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MTMC D/A ltr, 3 Aug 1977

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MTMC REPORT OA 7T-16

AN ANALYSIS OF MTMC PARTICIPATION IN THE REFORGER 76 EXERCISE

MARCH 1977

MILITARY TRAFFIC MANAGEMENT COMMAND
TRANSPORTATION ENGINEERING AGENCY
NEWPORT NEWS, VIRGINIA 23606

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DEPARTMENT OF THE ARMY
HEADQUARTERS
MILITARY TRAFFIC MANAGEMENT COMMAND
WASHINGTON, D.C. 20315

REPLY TO
ATTENTION OF:

MT-C

14 March 1977

SUBJECT: Report on Analysis of MTMC Participation in the REFORGER 76 Exercise

THRU: HQDA (DACS-ZB)
WASH DC 20310

TO: HQDA (DACS-ZA)
WASH DC 20310

1. The annual exercise of the Return of Forces to Germany (REFORGER) has, for many years, been the focal point of the Nation's reiteration of our commitment to the defense of Europe. In recent years, the emphasis has been on providing men to operate prepositioned equipment. In 1976, however, the emphasis shifted to a demonstration of the flexibility of our response to the reinforcement of NATO. For the first time, REFORGER 76 provided for the introduction of a division with its equipment into the European theater - a division which had not before been employed in Europe under its present organization.

2. Studies performed by the Military Traffic Management Command (MTMC) during the past three years concluded that an airlift (troops only)/ sealift deployment of an airmobile division is time competitive with an all airlift deployment and at one-fourth the cost. REFORGER 76 tested the deployment concept as well as MTMC's capabilities in the areas of traffic management and terminal operations. In this report, it is our aim to present an analysis of the MTMC role with the hope that future exercise participants will benefit from the experiences described and the suggestions for improvements set forth.

3. This report outlines the planning activities which led to the decision to commit the 101st Airborne Division (Air Assault) on this exercise and to the groundwork for the complex transportability actions required to accomplish the mission. Covered in detail are the technical aspects involved in loading the units at Fort Campbell, rail movement to the Naval Supply Center, Norfolk, staging cargo and loading the ships at Norfolk, transiting the ocean and unloading at the ports of

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Vlissengen and Ghent, as well as the return move through Bremerhaven and Norfolk to Fort Campbell. The report presents lessons learned which are applicable to all levels from unit loading technician, through division staff, to major command and Army staffs.

4. While problems and technical difficulties were encountered in transportation planning and execution for REFORGER 76, the overall assessment of the results leads to the conclusion that the deployment/redeployment was a success. The exercise clearly demonstrated that the movement of large numbers of minimally disassembled helicopters by ocean shipping is a viable strategic option. The exercise provided valuable training for both the deploying unit and the deployment managers. The successful exercise of host Nation support agreements and procedures in Europe was also a significant achievement. The report is commended for study at all levels because many of the principles relearned during REFORGER 76 are applicable to all deployable units.

H. R. DEL MAR
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Commanding

MTMC REPORT-OA 7T-16

ANALYSIS OF MTMC PARTICIPATION IN THE REFORGER 76 EXERCISE

March 1977

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ABSTRACT

This study is an analysis of the Military Traffic Management Command (MTMC) participation in the Return of Forces to Germany (REFORGER) 76 Exercise. It is designed to provide a documentary narrative of the exercise deployment and redeployment phases and an evaluation of the MTMC performance in the discharge of its REFORGER mission. Although problem areas in planning and execution are identified and corrective actions recommended, the deployment and redeployment of the 101st Airborne Division (Air Assault) was a highly successful operation that clearly demonstrated the Defense Transportation System's total approach capability to support the transportation of the equipment of an airmobile division, including several hundred assigned helicopters, from a CONUS origin to a potential combat employment destination overseas.

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SECTION I

EXECUTIVE SUMMARY

1. Objective. To analyze the MTMC participation in REFORGER 76.

2. Scope. This analysis is generally limited to those aspects of the deployment and redeployment of the 101st Airborne Division (Air Assault) for which MTMC had planning and/or operational responsibilities.

3. Background. At the request of the United States Readiness Command (USRECOM), MTMC conducted an analysis of deploying an airmobile division. This analysis, completed in May 1974, emphasized minimum disassembly of helicopters and concluded that an airlift (troops only)/sealift deployment is competitive with an all-airlift deployment in a contingency situation. The concepts proposed in this study were the basis for the development of the plans, procedures, and systems used in the eventual deployment of the 101st Airborne Division to Europe during REFORGER 76.

4. Conclusions. The REFORGER 76 deployment/redeployment was a highly successful operation, and the plans and procedures on which it was based were proved to be effective. REFORGER 76 clearly demonstrated that the movement of large numbers of minimally disassembled helicopters on roll-on/roll-off (RORO) ships is both feasible and practical.

5. Summarized Recommendations. It is recommended that:

a. Preliminary planning for unit oversea deployment include onsite surveys of the outloading installation(s), the seaports of embarkation (SPOE) and seaports of debarkation (SPOD) under consideration, and the vessels to be employed.

b. Accurate and timely unit cargo movement data be provided by the deploying unit during the planning phases.

c. A flexible, tailored port organization under a MTMC port commander be established to handle water terminal operations during unit surface deployments. The organization must be responsible to the MTMC port commander and discharge its functions under his operational control.

d. Movement documentation procedures be simplified. REFORGER 77 documentation activities be closely monitored to identify further possibilities for streamlining current military standard transportation and movement procedures (MILSTAMP) requirements.

e. The "redi-cover" used for CH-54 and CH-47 aircraft be redesigned.

f. An improved helicopter positioning device be developed for use on shipboard, and possibly on cargo aircraft.

g. All units deploying by surface means utilize cargo-carrying vehicles for military impedimenta and accompanying supplies to the maximum extent.

h. MTMC make available to the outloading installation(s) rail outloading and documentation technical assistance teams at least 30 days prior to deployment.

i. Various planning, operational, and procedural problems identified in this report be noted and corrective action be taken in future deployment exercises and operations.

SECTION II

INTRODUCTION

1. Subject. Analysis of MTMC participation in the REFORGER 76 Exercise.

2. Objective. To analyze MTMC participation in the REFORGER 76 Exercise.

3. Scope. This analysis is limited generally to those aspects of the deployment and redeployment of the 101st Airborne Division (Air Assault) for which MTMC had planning and/or operational responsibilities. REFORGER 76 operations that were not the responsibility of MTMC are evaluated only to the extent necessary to identify transportability problems within the cognizance of MTMC. The Military Traffic Management Command responsibilities are derived from its charter as the single manager operating agency for military traffic, land transportation, and common-user ocean terminals. Specifically, with reference to REFORGER 76, the Commander, MTMC, was responsible for:

a. Providing transportation planning support for REFORGER 76 to the OJCS, the unified and specified commands, and the military services.

b. Providing traffic management support for the movement of REFORGER 76 cargo and personnel within CONUS.

c. Arranging for the utilization of ocean terminals (military and commercial) within CONUS.

d. Controlling and coordinating the movement of REFORGER cargo into and out of CONUS air and water terminals.

e. Supervising CONUS water terminal operations to include REFORGER cargo receipt, segregation, staging, and loading aboard ship.

f. Supervising and managing ocean terminal operations in Europe to include the unloading and loading of REFORGER cargo and the associated handling, staging, processing, accounting, and documenting functions.

4. Study Parameters. The following phases of REFORGER 76 are keyed to one or more of the aforementioned responsibilities and then examined in this analysis:

a. Conceptual and operational planning.

b. Shiploading planning.

c. Unit deployment from CONUS.

d. Cargo discharge at European ports.

e. Unit redeployment from Europe.

f. Discharge in CONUS and return to home station.

5. Background. In 1973, the Commander in Chief, United States Readiness Command (CINCUSREDCOM), expressed his concern over the mobility status of the airmobile division. This type of division, with its large number of helicopters, presents transportability problems that are aggravated by the container trend in modern ocean shipping. At the request of CINCUSREDCOM, MTMC conducted an analysis of deploying an airmobile division. This analysis,[1/] completed in May 1974, emphasized minimum disassembly of helicopters and concluded that an airlift (troops only)/sealift deployment is competitive with an all-airlift deployment is competitive with an all-airlift deployment in a contingency situation. The concepts proposed in this study were the basis for the development of plans, procedures, and systems used in the eventual deployment of the 101st Airborne Division to Europe during REFORGER 76.

[1/] MTMTS Report 74-19. An Analysis of Simulated Deployment of the US Army Airmobile Division, Military Traffic Management and Terminal Service, Washington, DC 20315, May 1974.

Responsible for providing transportation planning support for REFORGER 76 to the Organization of the Joint Chiefs of Staff (OJCS), the unified and specified commands, and the military services.

SECTION III

CONCEPTUAL AND INITIAL OPERATIONAL PLANNING

1. General.

a. With the initiation of REFORGER 76 planning in 1974, the Commander, MTMC, emphasized to the Army Chief of Staff that it was imperative to make optimum use of strategic air and sealift assets in the deployment of the 101st Airborne Division (Air Assault) to Europe.

b. In December 1974, the Army Chief of Staff directed MTMC to undertake a study of the division deployment. Based on that request, MTMC conducted a detailed analysis of the deployment of either the entire division or only a separate brigade-sized task force by an all-air movement and by a combination of air and sealift. This analysis, an extension of the original airmobile deployment study, emphasized the minimization of costs involved in deploying a specific division within acceptable time frames. A detailed summary of this analysis is located in Appendix A.

