6.2.1. Gasoline and Diesel. Visually inspect the entire fuel system for leaks while the MHE is operating. The MHE shall be rejected if any fuel leaks are discovered.

#### 6-6.2.2. Compressed Natural Gas (CNG) and Liquefied Petroleum Gas (LPG).

a. The complete fuel system assembly shall be leak tested, when pressurized, with a non-ammonia soap solution or a leak detector instrument. The MHE shall be rejected if any leaks are discovered.

b. In the event compressed natural gas-powered (CNS) or liquefied petroleum gas-powered (LPS) type MHE is involved in an accident or fire causing damage to any part of the fuel system or fuel tank, or the fuel tank is subjected to a pressure greater than 125% of the service pressure, the MHE shall be removed from service until all necessary repairs and retesting have been completed.

c. Refer to [NAVSUP PUB 538](#) for specific [CNG fuel container](#) and [LPG fuel container](#) requirements.

6-6.3. **NEUTRAL START SWITCH (FUEL-POWERED MHE ONLY).** Where applicable, test the neutral start switch by attempting to start the engine with the directional control lever in either the forward or reverse position. If engine starts, the MHE shall be rejected.

6-6.4. **WARNING DEVICES (POWERED MHE ONLY).** Verify that all warning devices, such as horns, bells, lights, etc., fitted on MHE are operational. Repair or replace any inoperable device.

6-6.5. **SPARK EMISSION (ALL POWERED MHE).** Visually inspect for spark emission in a dark location. For fuel-powered MHE, inspect with the engine on and in neutral. Special attention should be given to the entire exhaust systems (pipes), the ignition wiring, the alternator/generator housing, and the area under the MHE where the engine is located. For electric-powered MHE, inspect while operating each electrical motor (e.g., drive motor, hydraulic, etc.). The drive wheels may be raised off the deck/floor to test the drive motor. Special attention should be given to the area around the covers and under the MHE where the wiring, contactors, and motors are located. The MHE shall be rejected if there is any spark emission.

6-6.6. **STATIC DISCHARGE TEST (TYPE EE, EX, AND HS/ORDNANCE MHE ONLY).** Place a conductive plate on the deck/floor so that the static conductor (either tires or ground straps) rests upon it. Using a calibrated Megohmmeter in accordance with manufacturer's recommendations, place one electrode on the plate and the other on an unpainted section of the chassis. Apply 500 volts and take the resistance reading. The MHE shall be rejected if the resistance is greater than 250,000 ohms. Record discharge reading on the MHE Safety Certification Form, [figure 6-1](#).

6-6.7. **CARRIAGE REACH AND ROLLER INSPECTION (REACH AND TIER TRUCKS ONLY).** With the forks retracted and centered, raise forks just above outriggers. Fully extend the fork carriage and measure the carriage reach and the distance of the roller from the top of the roller guide track. The reach and tier truck shall be rejected if the carriage reach or roller exceeds the manufacturer's technical manual specifications or tolerances.

6-6.8. **DRIVE CONTROL TEST (POWERED PALLET TRUCKS ONLY).** Verify the drive control is disabled in the park/deadman position by actuating the drive control in both forward and reverse directions at all speeds. For control arm type pallet trucks, the arm shall be vertical. For fixed controls, the deadman pedal shall be up or the parking brake engaged, as applicable. The pallet truck shall be rejected if it moves forward or backward. Verify that the drive control operates properly when the control arm is at a 45 degree angle, the deadman pedal is actuated, or parking brake released, as applicable. Actuate the drive control in both forward and reverse directions at all speeds. The pallet truck shall be rejected if it does not move at all speeds in both forward and reverse directions.

6-6.9. **BRAKE SYSTEM TESTS (EXCEPT STRADDLE CARRIERS AND MANUAL PALLET TRUCKS).** MHE shall be subjected to the following brake system tests, as applicable:

6-6.9.1. **Brake Operation Test.** Brake test course shall be level, clean asphalt, brushed concrete, level non-skid, or equivalent surfaces, and of adequate length to permit safe conduct of the test.

a. Load forks with a rated load (100% of the MHE's SWL). Test load shall bear against load backrest, shank of forks, or carriage and need not be at the rated load center. Ensure the test load is centered laterally. For MHE with tilt capability, the forks may be tilted to stabilize the load.

b. Determine the maximum speed of the MHE. This may be accomplished by determining the time it takes the MHE to pass through a 25-foot course as follows: Measure a 25-foot straight course.

## NAVSEA SW023-AH-WHM-010 EIGHTH REVISION

Transverse the course in reverse at maximum speed from a running start. Using an appropriate means to measure time (e.g., stop watch), note the time it takes for a reference point on the MHE to move from the start of the course to the end. Alternately, the maximum speed may be measured using a device such as a radar/laser gun.

c. With the MHE at maximum speed and after passing through the 25-foot course, if applicable, apply the service brakes to achieve maximum deceleration without sliding the tires. Record the stopping distance measured from the point of brake application.

d. Using [table 6-2](#), find the maximum allowable stopping distance associated with the speed or the 25-foot course time.

The MHE shall be rejected if:

- a. The recorded distance exceeds the maximum allowable stopping distance listed in [table 6-2](#).
- b. The brake pedal travels over half the distance to the floor.
- c. The brake pedal travels gradually to the floor (spongy brakes) after brakes are applied.
- d. The brakes do not gradually engage (grabbing) causing sudden or immediate stops.
- e. Brake fluid is leaking, exceeding manufacturer's specifications or standard industrial maintenance practices.
- f. Any component fails.

**6-6.9.2. Parking Brake Test.** Test the parking brake by engaging the parking brake on the unloaded MHE. Attempt to drive the MHE forward by applying a moderate amount of power to the MHE. If the MHE moves, adjust the parking brake, and repeat the parking brake test. The MHE shall be rejected if proper adjustments cannot be achieved.

**6-6.9.3. Safety/Disconnect System Test.** Test the safety braking/disconnect system by moving the unloaded MHE forward at a moderate speed (less than 5 mph) and engage the travel control disconnect. The MHE shall be rejected if the system fails to engage and bring the MHE to a stop.

**6-6.10. BRAKES (STRADDLE CARRIERS ONLY).** Verify that the brakes are adjusted in accordance with the manufacturer's recommendations. The straddle carrier shall be rejected if they are not adjusted in accordance with the manufacturer's recommendations.

**6-6.11. OPERATIONAL WEIGHT TEST (ALL FORKLIFT TRUCKS).** The following procedures are required to perform the operational weight test:

- a. Ensure the MHE is on a level surface.

## NAVSEA SW023-AH-WHM-010 EIGHTH REVISION

b. Position a rated load (100% of the MHE's SWL) on the forks with the center of mass at the rated load center. Ensure the load is centered laterally. If weights are used and stacked more than two high, the safety officer or supervisor shall determine whether the weights are stable prior to proceeding with these tests. If instability of weights has been determined, they must be secured with steel strapping or chains. Raise the forks 6 inches off the deck/floor, tilt full back, and hold for 2 minutes.

### **WARNING**

When the mast is fully raised, ensure the operator's hands are clear of controls and the person marking and verifying the height stands to the side of the MHE. An observer must ensure that all personnel are clear of the mast prior to raising the rated load.

c. Shift lateral to full limits and then raise load to full mast extension. Repeat lateral shift operation and then return load to deck/floor.

The following steps must be performed with the hydraulic system at normal operating temperatures. This may be accomplished by raising and lowering the mast five times.

d. With the mast vertical, forks centered and rated load on the forks, raise the forks to the maximum height. Mark a reference point on the mast or measure the carriage to a reference point on the fixed portion of the mast. If the forklift truck has a tilting mast (e.g., standard forklift truck), mark a reference point on the tilt cylinders or obtain an initial measurement on the mast angle.

e. After 2 minutes, measure the downward and tilt drift, as applicable, from the reference points.

### **NOTE**

Perform steps f through h on forklift trucks that have tilting carriages (e.g., sideloader and reaching and tiering forklift trucks).

f. Lower the forks to just above the outriggers or to the lowest point allowed by the centering limit switch, if so equipped.

g. Tilt the carriage rearward to its limit. Release the tilt lever.

h. After 2 minutes, tilt the fork carriage rearward again. Note any movement.

i. Lower and remove the load.

The forklift truck shall be rejected if the mast drifts vertically more than 1-3/4 inches. If equipped with a tilting mast, the forklift truck shall be rejected if it tilts more than one degree. If equipped with a tilting carriage, the forklift truck shall be rejected if any movement is noted when tilting the carriage rearward the second time. The forklift truck shall be rejected if it lifts, shifts or tilts the load too slowly or

## NAVSEA SW023-AH-WHM-010 EIGHTH REVISION

unevenly, the hoses and tubing have bulgings or distortions, the frame and mast assembly have fractures or broken welds, or if the forklift truck leaks hydraulic fluid. When raising or lowering the mast, if the forklift truck does not operate freely and/or binds or catches on the overhead guard or any other component, it shall be rejected.

**6-6.12. OPERATIONAL WEIGHT TEST (ALL POWERED PALLET TRUCKS).** The following procedures are required to perform the operational weight test:

- a. Position a rated load (100% of the MHE's SWL) on the forks with the mass centered on the forks with the center of mass at the rated load center. Raise the forks to maximum height.
- b. After 2 minutes, lower and remove the test load.
- c. The pallet truck shall be rejected if leakage of hydraulic fluid is found, if the forks do not raise smoothly to full height, or if the forks do not lower smoothly in a controlled decent.

**6-6.13. KING PIN (STRADDLE CARRIERS ONLY).** When a king pin exists, visually inspect the pin for signs of deformation or fracture. The straddle carrier shall be rejected if there is any deformation or evidence of failure.

**6-6.14. LIFTING WEIGHT TEST (STRADDLE CARRIERS ONLY).** Engage the rated load (100% of the MHE's SWL) with the lifting shoes. Lift and lower the rated load. The straddle carrier shall be rejected if the shoes do not attain full lift smoothly and evenly, or the shoes do not return smoothly and evenly to their lowest position. If the lifting shoes exhibit signs of permanent deformation or evidence of failure, the straddle carrier shall be rejected.