2. Concept Approval.

a. The Deputy Chief of Staff of Operations and Plans (DA DCSOPS) was briefed on this analysis on 21 April 1975. He requested that a follow-on analysis be conducted to determine the impact on cost estimates if certain personnel and equipment were not deployed in the exercise. From data provided by the Commander, 101st Airborne Division, MTMC determined that an approximate $2.3 million saving would result.[2/] At a conference held 2 June 1975 with the DA DCSOPS and the Commander, 101st Airborne Division, intense interest was shown in the results of the MTMC analysis and the potential for such an exercise deployment.

b. Based on MTMC findings, the Acting Secretary of the Army recommended to the Secretary of Defense, in July 1975, that the 101st Airborne Division be included as the major Army unit in the troop list for Exercise REFORGER 76. He added the comment that the use of that division in the exercise with its large number of aircraft would be an

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2/ Addendum to MTMC Report 75-6, dated 17 June 1975.

excellent method of displaying US flexibility in reinforcing the NATO Central Region.[3] The organization of the Joint Chiefs of Staff, in supporting this deployment exercise, acknowledged the necessity of deploying a division of this type by air and sea and the benefits to be obtained in exercising host nation support concepts associated with the Belgium, Netherlands, and Luxembourg (BENELUX) and Germany lines of communication (LOC).[4] In October 1975, the Office of the Secretary of Defense (OSD) expressed its support of the exercise deployment of the 101st Airborne Division as a part of REFORGER 76.[5]

3. Operational Planning.

a. MTMC operational planning commenced immediately upon OSD's approval in October 1975 of the 101st Airborne Division's participation in REFORGER 76. On 29 October 1975, DA, DCSOPS, held a REFORGER 76 planning conference, during which representatives of the DA Staff, HQ FORSCOM, XVII Corps, the 101st Airborne Division, and MTMC identified 22 significant long leadtime problems, agreed to specific taskings, and developed associated milestones. Included in the tasks assigned to MTMC was the survey of Fort Campbell rail outloading facilities. This survey was conducted in December 1975 and revealed significant deficiencies, which were presented to DA for decisions on upgrading requirements. A summary of the survey is provided in Section VI of this report. The other tasks assigned to MTMC at this conference were concerned primarily with identifying aircraft deployment support items and coordinating with MSC regarding the availability of certain vessel types.

b. In January 1976, a series of US European Command (USEUCOM) and US Army Europe (USAREUR) meetings were attended by personnel of MTMC Field Office, Europe. Recommendations of SPOD to use in exercising host nation agreements were made, and exercise time frames were determined.

c. During January and February 1976 MTMC explored the availability of certain vessels with MSC for use during the August-October 1976 time frame. In March, MSC advised MTMC that one break-bulk and three RORO vessels would be used for REFORGER 76 sealift at a dollar ceiling

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[3] Memo, Secretary of the Army, 10 Jul 75, Subject: Deployment of the 101st Airborne Division (Air Assault) to Europe.

[4] JCS 2311/966, dated 10 Sep 75, Subject: Deployment of the 101st Airborne Division (Air Assault) to Europe.

[5] Memo, ASD (IS), 22 Oct 75, Subject: Deployment of the 101st Airborne Division (Air Assault) to Europe.

of $4.1 million. MTMCTEA immediately commenced developing a detailed shipload plan for the deploying unit's equipment. A detailed summary of this shiploading planning is addressed in Section IV of this analysis.

d. On 11 March 1976, MTMC recommended to DA that a pretest be conducted to test the innovative helicopter loading techniques developed by MTMCTEA (MTMTS Report 74-19) and to gain experience and resolve potential problems prior to the deployment in August. On 29 March 1976 DA approved the pretest. A discussion of subsequent actions and of the pretest itself is presented in Section IV of this study.

e. On 30 March 1976, the Commander of Military Traffic Management Command Eastern Area Area (MTMCEA) was appointed as both the MTMC exercise director and the pretest director for REFORGER 76. The Director of MTMCTEA was tasked at the same time to provide necessary assistance to MTMCEA. The intensified planning with the Naval Supply Center (NSC), Norfolk, that followed will be covered in detail in Section VIII, Port Operations.

f. Perhaps the most vital REFORGER 76 planning session was conducted at USREDCOM between 11 and 14 May 76. Vessel loading, sailing, and arrival dates for both deployment and redeployment phases were finalized, and several unresolved problem areas were identified and eventually resolved.

g. Between the end of May and July when the first piece of equipment was loaded aboard a railcar at Fort Campbell, a great deal of detailed operational planning took place. Those areas of planning and coordination that pertain to the MTMC functions and responsibilities are addressed separately in subsequent sections.

h. REFORGER 76 was a peacetime exercise in which the speed of operations was governed by considerations of economics, safety, and extra handling care to minimize damage to helicopters and equipment. These considerations prevailed through all phases of the exercise.

Responsible for the supervision and control of REFORGER 76 cargo . . . . through the CONUS Ports of Embarkation.

SECTION IV

SHIPLOADING PLANNING

1. General.

a. The need for detailed shipload planning prior to an exercise such as REFORGER 76 cannot be overemphasized, nor can the details of such planning be minimized. Precise ship diagrams, exact equipment characteristics and unit movement requirements data, and known stow/ planning factors and loading procedures are necessary to insure that the detailed movement plan is accurate, complete, and timely.

b. The use and timely maintenance of COMPASS data must be reemphasized at all levels of command.

c. The REFORGER 76 move of the 101st Airborne Division (Air Assault) was the proving ground for many of the techniques used in planning unit moves (for example, 80-percent stow factor for vehicles on RORO ships, 55-percent and 80-percent stow factor for vehicles and general cargo, respectively, on break-bulk ships).

d. REFORGER 76 verified the need for trained personnel who are familiar with individual ship characteristics and the equipment to be moved, and it confirmed the importance of ship visits by trained personnel prior to deployment.

e. REFORGER 76 represents a quantum jump in the movement of Army aircraft by sea; it indicates an urgent need for revision and update of aircraft shipping manuals, and redesign of protective covers for aircraft that are exposed to the salt-air environment.

2. Description of Vessels Used in REFORGER 76.

a. The characteristics of the four vessels used to transport the 101st Airborne Division are presented in Table 4-1 and the vessels used are shown in Figures 4-1 through 4-4.

TABLE 4-1
VESSEL DESCRIPTIONS

Name	Type	Speed	Length	Deck Stowage Capacity
GTS Adm. Wm. M. Callaghan	RORO	25 Knots	700 FT	167,537 Sq Ft
USNS Meteor	RORO	20 Knots	540 FT	99,270 Sq Ft
USNS Comet	RORO	19 Knots	499 FT	86,478 Sq Ft
USS American Ranger	Break-bulk	21 Knots	544 Ft	Total DWT/13,264 LT

Figure 4-1. GTS Admiral William M. Callaghan, RORO Vessel.

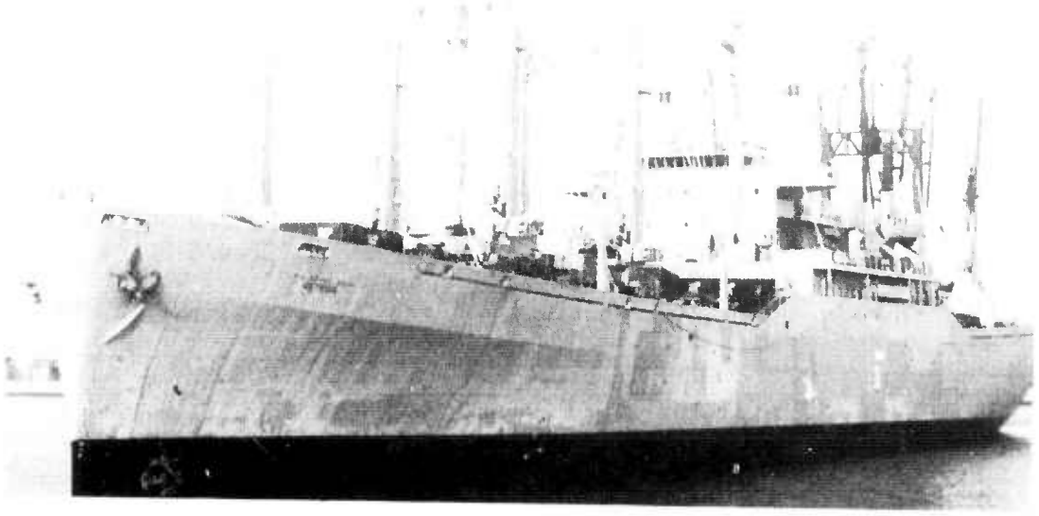

Figure 4-2. USNS Meteor, RORO Vessel.

Figure 4-3. USNS Comet, RORO Vessel.

Figure 4-4. USS American Ranger, C-4, Challenger Class Break-Bulk Ship.

b. The three RORO ships have stern and side loading ramps, are self-sustaining and have internal ramps utilized to load the roll-on decks. Hatches 1 and 2 on the Meteor and Comet are break-bulk hatches. The American Ranger has six break-bulk hatches, two of which (hatches 3 and 4) are converted to transport 20-foot containers.

3. REFORGER 76 Pretest.

a. The division's four types of helicopters (Figures 4-5 to 4-8) presented the major transportability challenge to MTMC transportation planners. MTMTS Report 74-19, An Analysis of Simulated Deployment of the US Army Airmobile Division, was the basis for the subsequent consideration of deploying the 101st Airborne Division (Air Assault) to Europe on an exercise. The report recommended that transportability tests be conducted to verify the proposed loadings and minimum disassembly concepts developed in the analysis. See Appendix B for a summary of the helicopter transportability operational tests (HELTOT) which were conducted using barge-ship systems.

b. The decision to use RORO ships for transporting the division's helicopters prompted MTMC planners to conduct a pretest.

Figure 4-5. CH-47 Chinook.

Figure 4-6. OH-58 Kiowa.

Figure 4-7. UH-1 Iroquois.

Figure 4-8. AH-1 Cobra.

(1) The purpose of the REFORGER 76 Pretest was to evaluate the MTMC conceptual aircraft loading plans and the feasibility of transporting the four types of helicopters found in the Air Assault Division on RORO ships. It was conducted in May 1976 and provided firsthand experience data on the procedures to be used for loading the various types of helicopters organic to the 101st Airborne Division (Air Assault) on RORO ships. The pretest observations and other collected data enabled movement planners and operators to readily identify and solve the problems associated with receipt and processing of helicopters for overseas shipment (that is, helicopter staging, disassembly, loading on and unloading from the vessel, movement and stowage within the vessel; the availability and effectiveness of tiedown restraints; and the supportive equipment and manpower necessary to load and unload and to handle the helicopters). The pretest also provided the transportation planning factors used to plan the actual exercise that commenced on 22 July 1976, with the outloading of railcars from Fort Campbell, KY, and concluded on 27 October 1976, when the last equipment returned to the division's home station. The vessel used for the pretest was the GTS Callaghan.

(2) The REFORGER 76 Pretest demonstrated that:

(a) The concept of transporting minimally disassembled helicopters on RORO ships, such as the GTS Callaghan and USNS Meteor, was feasible.

(b) The aircraft positioning device provided by the Aviation Systems Command (AVSCOM) was not adequate for final positioning of aircraft; therefore, a new device had to be developed prior to deployment of the division.

(c) The lifting equipment organic to the moving unit and/or provided by AVSCOM was satisfactory.

(d) The zippers on the helicopter redi-covers provided by AVSCOM came open while subjected to normal winds, and modifications were recommended.

(3) The REFORGER Pretest proved to be most valuable to the successful execution of the actual exercise. Based on the pretest, the conceptual helicopter loading plans were confirmed with minor changes, and a technique for below deck loading of helicopters with blades installed was developed (Figures 4-9 to 4-14). Deficiencies in special equipment, such as helicopter positioning devices and redi-covers, were identified and improvements recommended. The overall height of the CH-47 spreader bar and the variety of lifting eyes associated with the CH-47 were identified as potential problem areas. Perhaps the most important aspect of the pretest was the confidence gained in the sealift concept.

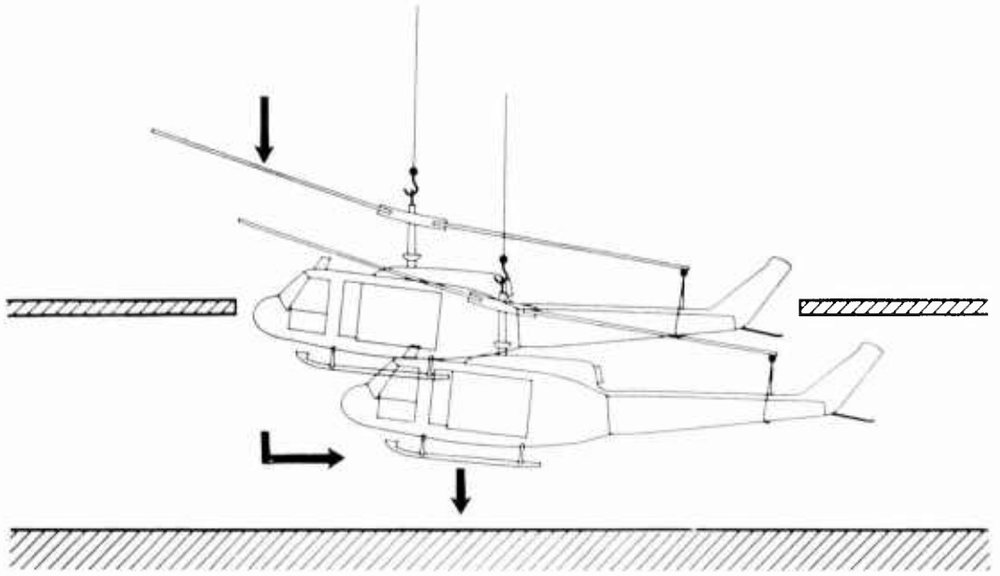

Figure 4-9. Concept for Lowering Helicopters With Main Rotor Blades Through the Vessel's Hatch.

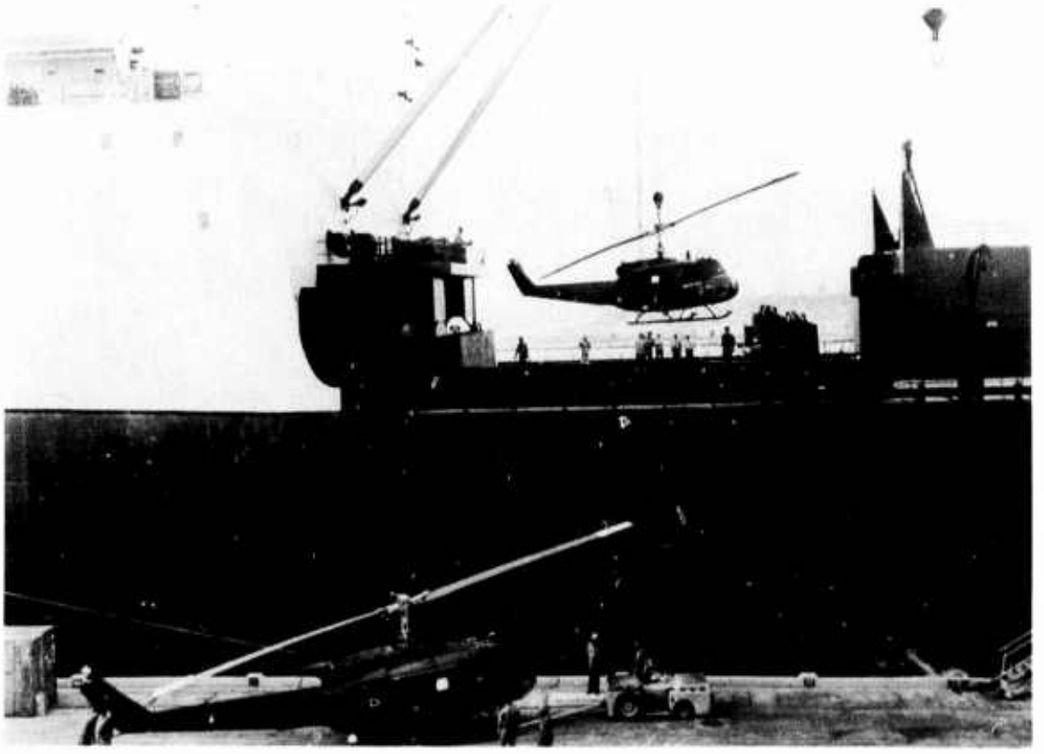

Figure 4-10. Helicopter Positioned for Lowering Through the Hatch.

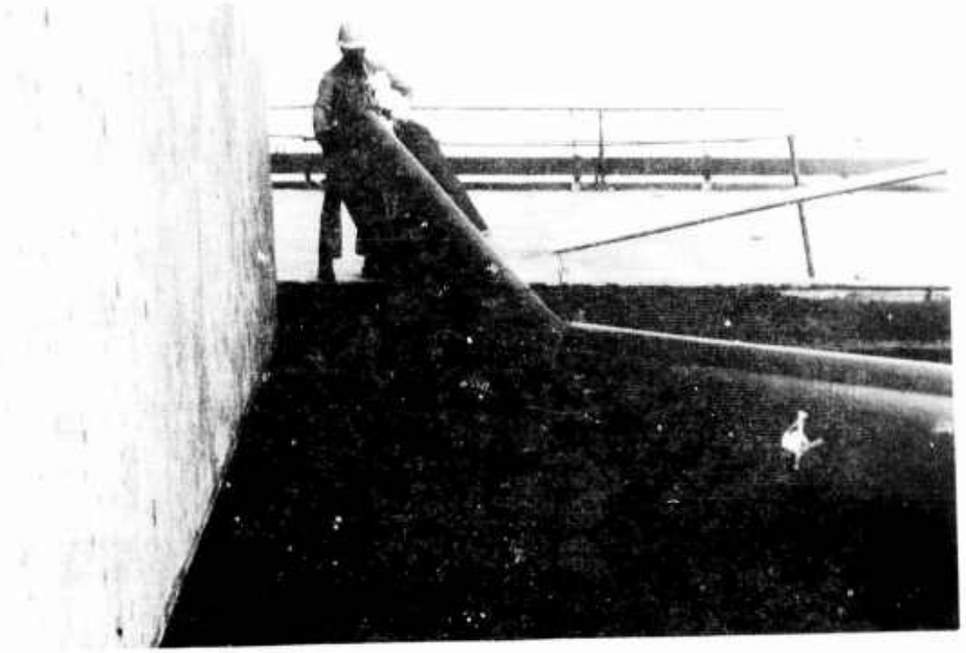

Figure 4-11. The Tail of the Helicopter is Lowered Carefully Through the Hatch.

Figure 4-12. The Nose is Guided Through the Hatch.

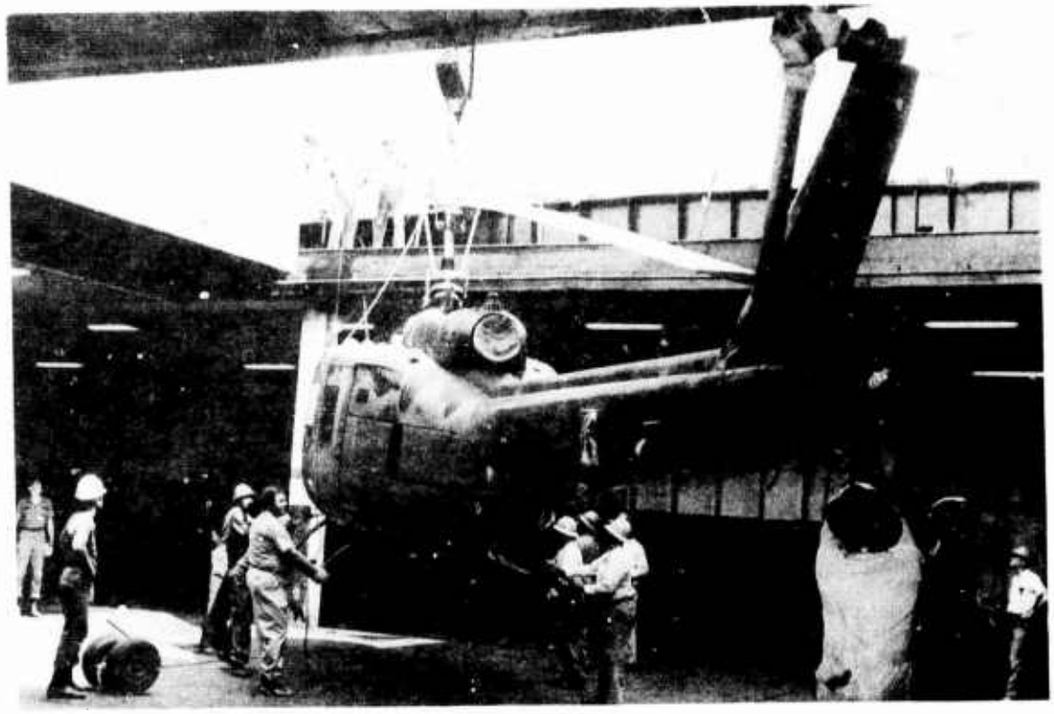

Figure 4-13. The Tail is Moved Backwards so the Front Blade can Safely Clear the Hatch Opening.

Figure 4-14. The Helicopter is Lowered Onto the Deck.

4. Template Loading.

a. General. Shipload plans were developed by template loading each piece of equipment, using 1/16-inch scale drawings of ships, aircraft, and vehicles. The template loading process confirmed that all equipment scheduled for movement would fit on the transportation assets available for REFORGER 76.

b. Template Construction and Use.