Table 6-2. Braking Distance Chart

Using a 25-foot course the following maximum allowable stopping distances apply		
Time (seconds)	Speed (mph)	Maximum (approximate) Allowable Stopping Distance (feet)*
1.0	17.0	38.82 or 38 ft. 9-3/4 in.
1.5	11.4	17.25 or 17 ft. 3 in.
2.0	8.5	9.7 or 9 ft. 8-1/4 in.
2.5	6.8	7.59 or 7 ft. 7 in.
3.0	5.7	6.33 or 6 ft. 3-3/4 in.
3.5	4.9	5.42 or 5 ft. 5 in.
4.0	4.3	4.74 or 4 ft. 8-3/4 in.
4.5	3.8	4.22 or 4 ft. 2-1/2 in.
5.0	3.4	3.8 or 3 ft. 9-1/2 in.
5.5	3.1	3.45 or 3 ft. 5-1/4 in.
6.0	2.8	3.16 or 3 ft. 1-3/4 in.
6.5	2.6	2.92 or 2 ft. 11 in.
7.0	2.4	2.71 or 2 ft. 8-1/2 in.
7.5	2.3	2.53 or 2 ft. 6-1/4 in.
8.0	2.1	2.37 or 2 ft. 4-1/4 in.
8.5	2.0	2.23 or 2 ft. 2-3/4 in.
9.0	1.9	2.11 or 2 ft. 1-1/4 in.
9.5	1.8	2.0 or 2 ft.
10.0	1.7	1.9 or 1 ft. 10-3/4 in.
11.0	1.5	1.73 or 1 ft. 8-3/4 in.
12.0	1.4	1.58 or 1 ft. 6-3/4 in.
13.0	1.3	1.46 or 1 ft. 5-1/2 in.
14.0	1.2	1.36 or 1 ft. 4-1/4 in.

Table 6-2 distances based on ASME B56.1

\* Stopping distance converted to nearest 1/4 inch.

**6-7. OVERLOAD WEIGHT TESTING OF MHE (EXCEPT PALLET TRUCKS AND STRADDLE CARRIERS)**

**NOTE**

Overload weight testing of MHE is not required, except under the conditions stated in [paragraph 6-5.3](#). Test results shall be documented on the MHE Safety Certification Form, [figure 6-1](#), and maintained in the MHE history file.

## NAVSEA SW023-AH-WHM-010 EIGHTH REVISION

- a. Ensure MHE is on a level surface. Blocks or steel stands may be used under front axle or frame to relieve strain on tires when overload is placed on forks.
- b. Secure the aft end of the MHE to prevent vertical movement. This may be accomplished using 3/8-inch chain or 1/2-inch wire rope and shackles or hooks through the rear lifting points.
- c. Position a test rated (100% of the MHE's SWL) on the forks with the center of mass at the rated load center. Ensure the load is centered laterally. If weights are used and they are stacked more than two high, the safety officer or supervisor shall determine whether the weights are stable prior to proceeding with this test. If instability of weights has been determined, they must be secured with steel strapping or chains. Raise the forks 6 to 12 inches above the deck/floor.
- d. Hold the rated load for 2 minutes.
- e. Inspect tiedown devices and counterweights to ensure an additional test load can be safely applied to the forks.
- f. Apply an additional test load(s) so the forks are supporting 150% of the MHE SWL. Ensure the center of the test load mass is at the rated load center of the MHE and centered laterally. Do not attempt to tilt or lift the test load when the MHE is loaded above 100% of the SWL, which may damage the MHE hydraulic system.

### NOTE

Due to the differences in the design of the MHE hydraulic system, adjustment of the safety relief valve may be required.

- g. If the fork carriage lowers or tilts due to the relief valve opening, loosen the jam nut on the safety valve adjustment screw and turn the safety relief valve adjustment screw clockwise, at least 1/2 turn, to prevent the relief valve from opening during 150% loading. After adjusting the relief valve, repeat steps c through f.
- h. Hold test load for 2 minutes.
- i. Inspect hydraulic system for leaks. Inspect hoses and tubing for bulging and distortion.
- j. If the relief valve was adjusted during this test, readjust the relief valve in accordance with manufacturer's specifications or by removing the test loads so that the rated load (100% of the MHE's SWL) is now on the forks. Raise the load to maximum height. Turn the safety relief valve adjustment screw counterclockwise until the test load begins to drift downward. Then turn the safety relief valve adjustment screw clockwise 1/4 turn. Tighten the jam nut under the safety relief valve adjustment screw.
- k. Lower and remove the load.
- l. Remove tiedowns. Remove blocks from axle or frame, if applicable.

m. Inspect the MHE structure, frame, mast assembly for deformation, fractures and broken welds.

#### **6-8. MHE LIFTING EYES INSPECTION AND TEST (EXCEPT STRADDLE CARRIERS)**

Prior to hoisting MHE, the lifting eyes shall be visually inspected for evidence of deformation (bends, elongation, etc.) and excessive corrosion. If any discrepancy is found, the MHE shall be tagged and removed from service, repaired or replaced, and tested as follows:

a. Apply a vertical lifting force of 1-1/2 times the weight of the MHE to the attachments using an appropriate lifting device (e.g., sling). This can be accomplished in the following manner:

(1) Tie the MHE down to the deck/floor without using the lifting eyes by running cable or chain over the forks at the heel and running another cable or chain between the battery well and the counterweight.

(2) Apply force with suitable hoisting equipment (crane with a sling capable of lifting the MHE plus 50% overload) and a dynamometer in series until the dynamometer registers 1-1/2 times the vehicle weight.

b. Hold the force for 2 minutes.

c. Lower the MHE and remove the lifting device. Examine the lifting lugs and points where attached to the MHE.

The MHE shall be rejected if the lifting attachments and points to which they are secured to the MHE exhibit elongation, permanent deformation, fractures or other evidence of failure. MHE containing lifting eyes, but not intended to be lifted, shall be marked, "NOT FOR LIFTING" and need not be tested.

#### **6-9. CERTIFICATION OF MHE (EXCEPT TYPE H PALLET TRUCKS)**

MHE that has satisfactorily passed the required periodic tests, specified in [paragraph 6-6](#), shall be certified as follows:

6-9.1. **CERTIFYING OFFICIAL.** The certifying official shall be designated in writing by the CO/OIC of the activity. This official shall be responsible to ensure that the MHE is inspected and tested in accordance with the requirements of this manual, and that the MHE is safe to issue for its intended use.

6-9.2. **MHE SAFETY CERTIFICATION MARKING.** Each unit shall be legibly stenciled or labeled, ¼-inch minimum, with the information identified in [figure 6-2](#). The testing activity's name and the expiration date (month/year), which indicates the date that the MHE should be scheduled for its next 18 month periodic test, shall be completed in the appropriate blanks on the certification label. Labels must be locally procured.

<b>SAFETY CERTIFICATION ACCOMPLISHED BY:</b>
<b>IAW NAVSEA SW023-AH-WHM-010</b>
<b>EXPIRES</b> _____.

**FIGURE 6-2. MHE Safety Certification Marking**

## APPENDIX A

### MATERIALS HANDLING EQUIPMENT OPERATOR TRAINING COURSE

#### A-1. PURPOSE

This training course establishes the minimum requirements that Department of Navy (DON) personnel must successfully meet prior to being issued a powered industrial Materials Handling Equipment (MHE) license to handle ammunition and explosives.

#### A-2. SCOPE

This course identifies the various types of MHE approved for handling ammunition and explosives afloat and ashore, defines the operational areas in which the MHE can be operated, addresses operational safety precautions, and concludes with a test that assesses the students knowledge of safety requirements and operational proficiency. Upon satisfactorily completing this course and the qualification requirements found in [paragraph 3-3](#), students may be issued a license under the provisions of [paragraph 3-4](#).

#### A-3. AVOIDANCE OF DUPLICATE TRAINING.

Operators who have satisfactorily completed this training course and have been issued a license to operate MHE for ammunition and explosives handling operations are also considered qualified to handle general supply materials and other hazardous materials (HAZMAT) provided the provisions of [paragraph 3-2](#) are satisfied. They should be exempt from the required training course prescribed in [Naval Supply Command Publication \(NAVSUP PUB\) 538](#) and their MHE Operator's License, [figure 3-2](#), would be annotated "YES" in the "General Supply Authorized" field.

#### A-4. COURSE VARIATIONS

Commanders, Commanding Officers or Officers-in-Charge (CO/OIC), at their discretion and under their documented approval, may authorize variations as needed to adopt this course to train and license MHE operators to handle materials other than ammunition and explosives.

#### A-5. CONTENT AND DURATION

MHE operators are trained to a competency level, not a defined number or hours. The number of hours identified for the entire course and each lesson are for scheduling purposes only and may be shorter or longer depending on the students abilities. Given a class size of 2 to 10 students with different experience levels, it takes 8 hours of classroom time to cover the various types of MHE, transportation and storage requirements for ammunition and explosives, operating and reporting requirements, mandatory inspection requirements, bulk storage, operation in confined areas, and the handling of various containers. The classroom time occurs on the first day and is enforced throughout the week during the practical exercises. Past experience indicates that 24 hours are required for practical exercises covering flatbed, trailer, railcar, ramp, dock and magazine handling operations. These hours are broken down as follows: 8 hours of basic operating and lifting techniques, 4 hours of handling bulk items, 4 hours of

## NAVSUP SW023-AH-WHM-010 EIGHTH REVISION

maneuvering in confined areas, and 8 hours of handling different size containers. The final 8 hours is a proficiency test consisting of a written test and an operational skills demonstration.

**A-5.1. COURSE MODIFICATIONS.** It is not possible for this course to cover every training scenario for all types of MHE in use, the operational environments encountered, and the abilities of the individual students. For these reasons, satisfactory completion of the classroom material is mandatory and instructors are permitted to modify the practical exercises to accommodate the MHE used and the operational environments encountered at each activity. For example, to issue a license to an individual to only operate a 6,000-pound DS Rough Terrain Forklift Truck, the instructor would eliminate operational areas that it would not be used in (a railcar, trailer, etc.) and have the practical exercises performed in appropriate rough terrain (steep ramps) conditions.

### **A-6. TRANSFER OF COMMAND**

If this same MHE operator is subsequently transferred to another activity that has only 4,000-pound EE Reaching/Tiering and 6,000-pound DS Front/Sideloader Forklift Trucks, then, at the discretion of the CO/OIC of the gaining activity, this operator's license may be upgraded based solely on a proficiency demonstration. The individual may be required to complete the gaining activity's licensing course.

#### **NOTE**

An employer does not need to retrain an employee in the operation of powered MHE if the employer certifies that the operator has been evaluated and has proven to be competent to operate MHE safely. Where their performance warrants further training, or when new classes/types of MHE or different areas of operation (working conditions) are encountered, operators would need additional training in these areas.