(1) Clear plastic templates were used to silhouette the aircraft on the ship drawings. The ammonia-light process gas-ozalid machine was used to produce plastic ship deck schematics and helicopter templates. The helicopter templates were taped to the deck schematics and then, using the same ammonia-light process, transferred to paper.

(2) The vehicle template loading effort was complicated by the lack of immediately available templates. Small 1/16-inch scale templates were handmade with paper and pencil. At best the "paper doll" templates were a poor substitute for plastic templates. Despite the problems associated with the templates, the template loads did present the terminal operator with a very detailed guide for vessel loadings.

(3) Full-size shadow templates were made of rough-cut 1/2-inch lumber. The templates were laid on the ship's deck, and the outline traced with white spray paint to mark the exact stow location of UH-1, AH-1, and OH-58 helicopters on the decks of the Callaghan and Meteor (Figures 4-15 and 4-16). Approximately 125 man-hours were expended on the Callaghan, and 60 man-hours on the Meteor template loading the deck. Necessary tiedown points were then determined by analyzing the location of the helicopter outline. Additional tiedowns were required and installed on the two ships (Table 4-2).

TABLE 4-2
ADDITIONAL VESSEL TIEDOWNS

Vessel	Main Deck	Upper Tween Deck	Lower Tween Deck	Side Ramp	Total
GTS Callaghan	6	48	29	4	87
USNS Meteor	46	55	20	16	137
Total					224

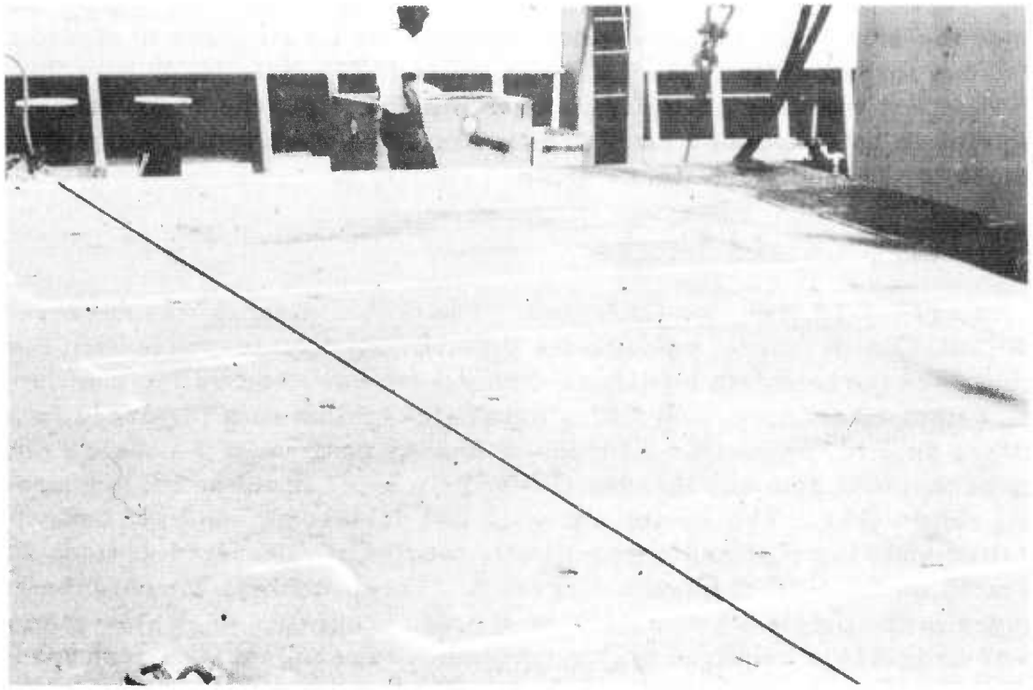

Figure 4-15. UH-1 Silhouette Marked on the Meteor's Hatch Cover.

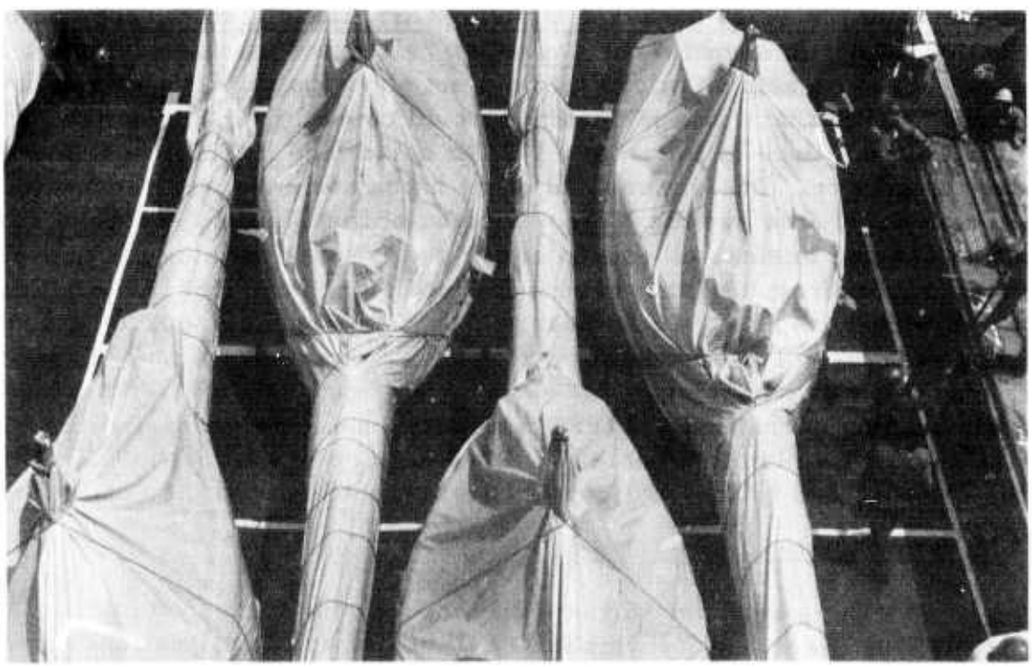

Figure 4-16. Helicopters Stowed on the Hatch Cover as Marked.

(4) The full-scale layout on the decks of the GTS Callaghan confirmed the stow plans and presented an excellent visual guide to stevedore personnel for accurate loading of helicopters. Template loading on the USNS Meteor was only partially successful, due to overhead clearance problems in hatch number four. These problems required significant changes to the load plan. (para 4c(2)).

c. Onsite Vessel Surveys.

(1) GTS Wm. M. Callaghan. The GTS Callaghan was surveyed by MTMCTEA personnel prior to the REFORGER Pretest to confirm the accuracy of the template loadings. The vessel was checked for configuration, height clearances, and lifting capability against data furnished by the Military Sealift Command. The onsite survey confirmed the basic accuracy of the MSC data and that the CH-47 helicopter could be lifted aboard using ship's gear. The onsite survey found permanent concrete ballast installed and king post and support walls located at different locations than indicated on the MSC-furnished diagrams. These findings caused minor changes in the original below deck stow plan. The main deck stow plan of CH-47 helicopters required major revision. The original stow plan loaded 37 CH-47 helicopters on the main deck. The survey reduced that number to 33 and relocated 10 CH-47 and 2 UH-1 helicopters.

(2) USNS Meteor. The MTMC Report 75-6, An Analysis of Deployment of the 101st Airborne Division (Air Assault) to Europe, selected the RORO Comet to augment the Callaghan helicopter loadings. This selection was based on ship drawings that did not show the Comet's raised hatch openings. Since these raised openings would cause loading problems, the Meteor was surveyed in November 1975 to determine its helicopter transporting capability. The dimensions of its hatch openings were adequate, and it was decided to use the Meteor instead of the Comet. A second survey was deemed desirable because of the short time available for the initial survey and as a result of the lessons learned during the REFORGER Pretest. However, the ship's Far East schedule precluded a second, more thorough survey. The second survey probably would have exposed the overhead clearance problems that were subsequently discovered during Norfolk loading operations. These clearance problems necessitated revising the stow plan to transfer 15 AH-1 helicopters from the Callaghan to the Meteor, and 9 UH-1 helicopters from the Meteor to the Callaghan.

5. Movement Data.

a. The Computerized Movement Planning and Status System (COMPASS) is the means by which HQ FORSCOM collects, maintains, and reports movement requirements data for active and reserve component units. COMPASS, thus, was the basis for all REFORGER 76 movement plans.

b. The use of the automated capabilities of COMPASS for REFORGER 76 was essential to the timely and accurate transmittal of data to all participants. The initial efforts to utilize COMPASS data were hindered by the REFORGER security classification, lack of a definitive troop list, and unfamiliarity with COMPASS procedures by the participating REFORGER units.

c. The principal problem involved in obtaining accurate COMPASS data was the need to balance the 101st Airborne Division equipment requirements against the limited transportation assets available. Tailoring the equipment requirements generated considerable workload at division level and on the part of MTMC planners. The USAREUR requirement for definitive movement data to consummate the host nation support agreements further complicated the problem. Four major iterations of the shipload plans and COMPASS data were required to match the equipment to be moved to the ships available for the exercise.

d. Accuracy in reporting, processing, and transmitting the COMPASS data improved after the initial phase. FORSCOM developed and implemented an automated data retrieval process to produce a "loading data" listing that presented a single-line listing for each item of equipment, with dimensions in feet, quantity (STON, MTON), and square feet. The COMPASS office, at the request of the 101st Airborne Division, also provided a consolidated vehicle listing.

e. A major problem in the use of COMPASS for a realtime operation is the delay in transmitting data from the moving unit, through FORSCOM, to the user, either planner or operator. The delays in the transmission of COMPASS data encountered during the early phases of the REFORGER 76 planning process were minimized by the use of couriers. Delays experienced during the final stages of processing were more serious.

f. The use and proper maintenance of COMPASS data must be reemphasized at all levels of command to obtain accurate unit movement requirements. MTMC will investigate the possibility of developing an electronic means for transmitting the processed COMPASS data. The benefits of the planning process could be greatly enhanced and the administrative work load greatly reduced if the MTMC computer and the FORSCOM computer could be linked to transfer the processed COMPASS data. MTMC could then easily process and edit the information as part of the planning process.