## LESSON NO. 1

### Introduction

#### Day 1 - Classroom 1.0 Hour

1. Good morning. My name is \_\_\_\_\_. Welcome to the course on “Handling Ammunition and Explosives with Industrial Materials Handling Equipment (MHE).”
2. COURSE REQUIREMENTS.
  - a. Lecturers and demonstrations are given at the start of each day. Tardiness will not be tolerated.
  - b. This course shall not be canceled due to inclement weather.
  - c. Students must attend the classroom, practical demonstrations, and a proficiency test to pass this course.
  - d. Students may be dropped from this course at the discretion of the instructor.
  - e. If disruptive, students shall be dismissed from class.
3. TELEPHONE NUMBERS.
  - a. Emergency \_\_\_\_\_
  - b. Safety \_\_\_\_\_
  - c. Others \_\_\_\_\_
4. COURSE CONTENT AND HOURS.
  - a. The course shall consist of 8 hours of classroom material, 24 hours of practical exercises and concludes with 8 hours of proficiency tests.
    - (1) Classroom material will consist of identifying the approved types of MHE and forklift attachments, discussing the licensing requirements, reviewing all safety precautions and regulations, reviewing the regulations for using MHE in various hazardous locations, reviewing pre- and post-operational inspection and functional test requirements, identifying human failures that cause accidents, procedures on what to do in the event of an accident or incident, and completing accident reports.
    - (2) Practical exercises will consist of performing the required pre-operational and post-operational inspections and functional tests, stow and break out various types of unit loads, operating MHE through designated obstacle courses, loading and unloading a boxcar, and bulk storage.

## NAVSUP SW023-AH-WHM-010 EIGHTH REVISION

(3) The proficiency test is given in two parts consisting of a written portion and an operational skills demonstration. Students must score 75 percent or better on each part to pass.

b. Course starts at \_\_\_\_\_ and ends at \_\_\_\_\_.

c. Lunch will be from \_\_\_\_\_ to \_\_\_\_\_.

### 5. REGULATIONS.

a. Uniform requirements: Military students must wear the uniform of the day; civilian students must wear proper attire.

b. Smoking regulations: Smoking is allowed only in designated areas.

c. Privately-owned vehicles: Shall be accordance with local law.

d. Housekeeping: Students are responsible for keeping the classroom and workroom clean.

### 6. TRANSPORTATION (Explain to the class any special requirements)

a. Mornings

b. To and from lunch

c. Evenings

7. **PERSONAL PROTECTIVE EQUIPMENT.** Depending on local/command safety regulations, only safety shoes are required for this course (students must furnish). However, a safety hard hat may be required as well. Additionally, eye and ear protection may be required due to operating conditions or when operating large capacity rough terrain vehicles. Consult with the work center supervisor for the appropriate PPE.

**8. MHE THEORY - STABILITY TRIANGLE**

This presentation is intended as a resource for providing training in Occupational and Health Administration (OSHA) revised powered industrial truck operator standards. It is not a substitute for any of the provisions of the Occupational Safety and Health Act of 1970, or for any standards issued by the U.S. Department of Labor's OSHA. It is also not a substitute for a powered industrial truck operator program documented in 29 CFR 1910.178(l), 29 CFR 1915.120(a), 29 CFR 1917.1(a)(2)(xiv), 29 CFR 1918.1(b)(10), and 29 CFR 1926.602(d).

**Stability of Powered Industrial Trucks (PITs)**

The stability of the powered industrial truck, loaded or unloaded, is critical to its safe operation. Therefore, the trainer will want to include a review of the basic principles of stability in the forklift operator training program.

**A. Definitions**

The following definitions help to explain the principle of stability:

- *Center of Gravity* is a point on an object at which all of the object's weight can be considered to be concentrated.
- *Counterweight* is the weight that is a part of the truck's basic structure that is used to offset the load's weight and to maximize the vehicle's resistance to tipping over.
- *Fulcrum* is the truck's axis of rotation when it tips over.
- *Grade* is a surface's slope that is usually measured as the number of feet of rise or fall over a 100-foot horizontal distance (measured as a percent).
- *Lateral stability* is a truck's resistance to tipping over sideways.
- *Line of action* is an imaginary line through an object's center of gravity.
- *Load center* is the horizontal distance from the load's edge (or the fork's or other attachment's vertical face) to the line of action through the load's center of gravity.
- *Longitudinal stability* is the truck's resistance to overturning forward or rearward.
- *Moment* is the product of the object's weight times the distance from a fixed point. In the case of a powered industrial truck, the distance is measured from the point that the truck will tip over to the object's line of action. The distance is always measured perpendicular to the line of action.
- *Track* is the distance between wheels on the vehicle's same axle.
- *Wheelbase* is the distance between the centerline of the vehicle's front and rear wheels.

**B. General**

- Stability determination for a powered industrial truck depends on a few basic principles. There are many factors that contribute to a vehicle's stability:
  - Vehicle wheelbase
  - Track
  - Height
  - The load's weight distribution
  - The vehicle's counterweight location (if so equipped)
- The *stability triangle*, used in most stability discussions, demonstrates stability simply.

### C. Basic Principles

- Determining whether an object is stable is dependent on the object's moment at one end of a system being greater than, equal to or smaller than the object's moment at the system's other end. This is the same principle on which a see-saw works. If the product of the load and distance from the fulcrum (moment) is equal to the moment at the device's other end, the device is balanced and will not move. However, if there is a greater moment at the device's one end, the device will try to move downward at the end with the greater moment.
- Longitudinal stability of a counterbalanced powered industrial truck depends on the vehicle's moment and the load's moment. In other words, if the mathematics product of the load moment (the distance from the front wheels, the point about which the vehicle would tip over) to the load's center of gravity times the load's weight is less than the vehicle's moment, the system is balanced and will not tip forward. However, if the load-moment is greater than the vehicle-moment, the greater load-moment will force the truck to tip forward.

### D. The Stability Triangle

- Almost all counterbalanced powered industrial trucks have a three-point suspension system; that is, the vehicle is supported at three points. The truck's steer axle is attached to the truck by a pivot pin in the axle's center. When the points are connected with imaginary lines, this three-point support forms a triangle called the stability triangle. [Figure A-1](#) depicts the stability triangle.

#### Notes:

1. When the vehicle is loaded, the combined center of gravity (CG) shifts toward line B-C. Theoretically, the maximum load will result in the CG at the line B-C. In actual practice, the combined CG should never be at line B-C.
2. The addition of additional counterweight will cause the truck CG to shift toward point A and result in a truck that is less stable laterally.
3. When the vehicle's line of action, or load center, falls within the stability triangle, the vehicle is stable and will not tip over. However, when the vehicle's line of action or the vehicle/load combination falls outside the stability triangle, the vehicle is unstable and may tip over. See [figure A-2](#).

### E. Longitudinal Stability

- The axis of rotation when a truck tips forward is the front wheels' points of contact with the pavement. When a powered industrial truck tips forward, the truck will rotate about this line.
- When a truck is stable, the vehicle's moment must exceed the load's moment. As long as the vehicle's moment is equal to or exceeds the load's moment, the vehicle will not tip over.
- On the other hand, if the load's moment slightly exceeds the vehicle's moment, the truck will begin to tip forward, thereby causing loss of steering control. If the load's moment greatly exceeds the vehicle's moment, the truck will tip forward.
- To determine the maximum safer load-moment, the truck manufacturer normally rates the truck at a maximum load at a given distance from the front face of the forks. The specified distance from the front face of the forks to the line of action of the load is commonly called a load center.

- Trucks with a 30,000 pounds or less capacity are normally rated at a given load weight at a 24-inch load center. For trucks of greater than 30,000 pounds capacity, the load center is normally rated at 36- or 48-inch load center distance.

**Note: To safely operate the vehicle, the operator should always check the data plate to determine the maximum allowable weight at the rated load center.**

- Although the true load-moment distance is measured from the front wheels, this distance is greater than the distance from the front face of the forks. Calculation of the maximum allowable load-moment using the load-center distance always provides a lower load-moment than the truck was designed to handle. When handling unusual loads, such as those that are larger than 48 inches long (the center of gravity is greater than 24 inches) or an offset center of gravity, etc.,

a maximum allowable load moment should be calculated and used to determine whether a load can be safely handled.

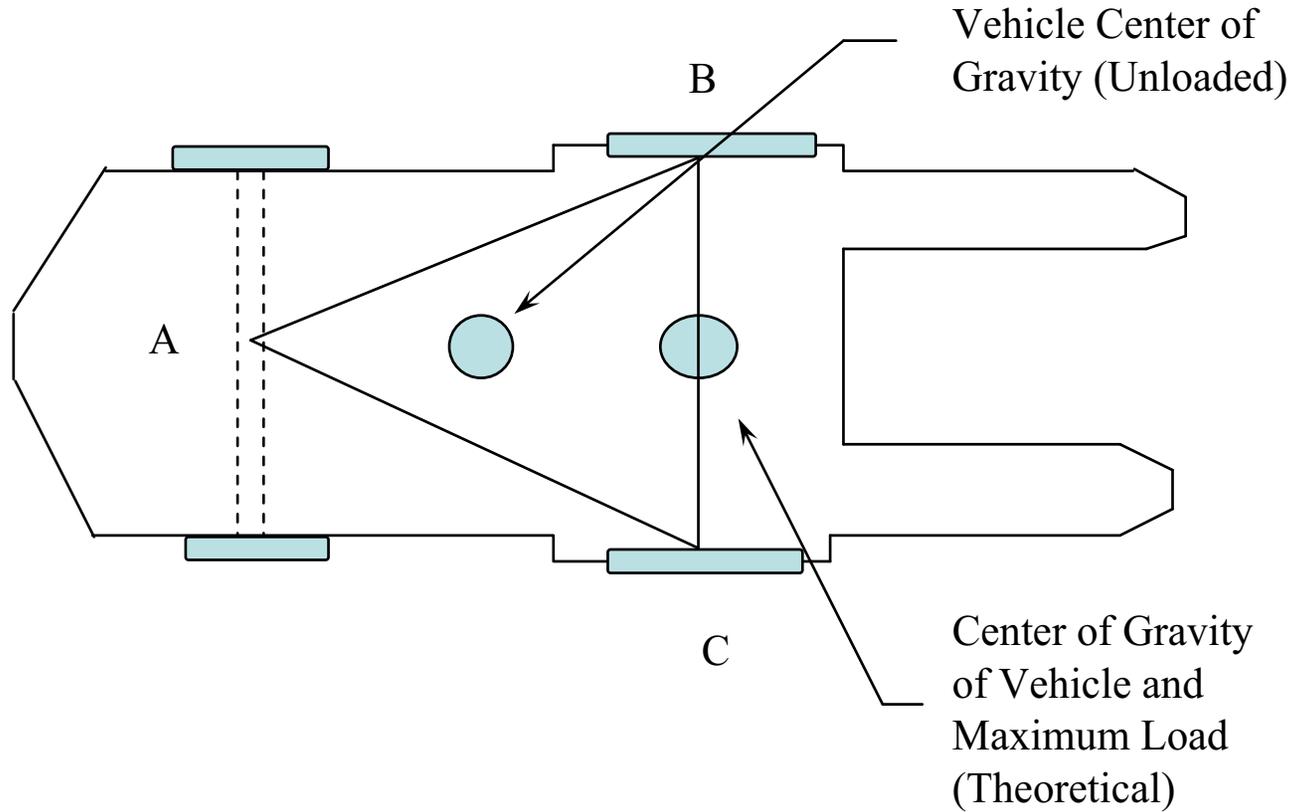
- For example, if an operator is operating a 3,000 pound capacity truck (with a 24-inch load center), the maximum allowable load moment is 72,000 inch pounds (3,000 times 24). If a probable load is 60 inches long (30-inch load center), then the maximum that this load can weigh is 2,400 pounds (72,000 divided by 30).

#### **F. Lateral Stability**

- The vehicle's lateral stability is determined by the lines of action's position (a vertical line that passes through the combined vehicle's and load's center of gravity) relative to the stability triangle.
- When the vehicle is not loaded, the truck's center of gravity location is the only factor to be considered in determining the truck's stability. As long as the line of action of the combined vehicle's and load's center of gravity falls within the stability triangle, the truck is stable and will not tip over. However, if the line of action falls outside the stability triangle, the truck is not stable and may tip over.
- Factors that affect the vehicle's lateral stability include the load's placement on the truck, the height of the load above the surface on which the vehicle is operating, and the vehicle's degree of lean.

#### **G. Dynamic Stability**

- The dynamic forces that result when the vehicle and load are put into motion must also be considered. The weight's transfer and the resultant shift in the center of gravity due to the dynamic forces created when the machine is moving, braking, cornering, lifting, tilting and lowering loads, etc., are important stability considerations.
- When determining whether a load can be safely handled, the operator should exercise extra caution when handling loads that cause the vehicle to approach its maximum design characteristics. For example, if an operator must handle a maximum weight load, the load should be carried at the lowest practical height, the truck should be accelerated slowly and evenly, and forks should be tilted forward cautiously. However, no precise rules can be formulated to cover all of these eventualities.



Notes:

1. When the vehicle is loaded, the combined center of gravity (CG) shifts toward line B-C. Theoretically the maximum load will result in the CG at the line B-C. In actual practice, the combined CG should never be at line B-C.
2. The addition of additional counterweight will cause the truck CG to shift toward point A and result in a truck that is less stable laterally.

FIGURE A-1. Stability Triangle (Unloaded)

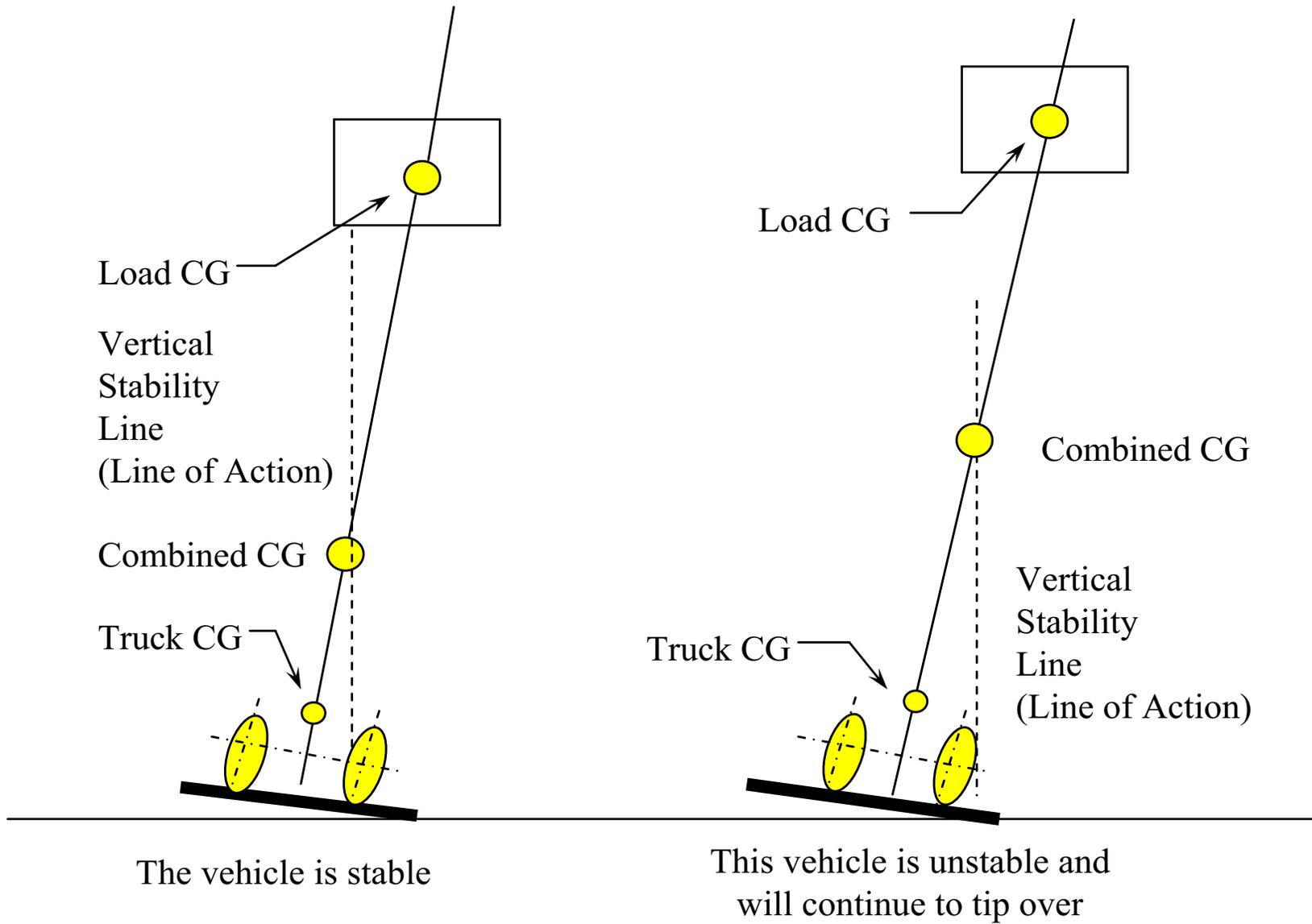


FIGURE A-2. Stability Triangle (Loaded)

## NAVSUP SW023-AH-WHM-010 EIGHTH REVISION

9. INTRODUCTION TO NAVSEA SW023-AH-WHM-010 and [NAVSUP PUB 538](#). The instructor will briefly complete an overview discussing [chapters 1 through 6](#) of this manual and [chapters 3, 4, 5 and 8](#) of NAVSUP PUB 538 that will comprise the ammunition and explosives training curriculum.

### 10. INSTRUCTIONAL AIDS.

- a. DVD playback capability
- b. Chalkboard
- c. Overhead projector
- d. Various handouts

### 11. FORMS.

- a. Medical Examiner's Certificate ([OPNAV 8020/2 Form](#)), [figure 3-1](#).
- b. MHE Operator's License ([figure 3-2](#)) for Navy activities or Form OF 346 for Marine Corps activities.
- c. MHE Inspection Form ([NAVSUP PUB 538](#), [figure 8-1](#))

### 12. RECOMMENDED VIDEOS.

Lesson 1 - Port Chicago Story (25 minutes)

Lesson 2 - Forklift Safety (15 minutes)

Lesson 3 - Lest They All Died in Vain, Parts 1 (36 minutes) and 2 (34 minutes)

Lesson 4 - None

Lesson 5 - None

Lesson 6 - None

Lesson 7 - The Color of Danger (16 minutes)

Lesson 8 - None

## LESSON NO. 2

### Types of Industrial Materials Handling Equipment

#### Day 1 - Classroom 1.0 Hour

1. OBJECTIVE. Students shall be introduced to the various types of approved MHE and forklift attachments described in this manual and [NAVSUP PUB 538](#) for handling ammunition and explosives. Students shall be instructed on the differences between operating MHE versus an automobile (e.g., top heavy, loaded and unloaded driving conditions, rear steering, tighter turning radius, etc.)
2. LESSON OUTLINE. Review chapter 3 of [NAVSUP PUB 538](#) and [paragraph 2-3](#) of this manual.
3. TEACHING PROCEDURES. Instructor lectures.
4. INSTRUCTIONAL AIDS (CLASSROOM).
  - a. Chalkboard
  - b. Overhead projector
  - c. Handouts
  - d. DVD playback capability
  - e. Movie (Forklift Safety)
  - f. [NAVSUP PUB 538](#)
5. EQUIPMENT AND MATERIALS. As required.

## LESSON NO. 3

### Explosive Classes, Transportation And Storage

#### Day 1 - Classroom 1.0 Hour

1. **OBJECTIVE.** Students shall be instructed to recognize the dangers of incorrectly handling ammunition and explosives, the hazards associated with the operational environments, and the reporting of accidents and incidents.

2. **LESSON OUTLINE.** All CONUS (continental U.S.) surface transportation of ammunition and explosives are controlled by the [Code of Federal Regulations \(CFR\) 49](#). Ammunition and explosives are normally moved by truck or by rail, hence explosive compatibility in transmit must be correct. All hazardous materials bear a DOT hazards classification marking designating it by Class and Division. Ammunition and explosives fall into one of the following:

a. Class 1.1 - materials are considered to be mass-detonating hazards. When the item functions as designed, either intentionally or accidentally, damage is primarily caused by concussion or blast. Specific minimum distances are maintained between piles of these materials in order to minimize the possibility of sympathetic detonation.

b. Class 1.2 - materials are considered to be non-mass-detonating fragment producing hazards. When the item functions as designed, either intentionally or accidentally, damage is primarily caused by fragment or blast, either individually or in combination, depending on storage configurations, type of packing, and quantity. Specific minimum distances are maintained between piles of these materials in order to minimize the possibility of fragment damage or initiation.

c. Class 1.3 - materials are considered to be mass fire hazards. When the item functions as designed, either intentionally or accidentally, damage is primarily caused by heat and flames from vigorous burning that is very difficult if not impossible to extinguish and low order blast and fragment effects. Specific minimum distances are maintained between piles of these materials in order to minimize the possibility of propagation from fire.

d. Class 1.4 - materials are considered to be moderate fire, no blast hazards. When the item functions as designed, either intentionally or accidentally, damage is primarily caused by heat and flames from vigorous burning that is very difficult if not impossible to extinguish. There may be minor fragments without a blast effect. Specific minimum distances are maintained between piles of these materials in order to minimize the possibility of propagation from fire.

e. Class 1.5 - materials are extremely insensitive detonating substances (EIDS) and EIDS ammunition. EIDS are Class 1.1 items that although mass detonating, are so insensitive that there is negligible probability of initiation or transition from burning to detonation in storage.

## NAVSUP SW023-AH-WHM-010 EIGHTH REVISION

f. Class 1.6 - materials contain EIDS that have been demonstrated through tests described in [DOD Directive 6055.9 \(series\)](#), that mass and confinement effects of the ammunition case are negligible on the probability of initiation or transition from burning to detonation.