6. Summary.

a. The helicopter loading tests (HELTOT and REFORGER 76 Pretest) verified the proposed loading and minimum aircraft disassembly concepts

developed by MTMC planners in MTMTS Report 74-19. These tests provided MTMC and 101st Airborne Division personnel with firsthand experience in loading aircraft aboard ships and served as a vehicle for developing the loading techniques used in REFORGER 76.

b. Good equipment templates and accurate ship drawings to prepare more effective shiploading plans are needed.

c. Onsite surveys by knowledgeable personnel, who are familiar with ship characteristics and the equipment to be moved, must be made. Sufficient time must be allowed to determine exact ship configuration and to discover any equipment clearance problems that may exist.

d. The initial problem involved in obtaining accurate COMPASS data was aggravated by the requirement to tailor the 101st Division equipment list to fit the available space on the vessels.

e. Delays in transmitting the processed movement data from the unit through FORSCOM to MTMC planners should be reduced.

Responsible for the control and coordination of the movement of REFORGER 76 cargo into CONUS water terminals.

Responsible for supervising CONUS water terminal operations to include REFORGER cargo . . . . loading aboard ship.

SECTION V

PRESTOW PLAN AND UNIT PORT CALL

1. Prestow Plan.

a. The MSC Commander, in March 1976, advised the Department of the Army that three RORO (Callaghan, Meteor, Comet) ships and one C-4 break-bulk, Challenger class (American Ranger) ship would be available for REFORGER 76. A loading plan was then developed in accordance with the following criteria:

(1) Aircraft to be loaded on the GTS Callaghan and the USNS Meteor.

(2) Vehicles and other specific items to be loaded on the RORO ships, using an 80-percent stowage factor. (Eighty percent of total square feet on RORO ships is considered usable for planning purposes.)

(3) General cargo (shelters, containers, and so forth) and vehicles to be loaded on the American Ranger, using 80-percent and 55-percent stow factors, respectively.

(4) Unit integrity to be maintained insofar as vehicles are concerned. All break-bulk cargo and MILVANs to be shipped on the American Ranger.

b. Data from the initial COMPASS printout revealed that the movement requirement was in excess of the lift capacity of the four designated ships. The 101st Airborne Division was advised of the 58,000-square-foot excess and was instructed to reduce the movement requirement. The revised requirement still included a 39,000-vehicle square-foot excess. MTMCTEA then applied an across-the-board 20-percent reduction to the division COMPASS data, excluding nondivisional units not located at Fort Campbell, KY. The revised shipload plans, using the stow factors in la above, plus the 20-percent reduction, indicated that the remaining equipment would go on the four ships. The 101st Airborne Division made the necessary adjustments to its COMPASS data, and the load plans were

reconfirmed. MTMCEA used the adjusted data as a basis for the prestow plan and the template loading of vehicles and general cargo. The template loading disclosed that another 15,679-square-foot reduction was necessary to complete the prestow plan.

c. The MTMCEA preplan, with the stow location of each piece of equipment, was transmitted to the 101st ABN Div (AA). The division objected to the lack of line item number identification and the lack of unit integrity. Representatives of the 101st ABN Div, COSCOM, FORSCOM, and MTMCTEA held a conference at HQ MTMCEA and resolved the difficulty by changing the stow of specific items of equipment as requested by the Division. This revision of the prestow plan required that some unit vehicles of units orginally scheduled to be loaded on the American Ranger be shifted to the Comet. The vehicle switch presented no presented no problems in Europe, since both ships discharged at the port of Vlissingen, the Netherlands.

d. The final COMPASS printout (23 June 76) was annotated to show ship and stow location of each vehicle prestowed on the three RORO vessels and the C-4 break-bulk vessel. General cargo (except aircraft and special-handling equipment) was annotated to show the name of the ship (American Ranger).

2. Port Call Message.

a. The MTMCEA port call message, dated 1 July 1976, instructed the 101st Airborne Division to mark all equipment by vessel and stow location; to schedule equipment to arrive by vessel (that is, equipment to be shipped on the Callaghan and the Meteor was to be placed on the first three trains, and equipment to be shipped on the Ranger and the Comet was to be placed on the last two trains), and to maintain like-item integrity in the formulation of railcar loading plans.

b. A unit move port call message is not normally as detailed as the REFORGER 76 port call message; however, the SPOE, because of the volume of the cargo, required the specified cargo arrival configuration to facilitate the port receipt and staging plans.

c. During rail outloading at Fort Campbell, the 101st Airborne Division (AA) did not comply with the specifics of the MTMCEA port call message. Trains were not loaded by vessel nor were they properly marked with stow locations. These problems were not communicated to MTMCEA by the division. The noncompliance required additional effort and manpower at the SPOE to receive, stage, and mark the equipment.

d. Although the port call message was more detailed than is usual for a unit move, the moving unit should have advised the MTMCEA of the problems imposed by the message so that differences could have been mutually resolved and the requirements and capabilities of the moving unit considered as well as the maximum use of transportation assets.

3. Summary.

a. The detailed prestow plan prepared by MTMC assured the maximum use of available sealift transportation assets.

b. Initial division equipment requirements exceeded the sealift assets. Three revisions of the equipment lists were required to reduce this excess.

c. Although the port call message was unusually detailed, failure of the division to communicate problems associated with the message required unplanned additional effort and manpower at the SPOE to stage and mark the vehicles.

d. Moving unit requirements and capabilities as well as the maximum use of transportation assets must be considered when preparing port calls.

Responsible for providing traffic management support for the movement of REFORGER 76 cargo within the Continental United States (CONUS).

SECTION VI

INSTALLATION OUTLOADING

1. Installation Survey.

a. General. During the initial planning stages of REFORGER 76, MTMC was tasked with evaluating the rail outloading capability of Fort Campbell, KY, and recommending any physical improvements that could significantly increase that capability. A survey[6/] of Fort Campbell was conducted in December 1975. It concluded that the realistic outloading capability of Fort Campbell was indeterminate due to the poor condition of the rail trackage, but that current rail facilities would not support a volume outloading. The physical improvements portion of the survey recommended a series of rehabilitation and maintenance programs with estimated costs provided by the Fort Campbell Facilities Engineering personnel. These programs were designed to provide a cost benefit guideline for upgrading the Fort Campbell rail system.

b. Rail Facility Description.

(1) The rail system at Fort Campbell is depicted in Figure 6-1. It consists of three parts: Clarksville Base Tracks, "A" tracks, and "B" tracks.

(2) Clarksville Base has a very good capability for storing railcars in an emergency.

(3) The "A" track is an extended area with fourteen small spurs, some with earthen loading ramps and overhead lighting. These spurs are well situated with respect to the unit motor pools. The "A" track also serves several warehouses via spurs A-18 thru A-21. Good access and extensive hardstand make these spurs possibilities for portable end-loading ramps.

6/ MTMC Report 75-43, Special Study on the Outloading Capability of Fort Campbell, KY, Military Traffic Management Command Transportation Engineering Agency, Newport News, VA 23606, January 1976.

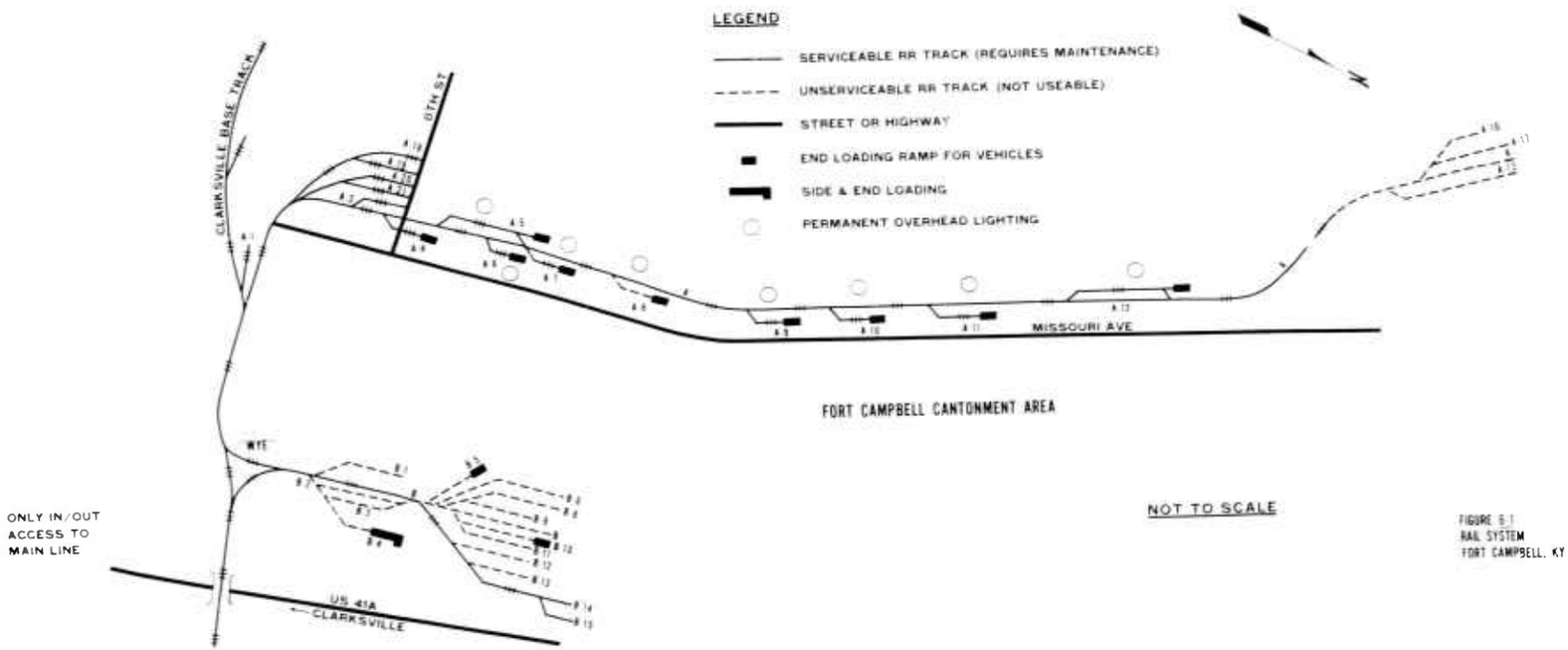

Figure 6-1. Installation Rail Network.

(4) The "B" tracks consist of a small classification yard and several spurs. Spur B-14 serves the switching locomotive shop, spur B-6 serves the engineer warehouses, and the north end of "B" serves the dry storage warehouses. Spur B-1 has an excellent hardstand and spur B-4 has a sunken ramp for side and end loading.