The amount and types of ammunition and explosives that may be loaded on a truck or rail or into a magazine are determined on the basis of net explosives weight (NEW) and compatibility. [NAVSEA SW020-AC-SAF-010](#) covers transportation compatibility. [NAVSEA OP 4](#) covers stowage compatibility afloat. [NAVSEA OP 5](#) covers storage compatibility ashore.

3. GENERAL HANDLING, TRANSPORTING AND STORAGE/STOWAGE REGULATIONS. The utmost care and discretion shall be exercised by everyone engaged in the handling, transporting and storage/stowage of all ammunition, explosives, and ammunition components. The following regulations are applicable:

a. Ammunition and explosives in containers, in bulk, or loaded into projectiles, cartridges or ammunition components shall be handled in a manner so as to prevent shock or friction that may cause a fire, explosion or damage to the material. These materials shall not be thrown, dropped, dragged or tumbled over floors/decks or over other containers.

b. Handling of ammunition and explosives shall be reduced to a minimum in order to prevent damage and the creation of hazardous conditions. Precautions shall be taken to avoid the contact of ammunition and explosives with sand, earth, gravel and other abrasive or spark-producing substances and to avoid unnecessary exposure to inclement weather or direct sunlight.

c. Containers of bulk ammunition and explosives shall be handled carefully to avoid rupture of the containers or the container seams and to prevent undue friction between the containers. If any container is found in an unsatisfactory condition, after inspection by Explosive Ordnance Disposal (EOD) or other qualified personnel, its contents shall be transferred to a proper container that is in material condition Code A in accordance with NAVSUP PUB 724 and the containers shall be properly relabeled.

d. Ammunition and explosives shall be handled in a manner to avoid obliterating or defacing the identification markings.

e. Employees may become complacent and careless when continually engaged in work with ammunition and explosives. As long as no accident occurs, they may be inclined to drift gradually into neglect of necessary precautions. Vigilance on the part of the officers and supervisors in charge will ensure observance by the employees of the precautions, rules and regulations necessary to avoid accidents. These safety regulations should be made the subject of periodic lectures. All employees should be indoctrinated in the necessity for strict compliance.

f. Anyone who is engaged in the handling, transportation or storage/stowage of ammunition and explosives must always think safety. Work safely until it becomes a habit. Accidents usually result from failure to observe regulations, failure to understand hazards or failure to take necessary precautions.

g. Safety regulations are explicit and shall be followed at all times.

## NAVSUP SW023-AH-WHM-010 EIGHTH REVISION

4. ACCIDENT. An accident is defined as any unplanned or unintended event, no matter how minor, that interrupts or interferes with the orderly sequence of actions and results in personal injury or property damage.

a. Accidents are usually one of five categories:

(1) Operator error - operator unaware of the precautions required; operator was aware of the precaution but proceeded anyway; operator was preoccupied (losing sight of the real situation); failure to recognize any unsafe condition; failure to consider the consequences of an unsafe act; and failure to observe all rules, regulations and procedures for MHE.

(2) Mechanical failure

(3) Forces of Nature

(4) Lack of proper training

(5) Lack of proper supervisory instruction

b. Reporting accidents or incidents involving dropped or mishandled ammunition and explosives shall:

(1) Be reported immediately to the supervisor in accordance with local written procedures. Ammunition and explosives shall not be moved or handled until the safety determination has been made, unless not moving the ammunition or explosives increases the risk of further mishap.

(2) A formal report shall be submitted in accordance with [OPNAVINST 5102.1 \(series\)](#).

(3) Local material disposition procedures shall be followed.

c. Found defects (e.g., holes in containers, leakage, etc.) regardless of cause or original must be immediately reported to supervisor.

## 5. INSTRUCTIONAL AIDS

a. Hazardous Materials Load and Segregation Chart [Available commercially from [J.J.Keller & Associates](#) at (800) 327-6868]

b. DVD playback capability

c. Movie (Lest They All Died In Vain, Part 1 and 2)

## LESSON NO. 4

### Operational Safety Regulations

#### Day 1 - Classroom 2.0 Hours

1. OBJECTIVE. Students shall be knowledgeable to all MHE safety precautions, regulations for using MHE in specific operational areas, and regulations, and in securing MHE.
2. LESSON OUTLINE.
  - a. Review applicable safety precautions in chapter 5 of [NAVSUP PUB 538](#) (paragraphs 5-1 through 5-7).
  - b. Review paragraphs 5-10 through 5-12 of [NAVSUP PUB 538](#), as applicable, for temporary parking, storing and securing MHE.
  - c. Review chapters 4 and 5 of this manual in detail.
3. TEACHING PROCEDURES. Instructor lectures on MHE safety precautions and MHE usage in hazardous locations and securing MHE.
4. INSTRUCTIONAL AIDS.
  - a. Classroom
  - b. Chalkboard
  - c. Overhead projector
5. EQUIPMENT AND MATERIALS. As required

## LESSON NO. 5

### MHE Inspection

#### Day 1 - Classroom 0.5 Hour, Worksite 1.0 Hour

1. OBJECTIVE. Students shall be instructed on the required procedures to perform daily pre-operational and post-operational tests and inspections on MHE using the MHE Inspection Form (figure 8-1 of [NAVSUP PUB 538](#)). Students will be made aware of the testing frequencies required on MHE and their attachments, and forks.
2. LESSON OUTLINE. Review chapter 8 ([paragraphs 8-1 and 8-6 of NAVSUP PUB 538](#)) in detail. Make mention of the periodic testing frequency requirements applicable to MHE as follows:
  - a. Every four years for forklift attachments documented in [paragraph 6-5.1](#).
  - b. Prior to being put into service and every 18 months thereafter found in [paragraph 6-5](#) of this manual.
  - c. Annually for forks documented in [paragraph 8-6 of NAVSUP PUB 538](#).
3. TEACHING PROCEDURES. Instructor lectures, and has students inspect actual MHE and complete the MHE Inspection Form (figure 8-1 of [NAVSUP PUB 538](#)). All MHE controls and their functions shall be explained and demonstrated by the instructor.
4. INSTRUCTION AIDS.
  - a. Applicable manufacturer's technical manual (for operating controls identification)
5. EQUIPMENT AND MATERIALS.
  - a. MHE Inspection Form (figure 8-1 of [NAVSUP PUB 538](#))
  - b. Applicable MHE

## LESSON NO. 6

### Basic Operation Of Forklift Trucks

#### Day 2 - Worksite 8.0 Hours

1. OBJECTIVE. Students are required to learn the proper procedures for lifting a load, skills in handling and maneuvering the forklift truck over designated obstacle courses, safety walker (spotter) requirements, and securing MHE.
2. SAFETY PRECAUTIONS TO BE OBSERVED. Instructor shall review selected areas from chapter 5 (primarily [paragraphs 5-3](#) and [5-4](#)) of [NAVSUP PUB 538](#), paragraph 8-2.1 of [NAVSUP PUB 538](#), and [paragraphs 4-2](#), [4-5](#) and [4-5.3](#) of this manual.
3. LESSON OUTLINE.
  - a. Pre-operational inspection on the forklift truck using the MHE Inspection Form ([figure 8-1](#)) and supporting inspection procedures identified in [NAVSUP PUB 538](#).
  - b. Lifting a pallet (nominal 48 x 40 x 36 inches weighing at least 500 pounds).
    - (1) Approach the pallet squarely, aligning forks between the top and the bottom decking and equal distance from the center stringer.
    - (2) Enter forks squarely, penetrating not less than three-quarters of the pallet, with or without stops, and shall not extend through the pallet.
    - (3) Lift the pallet approximately two inches and tilt back.
    - (4) Raise the pallet approximately 6 inches above the ground/deck.
    - (5) Look over both shoulders, sound horn and back straight away.
    - (6) Stop and lower pallet approximately 4 inches above the ground/deck.
    - (7) Move the pallet to the desired location.
  - c. Setting the pallet down.
    - (1) Position the pallet at the proper storage/stowage location.
    - (2) Level the pallet.
    - (3) Lower the pallet to the ground/deck.

## NAVSUP SW023-AH-WHM-010 EIGHTH REVISION

(4) Look back over both shoulders, sound horn and back straight away from the pallet until the forks clear the pallet.

d. Using the above instructions, lift the same pallet and drive the following pre-designated obstacle courses in both forward and reverse directions as demonstrated by the instructor. These obstacle courses will simulate entering a boxcar from a loading dock, loading onto a flatbed truck, and double stacking unit loads.

(1) A 40-foot long by 52-inch wide straight aisle. (Refer to [figure A-3](#)).

(2) A 32-½ foot diameter (16 feet, 3-inch radius) circle passing obstacles alternately on the left and the right. (Refer to [figure A-4](#)).

(3) Continue driving the prescribed obstacle courses, observing all the safety regulations, until all students have experienced operating the forklift truck and have undertaken the safety warker's (spotter's) responsibilities.

e. Upon completion of step d, perform a post-operational inspection using MHE Inspection Form ([figure 8-1](#)) and the inspection procedures identified in [NAVSUP PUB 538](#). Lastly, secure the MHE.

4. TEACHING PROCEDURES. Instructors shall demonstrate:

a. The proper method of lifting and setting down the pallet.

b. How to operate the forklift truck with a unit load in both forward and reverse directions using the pre-designated obstacle courses.

c. The proper positioning and signaling for a safety walker (spotter) (paragraph 5-3.4ee of [NAVSUP PUB 538](#)).

5. EQUIPMENT AND MATERIALS.

a. Worksite

b. 4,000/6,000-pound Forklift Truck

c. Palletized unit loads, as required

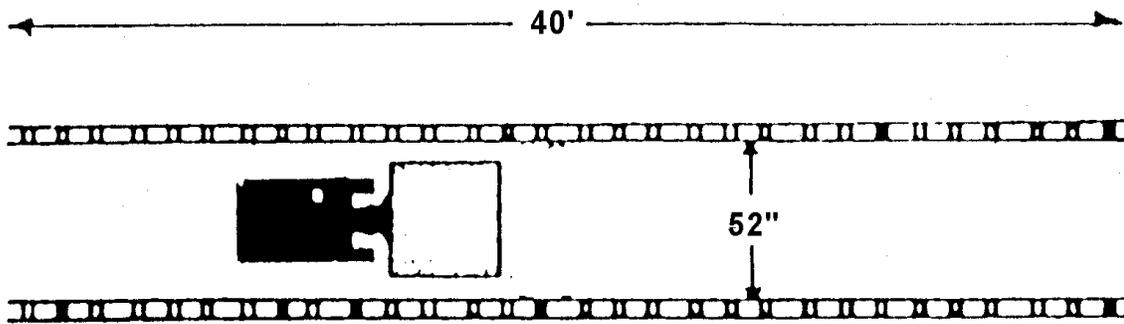


FIGURE A-3. Straight Aisle Course

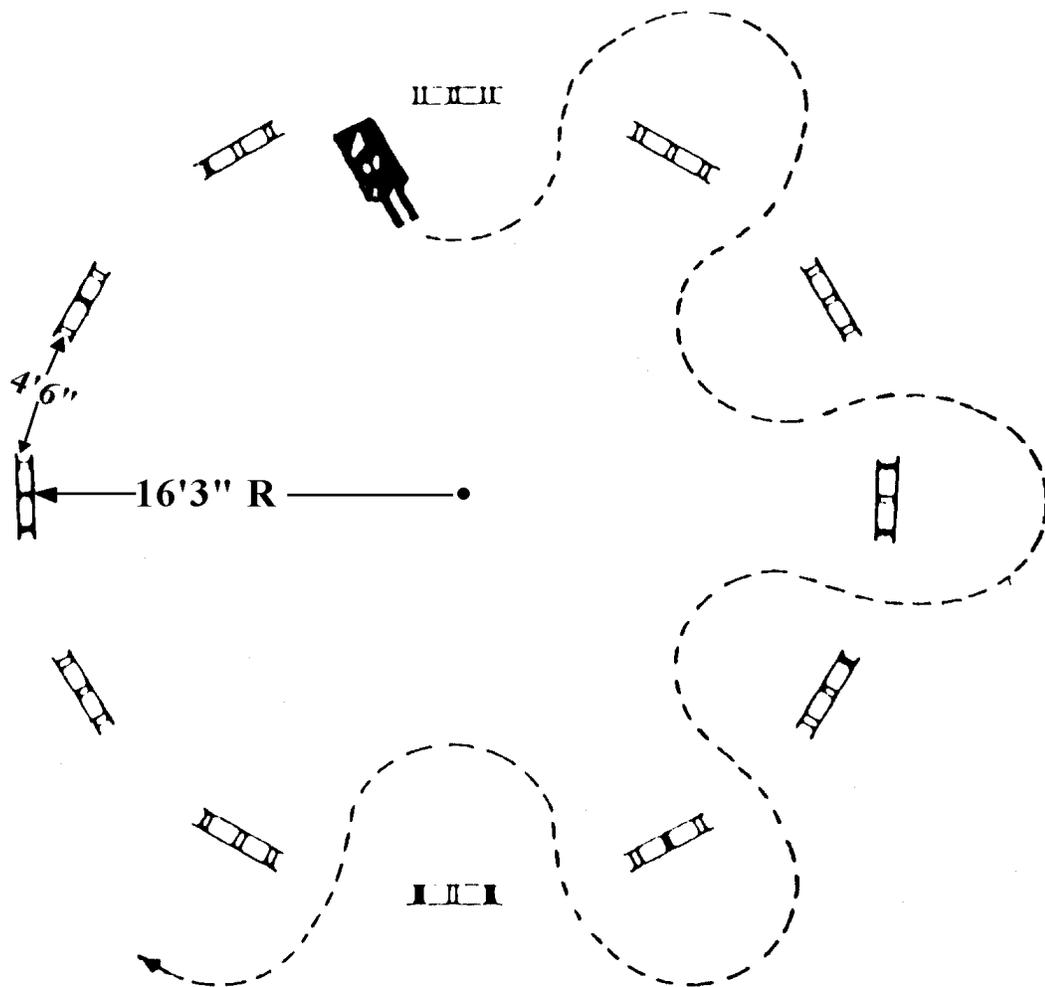


FIGURE A-4. Weaving Obstacle Course

## LESSON NO. 7

### Storage/Stowage

#### Day 3 - Classroom 0.5 Hours, Worksite 3.5 Hours

1. OBJECTIVE. Students will be instructed to safely operate MHE, properly store/stow unit loads, safety walker requirements and securing MHE.
2. SAFETY PRECAUTIONS TO BE OBSERVED. Instructor shall review selected areas from [chapter 5](#) (primarily [paragraphs 5-3](#) and [5-4](#)) and paragraph 8-2.1 of [NAVSUP PUB 538](#).
3. LESSON OUTLINE.
  - a. Pre-operational inspection on the forklift truck using the MHE Inspection Form ([figure 8-1](#)) and supporting inspection procedures identified in [NAVSUP PUB 538](#).
  - b. Each student will move 6 unit loads (nominal 48 x 40 x 36 inches weighing at least 500 pounds), one pallet at a time, using the following procedures: [unit loads will be arranged three high by two wide]
    - (1) Using a forklift and fork stops, if required, approach within 6 inches of the stack of pallets.
    - (2) Stop forklift truck and raise forks to proper height of highest tiered pallet.
    - (3) Enter pallet fully and stop.
    - (4) With foot on the brake, raise the pallet approximately 2 inches and tilt back.
    - (5) Look over both shoulders, sound horn and back straight away until you've cleared the stack or any other obstructions.
    - (6) Stop forklift truck and, with foot on the brake, lower the pallet approximately 4 inches above the ground/deck.
    - (7) Move the pallet to the staging area to begin block stow and stop. The first pallet must be square on the ground/deck. All other pallet must be aligned tight to the first pallet.
    - (8) With foot on the brake, raise the pallet 6 inches above the stow location.
    - (9) Level the pallet and drive forward to the proper location where the pallet is to be set down and stop.
    - (10) With foot on the brake, set the pallet down.

## NAVSUP SW023-AH-WHM-010 EIGHTH REVISION

(11) Look over both shoulders, sound horn and back straight away clearing the pallet and any other obstructions. Drive the empty forklift truck to transport remaining pallet loads.

(12) Lift next pallet load repeating the same steps. Continue these procedures until all six pallet loads have been moved and stacked three high by two wide.

(13) Continue driving the prescribed driving requirements, observing all the safety regulations, until all students have experienced operating the forklift truck and have undertaken the safety walker's (spotter's) responsibilities (paragraph 5-3.4ee of [NAVSUP PUB 538](#)).

c. Upon completion of step b, perform a post-operational inspection using MHE Inspection Form ([figure 8-1](#)) and the supporting inspection procedures identified in [NAVSUP PUB 538](#). Lastly, secure the MHE.

4. TEACHING PROCEDURES. Instructor shall demonstrate each step in the lesson outline.

5. INSTRUCTIONAL AIDS.

- a. DVD playback capacity
- b. Movie (The Color of Danger)

6. EQUIPMENT AND MATERIALS.

- a. Worksite
- b. 4,000/6,000-pound Forklift Truck
- c. Palletized unit loads, as required

## LESSON NO. 8

### Operating MHE In Confined Areas

#### Day 3 - Classroom 1.0 Hour, Worksite 3.0 Hours

1. OBJECTIVE. Students shall be instructed to safely operate MHE in confined areas, such as small magazines and railcars.
2. SAFETY PRECAUTIONS TO BE OBSERVED. Instructor shall review selected areas from [paragraphs 5-3 and 5-4 of NAVSUP PUB 538](#).
3. LESSON OUTLINE.
  - a. Inspect the following items on the boxcar:
    - (1) Wheels are chocked before any loading or unloading operation, except for pier wharf or MILVAN/ISO Container operations.
    - (2) Doors on loading dock are fully opened.
    - (3) Floor is in good condition with nails and dunnage removed.
  - b. Using local procedures, ensure the correct bridgeplate is used. Inspect the bridgeplate for the following:
    - (1) Enough strength to support the load and the forklift truck.
    - (2) No broken welds or other deformations.
    - (3) Properly positioned and secured.
    - (4) Correct bridgeplate (inboard or outboard).
  - c. Pre-operational inspection on the forklift truck using the MHE Inspection Form ([figure 8-1](#)) and supporting inspection procedures identified in [NAVSUP PUB 538](#).
  - d. Students will move 8 unit loads (nominal 48 x 40 x 36 inches weighing at least 500 pounds), one load at a time, into the boxcar using the following procedures:
    - (1) Ensure the fork carriage is centered.
    - (2) With foot on the brake, lift the unit load and tilt back.
    - (3) Approach the corner of the boxcar parallel to and within 2 inches of the side.
    - (4) With foot on the brake, level the unit load.

## NAVSUP SW023-AH-WHM-010 EIGHTH REVISION

- (5) Drive squarely up to and touch the end of the boxcar.
- (6) With foot on the brake, move the unit load to the left or right until touching the side of the boxcar.
- (7) With foot on the brake, lower the unit load to the floor. Unit load should be flush against the side/end of the boxcar.
- (8) Look back over both shoulders, sound horn and back straight away until forks are clear of the pallet.
- (9) Repeat steps d(1) through d(8) for the opposite corner of the boxcar.
- (10) Repeat steps d(1) through d(8) for the opposite end of the boxcar.
- (11) For stacking unit loads, two tier high, repeat steps d(1) through d(4).
- (12) Stop forklift truck within 6 inches of the previously positioned unit load.
- (13) Raise unit load approximately 6 inches above the previously positioned unit load.
- (14) Repeat steps d(6) and d(7).
- (15) Repeat these procedures until all 8 unit loads have been positioned in the boxcar. Continue with this training exercise, observing all the safety regulations, until all students have experienced operating the forklift truck.

e. Upon completion of step d, perform a post-operational inspection using the MHE Inspection Form ([figure 8-1](#)) and the supporting inspection procedures identified in [NAVSUP PUB 538](#). Lastly, secure the MHE ([paragraph 5-10](#) or [5-11](#) of [NAVSUP PUB 538](#)).

#### 4. TEACHING PROCEDURES.

- a. Instructor shall demonstrate each step in the lesson outline.

#### 5. EQUIPMENT AND MATERIALS.

- a. 4,000/6,000-pound Forklift Truck
- b. Two DODX railcars or, if not available, two dimensionally simulated railcars.
- c. Eight palletized unit loads.
- d. Two bridgeplates.
- e. Loading dock.

## LESSON NO. 9

### Handling Containers

#### Day 4 - Classroom 1.0 Hour, Worksite 3.0 Hours

1. OBJECTIVE. Students shall be instructed in the handling of missile and other long containers with MHE and safety walker (spotter) requirements.
2. SAFETY PRECAUTIONS TO BE OBSERVED. Instructor shall review selected areas from chapter 5 of [NAVSUP PUB 538](#).
3. LESSON OUTLINE.
  - a. Pre-operational inspection on the forklift truck using the MHE Inspection Form ([figure 8-1](#)) and supporting inspection procedures identified in [NAVSUP PUB 538](#).
  - b. Verify that the trailer wheels are chocked to prevent vehicle movement.
  - c. Verify that the trailer loading area is free of nails and dunnage.
  - d. Position six identical containers onto a flatbed trailer (three containers wide and two high) using the appropriate truckload document.

#### NOTE

Refer to either [NAVSEA SW020-AC-SAF-010](#) or the [truckload index](#) located on this DVD-ROM for the appropriate Weapon Requirement (WR-51), Military Standard (MIL-STD-1320), or NAVSEA Drawing to obtain the appropriate weapon system's truckload procedures.