(5) The survey of the system revealed that some maintenance was required on many tracks and spurs to upgrade them to an acceptable standard. The most prevalent deficiency was rotted ties. Other defects in order of descending magnitude were: unserviceable switch mechanism, loose or missing spikes, poor track gauge and surface conditions, and broken joint bars and rails. The survey indicated that Clarksville Base track and spurs were serviceable. However, the only spurs in the "A" track that were usable for vehicle outloading were A-1, A-4 thru A-7, A-9 thru A-12, and A-18 thru A-21. Track "A" from a point 2500 feet north of the ramp at A-12 to the airfield was unserviceable except as shown in Figure 6-1. The unserviceable track amounted to some 30 to 40 percent of the total trackage at Fort Campbell.

c. Rail Rehabilitation. Based on the outloading capability survey of Fort Campbell (MTMC Report 75-43), funds were allocated and the necessary actions were taken to upgrade the installation rail facility to attain a 180-car per day level. This level was adequate to meet REFORGER 76 outloading requirements.

2. Cargo Documentation Assistance.

a. At the REFORGER 76 deployment and redeployment planning conference chaired by the J-4, USREDCOM, MacDill AFB, FL, on 11-14 May 1976, it was determined that Military Standard Transportation and Movement Procedures (MILSTAMP) were applicable and would be utilized for the deployment and redeployment of the 101st Airborne Division.

b. The specific documentation procedures utilized for REFORGER 76 evolved from several meetings between the Fort Campbell installation transportation officer (ITO) and MTMCEA documentation personnel. A decision was made to follow the documentation procedures normally employed, and unit cargo was to be handled in the same manner as a normal supply or cargo shipment under the Surface Cargo Reporting System (SURS). MILSTAMP documentation is currently required for accountability, control, and billing of equipment and supplies destined for overseas in conjunction with a complete or partial unit move, if the cargo transits common-user water terminals or moves in ships obtained by MSC.[7/] The basic

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[7/] Department of Defense 4500.32-R Volume I, Military Standard Transportation Movement Procedures, 1 January 1975.

document for all cargo movements is the TCMD. This identifies the material in the shipment and provides essential transportation planning data. It is used to obtain clearance, to provide advance notice to intermediate transhipment points, and to prepare ocean manifests.

c. On 6 July 1976, MTMCEA documentation personnel visited Fort Campbell to assist ITO personnel in the preparation and processing of the transportation control movement documents (TCMDs) to be used for the movement of equipment and supplies. Listings of the equipment scheduled to move consisted of approximately 3,000 units and required the same number of TCMDs. Due to the volume, it was decided to follow a procedure wherein TCMD cards and hard copy TCMDs (DD Form 1384) could be simultaneously generated by computer.

d. Through coordination meetings at Fort Campbell, data systems personnel were provided with the necessary data elements to enable them to write a computer program. This system required that a set of cards be punched for each line number on the equipment listing, showing the total number of vehicles and the cube of each line number. The computer then reproduced the cards, creating sets equal to the number of pieces in the master card file, and at the same time printed hard copy TCMDs. These TCMDs were complete except for SPOD, consignee, weight, and USA number. MTMCEA supplied 13 cartons of machine-type DD 1384s by air freight to Fort Campbell. The following procedures were then developed for the flow and processing of TCMDs and cards:

(1) Hard copy TCMDs would be controlled by the ITO.

(2) As each vehicle passed the weighing station, ITO personnel would fill in SPOD, consignee, weight, and USA number.

(3) The second copy plus one carbon copy would be forwarded to the ITO operations center.

(4) The original and the balance of the copies would be placed in a waterproof envelope and attached to the appropriate vehicle for use at Norfolk for terminal processing.

(5) The ITO operations center would use the second copy and its carbon copy to prepare rail GBLs and to complete TCMD cards for transmission to Naval Supply Center (NSC), Norfolk.

(6) The TCMD cards received at NSC would be held in suspense until receipt of equipment.

(7) As each piece of equipment arrived at NSC, the attached TCMD copies would be pulled from the waterproof envelope and annotated with receiving data.

(8) The original copy would then be forwarded to the NSC documentation section for keypunching and transmission to MTMC Eastern Management Information Systems Office (EMISO).

(9) When equipment was actually loaded aboard a vessel, another TCMD copy would be removed from the attached envelopes and forwarded to the documentation section, and then the load cards would be forwarded to EMISO to produce the ocean cargo manifest. This TCMD was not, in fact, used for manifest purposes. Consequently, the manifest reflected prestow location for some equipment instead of actual ship and stow location.

e. On 21 July 1976, the Fort Campbell ITO requested onsite documentation assistance from MTMCEA to resolve the following problems that resulted from the ITO release of the TCMDs and distribution to each unit for processing:

(1) Units did not receive enough TCMDs to accommodate their requirements. This required that additional TCMDs and cards be manually prepared which, in turn, resulted in duplication of transportation control numbers (TCNs).

(2) Consignee and POD information provided by the units was incorrect in many instances.

(3) TCMDs were applied to vehicles for which they were not designated; for instance, a 2-1/2-ton truck TCMD applied to a 1/4-ton trailer.

(4) Packing lists for MILVANS were not properly prepared, requiring ITO personnel to adjust certain data elements in order to comply with MILSTAMP requirements.

(5) Approximately 5 percent of the equipment arrived in Norfolk without TCMDs. This required extensive coordination between NSC and Fort Campbell.

(6) One TCN was applied to seven different vehicles in one case.

f. The requirement to prepare a TCMD for each shipment unit (approximately 3,000) was extremely time-consuming for division and ITO personnel. The simultaneous preparation, control, and distribution of

over 3,000 TCMDs contributed to documentation errors and proved to be a very cumbersome operation.

g. Special documentation instructions have been provided in three Department of the Army field manuals.[8/] The prescribed procedures listed below were not followed during REFORGER 76.

(1) Units preparing for overseas movement assemble the information required for documentation by completing a manual TCMD (DD Form 1384) or locally produced worksheet.

(2) The completed TCMD or worksheet is submitted to the ITO for conversion to punchard TCMD.

(3) The ITO transceives TCMD data to the Water Terminal Clearance Authority (WTCA). The WTCA then provides the SPOE with the advanced TCMD data so that TCMD card packs can be prepared.

(4) As the equipment arrives at the SPOE, these card packs are attached to their respective pieces of equipment, and a card is pulled each time the equipment moves through the terminal (marshaling yard, shipside, and aboard ship). These TCMD cards update the computer data file as to the status of each piece of equipment. This file eventually provides the data for the ocean cargo manifest.

h. While the above procedures relieve the moving unit and ITO of the responsibility for distributing and attaching individual TCMDs to each shipment unit, the opportunity for making errors in documentation continues to exist. When the equipment arrives at the terminal, a minimum of two documentation actions is required. The card pack must be attached to the shipment unit, and one card must be removed and transmitted to reflect the arrival of the shipment unit. The second procedure requires that a card be pulled when the shipment unit is loaded aboard the vessel.

i. MILSTAMP does not provide workable documentation procedures for large unit moves. Simplified procedures should be developed. Since transportation planners strive to maintain unit integrity, units normally move through one SPOE and generally on dedicated ships. Under these conditions unit equipment moves through the port facilities in isolation and

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[8/] Department of the Army FM 55-11, Army Movement Control Units, October 1973; FM 55-61, MILSTAMP Guidance Manual, November 1973; FM 55-65, Preparation for Unit Movement Overseas by Surface Transporation, January 1976.

is never integrated into or consolidated with other cargo shipments. The cargo is shipped as a unit and discharged as a unit. Individual equipment control and accountability, normally provided by the TCMD, is unnecessary. The requirement to have individual documents physically attached to each vehicle or other shipment unit and to continually update the cargo movement through the terminal by retrieving copies thereof is not considered necessary for unit moves with dedicated shipping.

3. Rail Outloading Assistance.

a. MTMC representatives visited Fort Campbell, KY, 15 through 25 July to provide technical assistance to the 101st Airborne Division during the rail outloading operations for the REFORGER 76 exercise. This assistance was given in consonance with the MTMC function of providing traffic management support to insure maximum responsiveness and economy in military transportation operations.

b. The initial problem areas confronting the division were brought to the attention of MTMC representatives at Fort Campbell by personnel from the division transportation office (DTO). These problems were addressed prior to the outloading and were directly associated with the blocking and bracing operations scheduled to begin 22 July. At the request of MTMC representatives, MTMCTEA provided two rail-loading specialists, who arrived at Fort Campbell on 18 July.

c. Operational planning conferences were scheduled with the 20th Engineer Battalion. This unit was responsible for all operational loading sites, blocking and bracing materials, and the supervisory personnel for the outloading. Several problems were resolved prior to the actual outloading operation. The initial problem was to determine the proper amount and type of materials required to support a division outloading operation. This problem was compounded by a local blocking, bracing, and tiedown regulation that did not coincide with the loading order of the Association of American Railroads (AAR). The local regulation was discarded and material requirements were computed from the AAR loading rules. Once this was accomplished, a MTMCEA loading specialist briefed individual loading teams on loading, blocking, and securing procedures. Approximately three hours of instruction were presented at the rail-loading sites prior to the beginning of acual loadings. For future outloading operations, it is recommended that preliminary instruction be conducted in classrooms where viewgraphs, slides, and other supporting aides can be used to supplement the instruction. After classroom instruction has been completed and personnel have a basic understanding of rail outloading requirements, onsite instruction should be conducted using the "hands on" technique.

d. The following is a chronological development of the rail outloading operations and of the technical assistance rendered by MTMC representatives.

(1) For Campbell originally scheduled the outloading of unit equipment for 20 July 1976. Subsequently, outloading operations were rescheduled to 22 July 1976 to allow additional preparation time for the units.

(2) The revised loading schedule called for loading operations to commence at 0800 Thursday, 22 July, and to continue through Saturday, 24 July. Loadings were not scheduled for Sunday, 25 July, or Monday, 26 July. Completion of the outloading was scheduled for Tuesday, 27 July, and Wednesday, 28 July. The void time on the 25th and 26th of July was to be used in the event of unanticipated delays during the initial outloading phase. Loadings were preplanned in that each outloading site was to be filled with a specific number of cars per day as reflected in Table 6-1. Once the required number of cars at each site were loaded, the cars were to be switched from the sites and replaced with empty cars for the next day's outloading. The loading sites along Missouri Avenue ("A" tracks) and near the coal yard ("B" tracks) (see Figure 6-1) were filled with railcars on 20 July 1976, as shown in Table 6-2. At the start of outloading operations at Fort Campbell, more than 270 railcars had been moved onto the installation, leaving very little space for storage and railcar switching operations.