- (1) Align forklift truck with container; ensure forks are properly spaced to fit into fork pockets.
- (2) If required, ensure fork stops are properly installed to prevent forks from protruding through the container.
- (3) Insert forks through fork pockets, lift container approximately 2 inches, and tilt back.
- (4) Look over both shoulders and back away from the stack until clear.
- (5) Lower the container approximately 4 inches from the ground/deck. Move the container to the desired location on the flatbed trailer.

## NAVSUP SW023-AH-WHM-010 EIGHTH REVISION

(6) With foot on the brake, level forks and raise the container high enough to clear the bed of the trailer.

(7) Following the safety walker's (spotter's) directions, drive forward and lower the container in the desired position on the flatbed trailer.

(8) Look back over both shoulders, sound horn and back forklift truck straight away until forks clear the container and the flatbed trailer. Lower forks approximately 4 inches above the ground/deck.

(9) Repeating steps d(1) through d(8) to position the second container on the opposite side of the trailer.

(10) Repeating steps d(1) through d(8), position the third container on top of the first container, fourth container on top of second container, etc., ensuring the interlocks between the containers are fully engaged.

(11) Repeat the above steps to stack the containers on both sides of the trailer, ensuring that they are flush against the blocking and aligned properly fore and aft on the flatbed trailer.

(12) Continue with this training exercise, observing all the safety regulations, until all students have experienced operating the forklift truck.

e. Upon completion of step d, perform a post-operational inspection using the MHE Inspection Form ([figure 8-1](#)) and the supporting inspection procedures identified in [NAVSUP PUB 538](#). Lastly, secure the MHE.

#### 4. TEACHING PROCEDURES.

- a. Instructor shall demonstrate each step in the Lesson Outline.

#### 5. INSTRUCTIONAL AIDS

- a. Classroom - Chalkboard
- b. Worksite - Area, as required
- c. Appropriate truck loading document

#### 6. EQUIPMENT AND MATERIALS (Worksite)

- a. 4,000/6,000-pound Forklift Truck
- b. Six identical weapon containers.
- c. One flatbed trailer or raised platform.

## LESSON NO. 10

### Operating Electric Pallet Trucks

#### Day 4 - Worksite 4.0 Hours

1. OBJECTIVE. Students shall learn the proper procedures for inspecting, operating and skills in maneuvering an electric pallet truck over pre-designated obstacle courses.
2. SAFETY PRECAUTIONS TO BE OBSERVED. Instructor shall review selected areas from chapter 5 of [NAVSUP PUB 538](#).
3. LESSON OUTLINE.
  - a. Perform a pre-operational inspection on the electric pallet truck using the MHE Inspection Form ([figure 8-1](#)) and supporting inspection procedures found in [NAVSUP PUB 538](#).
  - b. Lifting and lowering a pallet (nominal 48 x 40 x 36 inches weighing at least 500 pounds).
    - (1) Approach the pallet squarely, aligning forks between the top and bottom decking and an equal distance from the center stringer.
    - (2) Enter forks squarely into the pallet, penetrating not less than three-quarters through the pallet. Prior to lifting the pallet, verify that the pallet's base is not resting on the pallet truck's wheels.
    - (3) With brakes on, lift the pallet approximately 2 inches above the ground/deck.
    - (4) Lower pallet to the ground/deck.
    - (5) Look back over both shoulders and, if equipped, sound horn and back straight away from the pallet until the forks are clear of the pallet.
  - c. Designated obstacle courses. Using the above instructions, lift the same pallet and drive the following designated obstacle courses in the forward and reverse directions as demonstrated by the instructor.
    - (1) A 40-foot long by 52-inch wide straight aisle. (Refer to [figure A-3](#)).
    - (2) A 32-½ foot diameter (16 feet, 3-inch radius) circle passing obstacles alternately on the left and the right. (Refer to [figure A-4](#)) An alternate obstacle course for ships, such as cruisers, frigates and destroyers, that have limited deck space is shown in [figure A-5](#).
    - (3) Continue driving the prescribed obstacle courses, observing all the safety regulations, until all students have experienced operating the forklift truck and have undertaken the safety walker's (spotter's) responsibilities.

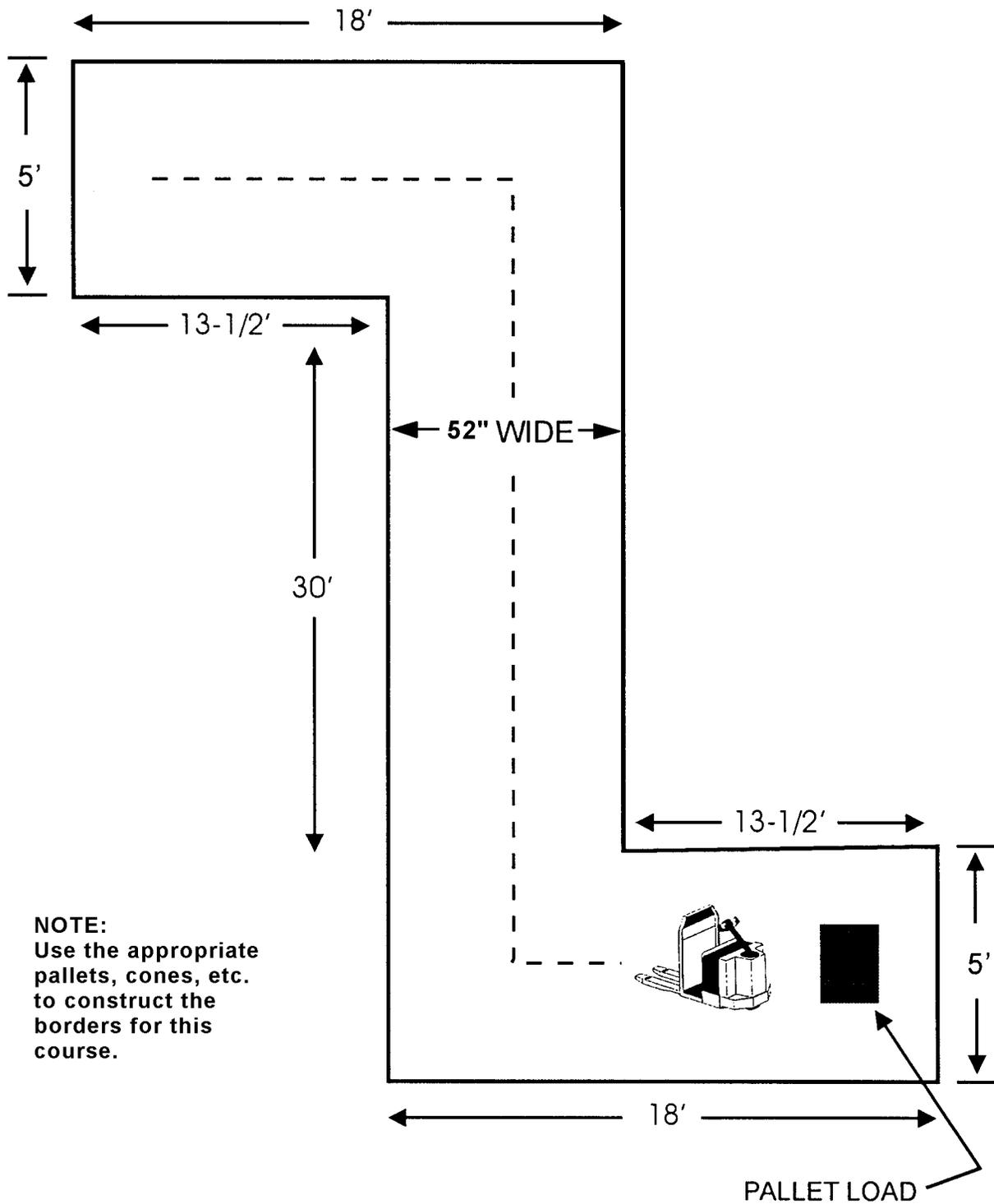


FIGURE A-5. Alternate Shipboard Obstacle Course

## NAVSUP SW023-AH-WHM-010 EIGHTH REVISION

d. Upon completion of step c, perform a post-operational inspection, using the MHE Inspection Form (figure 8-1) and the supporting inspection procedures identified in NAVSUP PUB 538, and secure pallet truck.

### 4. TEACHING PROCEDURES.

a. Instructor shall demonstrate each step in the Lesson Outline.

### 5. EQUIPMENT AND MATERIALS.

a. MHE Inspection Form (figure 8-1 of NAVSUP PUB 538).

b. Type E/EE Electric Pallet Truck.

c. Pallet loads.

d. Pallets, cones, etc. (as appropriate to similar obstacle course borders).

## LESSON NO. 11

### Proficiency Test

#### Day 5 - Jobsite 8.0 Hours

1. **OBJECTIVE.** Students shall satisfactorily pass a written test and, while observing all safety precautions and regulations, satisfactorily complete an operational skills demonstration consisting of inspecting, operating, and securing MHE.
  
2. **LESSON OUTLINE.** This proficiency test shall be conducted in two sections: written and operational skills demonstration. Each test shall be based on a score of 100 points, with 75 points representing the pass/fail criteria. A student who scores less than 75 points must re-take each test. The instructor shall prepare a local written test or request one from the [Naval PHST Center \(Code G13\)](#). This test shall minimally consist of 25 multiple choice questions based on the operational safety regulations in [chapter 4](#) of this manual and chapter 5 of [NAVSUP PUB 538](#). The retention of the graded written test is at the discretion of the instructor's CO/OIC in accordance with local procedures. The operational skills demonstration shall consist of six parts given in a continuous sequence as follows:
  - a. Part 1 - Students shall perform a pre-operational MHE inspection using the MHE Inspection Form ([figure 8-1](#)) and the inspection procedures found in [NAVSUP PUB 538](#). The students shall verbally address each inspection criteria to the instructor. The instructor shall deduct one point for each inspection criteria not reported or performed.
  
  - b. Part 2 - Students shall break out one pallet (nominal 48 x 40 x 36 inches weighing at least 500 pounds) from a stack of four pallets (two high by two wide) or two pallets (side-by-side) for electric pallet trucks only. The instructor shall deduct one point for each of the following applicable infractions:
    - (1) Failure to fasten seat belt, if equipped. Refer to [NAVSUP PUB 538](#) for shipboard exceptions.
    - (2) Improper use of spacer.
    - (3) Bumping a pallet.
    - (4) Improper penetration of fork stop ([figure 3-10](#) of [NAVSUP PUB 538](#)).
    - (5) Forks protruding through pallet.
    - (6) Lifting pallet with tilt control.
    - (7) Failure to look back over both shoulders before traveling in reverse direction.
    - (8) Failure to sound horn before traveling in reverse direction.

## NAVSUP SW023-AH-WHM-010 EIGHTH REVISION

- (9) Failure to have full tilt on load before traveling in any direction.
- (10) Dragging pallet to be lifted across the top of the remaining pallet.
- (11) Failure to lower pallet approximately 4 inches above the ground/deck before traveling.
- (12) Foot not on brake when lifting and tilting.

c. Part 3 - Students shall drive with a pallet (nominal 48 x 40 x 36 inches weighing at least 500 pounds) in the forward and reverse directions through a straight aisle course (40 foot long x 52 inch wide) with 12 pallets, cones, etc., equally spaced along each side. Refer to [figure A-3](#) for straight aisle course illustration. If the student hits 2 or more pallets, cones, etc., then the student shall not continue the test.

d. Part 4 -

(1) Students shall drive one pallet (nominal 48 x 40 x 36 inches weighing at least 500 pounds) through a 32-½ foot diameter obstacle course. The circle's perimeter is formed by placing 12 pallets, cones, etc., at an equal distance spaced 4 feet 6 inches apart from each other. Refer to [figure A-4](#) for the obstacle course illustration. Students will be required to weave in and out between the pallets, cones, etc., in the forward and reverse directions. If the student hits two or more pallets, cones, etc., the student shall not continue this test.

(2) Alternate (Electric Pallet Trucks Only). Aboard ships with limited deck space, such as cruisers, frigates, destroyers, etc., the alternate obstacle course shall be configured in accordance with [figure A-5](#). Students shall lift one pallet (nominal 40 x 40 x 36 inches weighing at least 500 pounds), travel with the load in the reverse direction to the final destination, and then drive in the forward direction back to the original location. The course's borders shall be configured using the appropriate pallets, cones, etc. If the student hits two or more pallets, cones, etc., the student shall not continue the test.

e. Part 5 - Students shall restow one pallet (nominal 48 x 40 x 36 inches weighing at least 500 pounds) onto a stack of four pallets (two high by two wide) or two pallets (side-by-side) for electric pallet trucks only. The instructor shall deduct one point for each of the following applicable infractions:

- (1) Failure to restow pallet from opposite side.
- (2) Failure to level pallet within 6 inches of stow.
- (3) Failure to land pallet squarely.
- (4) Lowering pallet with tilt.
- (5) Bumping pallet into position.
- (6) Failure to look before backing.

## NAVSUP SW023-AH-WHM-010 EIGHTH REVISION

- (7) Dragging pallet.
- (8) Failure to lower forks.
- (9) Improper use of spacer.

f. Part 6 - Students shall return the pallet to the original starting position and secure MHE. The instructor shall deduct one point for each of the following applicable infractions:

- (1) Failure park MHE in the designated area.
- (2) Failure to lower forks to the ground/deck.
- (3) Failure to set the parking brake.
- (4) Failure to neutralize controls.
- (5) Failure to disconnect battery connector cable (electric only) after dismounting MHE.
- (6) Failure to remove key.

(7) Each item verbally not reported or performed by the student to the instructor during the post-operational inspection of the MHE, using the MHE Inspection Form (figure 8-1 of [NAVSUP PUB 538](#)) and the supporting inspection procedures.

3. **INSTRUCTIONAL PROCEDURES.** Instructor shall read the instructions to the students, emphasizing that the students must have the ability to understand and follow written and verbal instructions.

4. **INSTRUCTION AIDS.**

- a. Operational skill test raw score sheet.
- b. MHE operator training certificate.
- c. MHE operator written test.

5. **EQUIPMENT AND MATERIALS.**

- a. Forklift truck or electric pallet truck, 4000/6000-pound capacity.
- b. Four pallets (nominal 48 x 40 x 36 inches weighing at least 500 pounds).
- c. MHE Inspection Form (figure 8-1 of [NAVSUP PUB 538](#)).
- d. Pallets, cones, etc. (as appropriate to simulate the obstacle course borders).

**OPERATIONAL SKILL TEST RAW SCORE SHEET**

<b>PART ONE: Pre-Operational Inspection</b>		<b>Deductions</b>
Color, Markings	Type	
	Restrictions	
	Test Date	
	Capacity	
Battery		
Static Tires or Straps		
External Conditions	Weldments	
	Loose or Missing Bolts	
	Lift Chains	
	Hoses - Leaks	
	Cylinders Leaks	
	Fork Stops	
	Forks	
	Fork Pins	
Battery Connector Cable		
Hydraulic Cylinders	Hoist	
	Tilt	
	Sideshift	
Brakes	Parking Brake	
	Foot Brake	
	Seat Brake	
Seat Belt		
Warning Device (Horn)		
TOTAL DEDUCTIONS PART ONE		

<b>PART TWO: Breakout Pallet</b>	<b>Deductions</b>
Seat belt not fastened	
Improper use of spacer	
Bumping pallet	
Improper penetration of forks	
Forks protruding through pallet	
Lifting pallet with tilt control	

**NAVSUP SW023-AH-WHM-010 EIGHTH REVISION**

<b>PART TWO: Breakout Pallet</b>		<b>Deductions</b>
Failure to look before backing		
Failure to sound horn before backing		
Failure to have full tilt on pallet		
Dragging pallet		
Failure to lower pallet approximately 4 inches before traveling		
Foot not on brake when lifting and fitting		
<b>TOTAL DEDUCTIONS PART TWO</b>		

<b>PART THREE: Driving Through Straight Aisle</b>		<b>Deductions</b>
Forward	Pylons Hit	
	Stops/Slows	
Reverse	Pylons Hit	
	Stops/Slows	
<b>TOTAL DEDUCTIONS PART THREE</b>		

<b>PART FOUR: Obstacle Course</b>		<b>Deductions</b>
Forward	Pylons or Pallet Hit	
	Stops/Slows	
Reverse	Pylons or Pallet Hit	
	Stops/Slows	
<b>TOTAL DEDUCTIONS PART FOUR</b>		

<b>PART FIVE: Restow Pallet</b>		<b>Deductions</b>
Failure to restow pallet from opposite side		
Failure to level pallet within 6 inches of stow		
Failure to land pallet squarely		
Lowering pallet with tilt		
Bumping pallet into position		
Failure to look before backing		
Dragging pallet		
Failure to lower forks		
Improper use of spacer		
<b>TOTAL DEDUCTIONS PART FIVE</b>		

**NAVSUP SW023-AH-WHM-010 EIGHTH REVISION**

<b>PART SIX: Secure MHE</b>		<b>Deductions</b>
Failure to park in designated area		
Failure to lower forks to the ground/deck		
Failure to set parking brake		
Failure to neutralize controls		
Failure to disconnect battery connector cable (electric drive only) after dismounting MHE		
Failure to remove key		
<b>Post-Operational Inspection</b>		<b>Deductions</b>
Color, Markings	Type	
	Restrictions	
	Test Date	
	Capacity	
Battery		
Static Tires or Straps		
External Conditions	Weldments	
	Loose or Missing Bolts	
	Lift Chains	
	Hoses - Leaks	
	Cylinders Leaks	
	Fork Stops	
	Forks	
	Fork Pins	
Battery Connector Cable		
Hydraulic Cylinders	Hoist	
	Tilt	
	Sideshift	
Brakes	Parking Brake	
	Foot Brake	
	Seat Brake	
Seat Belt		
Warning Device (Horn)		
<b>TOTAL DEDUCTIONS PART SIX</b>		

**NAVSUP SW023-AH-WHM-010 EIGHTH REVISION**

Based on a maximum score of 100 points, with 75 points representing the operational skill test pass/fail criteria, record the number of deductions from the six parts below. Then, subtract the total number of deductions from 100 points to determine whether the student has passed or failed this test.

PART 1	PART 2	PART 3	PART 4	PART 5	PART 6	TOTAL

This form is provided as an example and its use is at the instructors' discretion. The retention of this information is at the discretion of the instructors CO/OIC in accordance with local procedures.

**NAVSUP SW023-AH-WHM-010 EIGHTH REVISION**

[Click Here to reproduce and annotate this certificate](#)

**MHE OPERATOR TRAINING CERTIFICATE**

The student named below successfully completed the written and operational skill demonstration tests and I recommend that the command issue the appropriate MHE license in accordance with NAVSEA SW023-AH-WHM-010.

Student Name (*last, first, middle initial*)

Rank/Grade

Parent Command

The student named above successfully demonstrates proficiency on the following MHE on dates indicated and I recommend that the command issue/upgrade the appropriate MHE license in accordance with NAVSEA SW023-AH-WHM-010.

Class/Lift Code and SWL	Instructor Name ( <i>last, first middle initial</i> ) Instructor Signature/Date Parent Command	Evaluator Name ( <i>last, first, middle initial</i> ) Evaluator Signature/Date Parent Command Evaluator's Description of Workplace

This certificate is an example of the documentation that must be maintained by the parent command issuing the MHE license. The information must be documented and maintained, however the format is optional.

Ref: NAVSEAINST 4160.3A NAVSEA S0005-AA-GYD-030/TMMP

**NAVSEA/SPAWAR TECHNICAL MANUAL DEFICIENCY/EVALUATION REPORT (TMDER)**

INSTRUCTION: Continue on 8 1/2" x 11" paper if additional space is needed.

1. Use this report to indicate deficiencies, problems and recommendations relating to publications.
2. For CLASSIFIED TMDERs see [OPNAVINST 5510H](#) for mailing requirements.
3. For TMDERs that affect more than one publication, submit a separate TMDER for each.
4. Submit TMDERs at website <https://nsdsa.nmci.navy.mil> or mail to: COMMANDER, CODE 310 TMDER BLDG 1388, NAVSURFWARCENDIV PHD NSDSA, 4363 MISSILE WAY, PORT HUENEME CA 93043-4307

1. PUBLICATION NUMBER  <b>NAVSEA SW023-AH-WHM-010</b>	2. VOL/PART	3. REV. NO./DATE OR TM CH. NO./DATE  <b>8TH REV/1 July 2011</b>	4. SYSTEM/EQUIPMENT IDENTIFICATION
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5. TITLE OF PUBLICATION <b>HANDLING AMMUNITION AND EXPLOSIVES WITH INDUSTRIAL MATERIALS HANDLING EQUIPMENT (MHE)</b>	6. REPORT CONTROL NUMBER (6 digit UIC-yy-any four: xxxxxx-03-xxxx)
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7. RECOMMENDED CHANGES TO PUBLICATION

7a. Page #	7b. Para #	7c. RECOMMENDED CHANGES AND REASONS

8. ORIGINATOR'S NAME AND WORK CENTER	9. DATE	10. ORIGINATOR'S EMAIL ADDRESS	11. TMMA of Manual (NSDSA will complete)
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12. SHIP OR ACTIVITY Name and Address (Include UIC/CAGE/HULL)	13. Phone Numbers: Commercial (____) ____-____ DSN (____) ____-____ FAX (____) ____-____
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