TABLE 6-1
PLANNED TRAIN LOADING SCHEDULE

Site	22 July	23 July	24 July	26 July	27 July	28 July	Total
A-3	13 DODX Flat	13 DODX Flat	none	none	none	none	26
A-5	13 DF 60'	11 DF 60'	none	none	13 DF 60'	13 DF 60'	50
A-6	9 DF 60'	none	7 DF 60'	none	9 DF 60'	none	25
A-7	none	none	none	none	9 DF 60'	none	9
A-9	10 DODX Flat	none	none	none	none	none	10
A-10	10 DODX Flat	none	none	none	none	10 DODX Flat	20
A-11	10 DODX Flat	10 DODX Flat	10 DODX Flat	none	10 DODX Flat	10 DODX Flat	50
A-12	19 Bilevels	18 Bilevels	19 Bilevels	none	18 Bilevels	10 Bilevels	84
B-1	18 DF 60'	18 DF 60'	13 DF 60'	none	20 DODX Flat	18 DODX Flat	87
B-4	12 TOFC	13 TOFC	13 TOFC	14 TOFC	11 TOFC	10 TOFC	73
CB	6 DODX Flat	8 DODX Flat	8 DODX Flat	6 DODX Flat	none	none	28
RECAPITULATION BY TYPE							
DODX Flat	49	31	18	6	30	38	172
DF 60'	40	29	20	none	31	13	133
Bilevels	19	18	19	none	18	10	84
TOFC	12	13	13	14	11	10	73
Total	120 Cars	91 Cars	70 cars	20 cars	90 cars	71 cars	462 cars

TABLE 6-2
NUMBER/TYPE OF RAILCARS AND LOCATIONS - FIRST DAY (20 July)

Date	Time	Track Number	Railcars	Number	Initial Problems
20 July	1220	A-12	Bilevels	21	None
"	1240	A-11	DODX Flatcars	9	None
"	1245	A-10	DODX Flatcars	9	None
"	1250	A-9	DODX Flatcars	9	None
"	1300	A-8	DF 60' Chain Tiedown	9	None
"	1305	A-7	None	0	None
"	1305	A-6	DF 60' Chain Tiedown	9	Bulkhead at ramp needed repairs prior to outloading.
"	1315	A-5	DF 60' Chain Tiedown	17	None
"	1330	A-4	DODX Flatcars	7	None
"	1330	A-3	DODX Flatcars	13	Short blocking & bracing mat'l.
			Total	103	
			STORED EMPTIES		
20 July	1340	A-18 & A-19	Mixed	28	
"	1350	Airport Tracks	DODX Flatcars	60	
"	1405	Clarksville Base	DODX Flatcars	11	
"	1410	Clarksville Base	Bilevels	21	
"	1420	B-1	None	0	
"	1430	B-4	TOFC	12	
			Total	131	
				103	
			Grand Total	234*	

* Plus approximately 40 railcars being switched.

(3) Outloading operations commenced at 0800 on 22 July with most sites working, some at a faster pace than others. Site A-12 experienced a delay in operations and did not start outloading until 0930. Site A-3 experienced trouble loading trucks (platform utility, 1/2-ton "mules") in that they arrived at the siding with incorrect, undersized, and improper banding. MTMC representatives, in conjunction with the servicing railroad inspector, developed an on-the-spot "fix" by wiring the "mules" together with #8-gauge annealed wire, making the load acceptable to the railroad. These changes delayed the loading completion time of the site by several hours. Sites A-9 and A-10 were used primarily for loading 1/4-ton trailers. Due to the railcar loading techniques employed using materials handling equipment (MHE) (Figure 6-2), these operations were extremely slow. The site did not complete outloading until late in the evening. Had trailers been banded together, the loading time, as well as the blocking and bracking requirements, could have been reduced appreciably (Figure 6-3). Site A-11 completed loading operations at approximately 1300 hours; however, the Illinois Central & Gulf railroad inspector rejected the tiedown configuration. Equipment loaded at this site consisted primarily of M102A1 howitzers. Since tiedown configurations for this equipment did not exist in the AAR loading drawings, on-the-spot blocking, bracing, and securement procedures were developed by MTMC representatives and approved by the railroad inspector (Figure 6-4). The entire string of railcars was then broken down and completely resecured. This delayed loading completion time considerably, and site A-11 did not

Figure 6-2. MHE Loading Railcars.

Figure 6-3. 1/4-Ton Trailers Loaded Without Being Banded.

Figure 6-4. M102A1 Howitzer Blocking and Bracing Developed by MTMC.

complete operations until after 2000 hours. In future outloading operations, unit equipment lists and the AAR loading rules should be reviewed to resolve any discrepancy between the two. If loading diagram shortages exist, steps should be taken to have them drawn and approved prior to the start of the outloading.

(4) Operations at Sites A-6 and A-5, where large vehicles were being loaded on 60-foot (chain tiedown) flatcars (Figure 6-5), went very smoothly and quickly. These railcars were completed and accepted for shipment by 1330 hours (Figure 6-6). MILVANS loaded at site B-1 were backed down the string of trailer-on-flatcars (TOFC) and positioned with the average string of cars, taking approximately fours to complete (Figure 6-7). The container-on-flatcar (COFC) loading at Clarksville Base spur did not proceed as smoothly as this, since the crane used for loading the containers was stationary, and the railcars had to be repositioned each time a container was loaded. The use of COFC to ship 51 MILVANs was recommended by MTMC representatives in lieu of the planned use of 26 conventional noncushioned flatcars. Conventional flatcars would have required considerable blocking and bracing material, as well as labor time. In place of the 26 conventional cars, 13 container cars were used (4 containers per car). These special-purpose railcars greatly simplify rail movement, reduce loading/unloading time and loading cost, and most important, reduce the potential for damage to cargo. As only 13 container cars were required, the slow loading operation did not adversely affect the overall movement. Site A-12 was used to load bilevel flatcars (Figure 6-8) with smaller vehicles. The earth ramp at the site was removed to permit a mobile bilevel ramp to be positioned (Figure 6-9). Bilevel chain tiedown cars (Figure 6-10) had not been inspected to insure that the railcars were of the type that could be used to secure the vehicles scheduled for shipment. Upon railcar examination, MTMC representatives recommended the purchase of 700 adapters for use with the M880-series trucks. These adapters are U-shaped connectors that attach to holes in the vehicles frame and provide the only hardpoint on the vehicle for securement. Serious consideration should be given to modifying the tiedown points on the M880-series vehicles to permit them to be secured with any conventional tiedown device. Present tiedown points consist of holes in the frame.

(5) Wooden spanners (Figure 6-11) were used between railcars at all sites. Problems were encounted at A-12 due to the thickness of the spanners. Readjustments were required periodically. This temporarily delayed operations. MTMC representatives recommended a temporary modification to enable the spanners to remain in place. However, all the spanners had been fabricated in advance, and once the outloading commended it was impossible to make the required modification. It is recommended that the wooden spanners in the AAR loading rules be modified in the future to correct the deficiency noted at Fort Campbell.

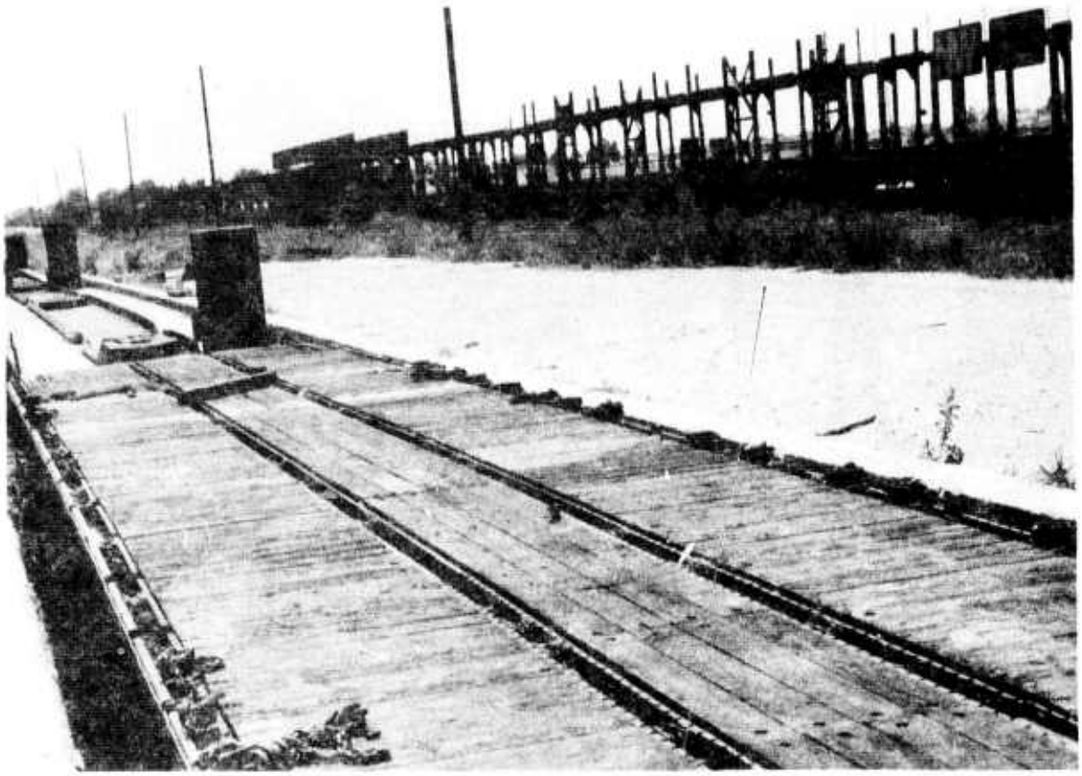

Figure 6-5. Dunnage Free 60-Foot Flatcars.

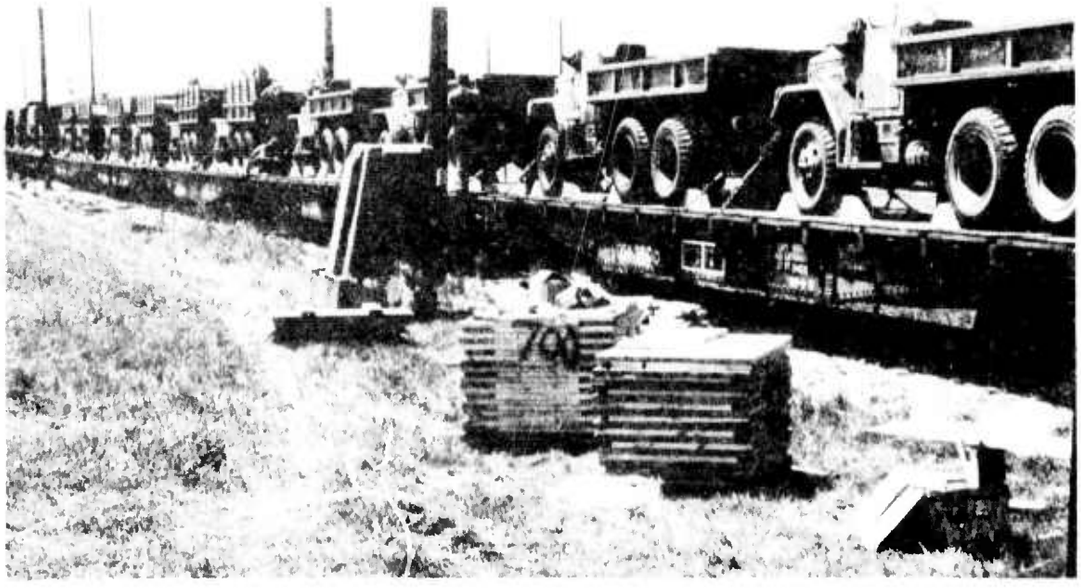

Figure 6-6. Heavy Vehicles Loaded on 60-Foot Railcars.

Figure 6-7. MILVANS and Chassis Loaded on Trailer-on-Flatcars.

Figure 6-8. Bilevel Railcars.

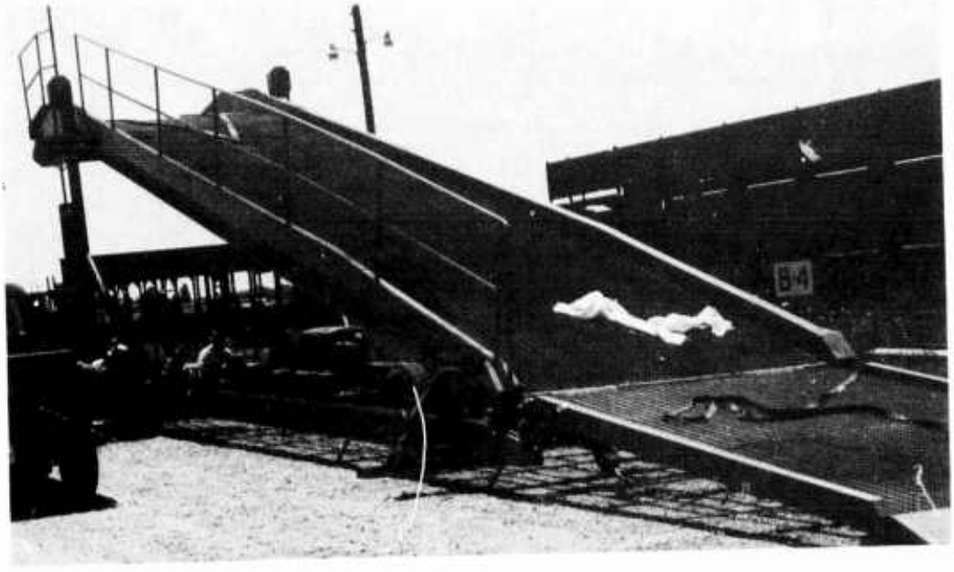

Figure 6-9. Bilevel Portable Ramp.

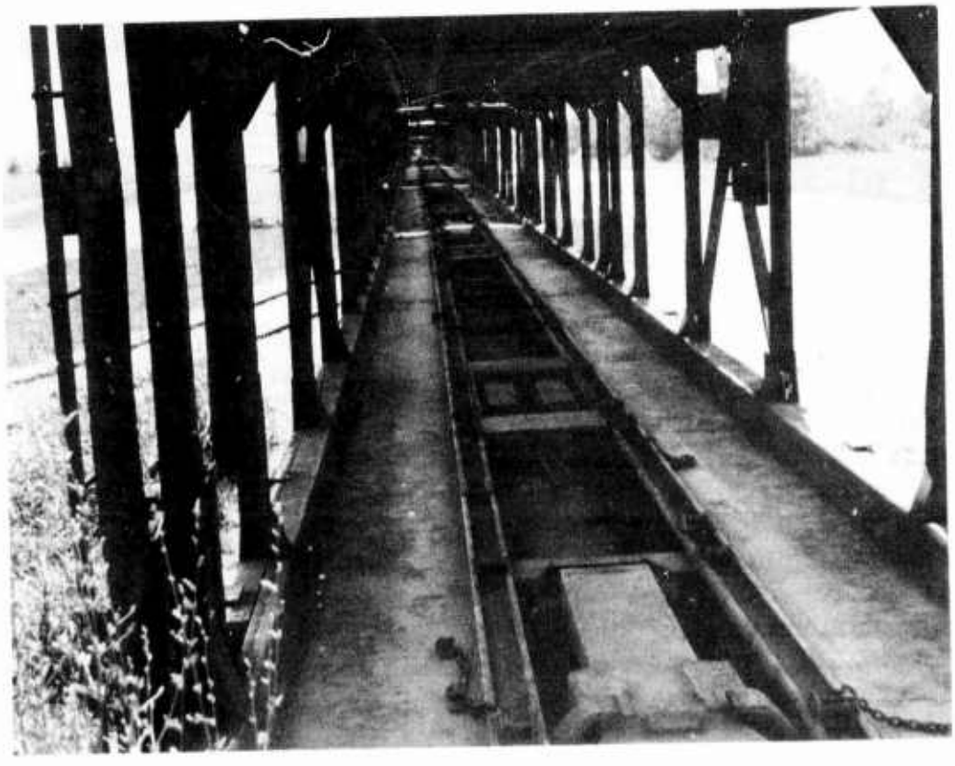

Figure 6-10. Tiedowns on Bilevel Railcars.

Figure 6-11. Wooden Spanners Joining DODX Flatcars.

(6) Blocking and bracing activities required continual supervision and assistance from MTMC representatives during the first day of outloading operations. Each loading site was visited on a rotational basis, questions were answered, procedures were explained, and modifications were made, as necessary. The supervisors and the unit crews appeared to be completely inexperienced in blocking and bracing techniques. The loading, blocking and bracing, and load inspections on the first day consumed so much time that the cars could not be switched from sites before the next day's activities began. This was coupled with the fact that the two organic locomotives of the post (estimated to have the capacity of pulling approximately 60 railcars in tandem) actually could pull only 20 to 25 railcars. To improve the switching operations a 130-ton locomotive was leased from the Illinois Central & Gulf Railroad, and Fort Eustis rail detachment personnel were obtained to supplement the Fort Campbell rail crew. Long site work times, railcar congestion, and inadequate locomotive capabilities jointly caused operational delays during the first 3 days of outloading (Figure 6-12).

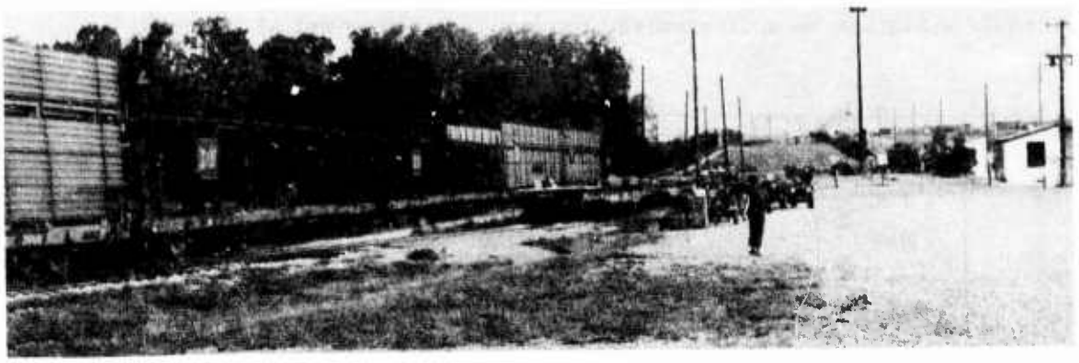

Figure 6-12. Rail Congestion due to Locomotive Failure.

(7) Delays in outloading on the second day were directly attributable to problems of the first day. Sites A-3, A-5, A-6, A-9, A-10, and A-11 were not emptied of the loaded railcars from the first day's move and, therefore, were not ready to commence outloading operations by 0800 hours. One site did not commence operations until 1530 hours, thus compounding the problems incurred on the first day. At the end of the second day, 23 July, a number of loaded railcars were awaiting pickup, and delay caused considerable congestion in the various operational sites. The first train was not pulled onto the mainline track until 24 July.

(8) On 24 July, the third day of outloading operations, standard flatcars had to replace the chain-tiedown cars scheduled to be loaded, because the chain-tiedown cars were blocked by congestion and could not be positioned in time. Loading sites had to be rescheduled, due to heavy congestion and inability to empty and refill sites with empty railcars.

(9) Between 24 July and 26 July approximately 275 railcars were cleared from Fort Campbell, completely eliminating the congestion. The last 2 days (27 and 28 July) of outloading went smoothly and on schedule (Table 6-3); short delays caused by rain were the only problem.

e. Fort Hood Outloading. The commercial highway drayage of REFORGER equipment to the port of Beaumont, TX, was successfully conducted. Port operations were not hampered by sequence of equipment arrival or by equipment condition upon arrival. A sensitive weapon system component was transported from Fort Hood to Beaumont, which required extensive coordination to insure that appropriate receipt and security measures were taken. The only problem in the move was the shipment of a communications van with classified equipment that was not properly identified by the shipper and, therefore, was not provided the required

hand-to-hand receipt procedure for classified shipments. (Note: This security violation was discovered during redeployment at Norfolk.)

TABLE 6-3
ACTUAL TRAIN LOADING SCHEDULE

Site	22 July	23 July	24 July	26 July	27 July	28 July	Total
A-3	13 DODX Flat	13 DODX Flat	none	none	none	none	26
A-5	14 DF 60'	11 DF 60'	none	none	13 DF 60'	13 DF 60'	51
A-6	9 DF 60'	none	10 DODX Flat	none	9 DF 60'	none	28
A-7	none	none	10 DODX Flat	none	9 DF 60'	none	19
A-9	10 DODX Flat	none	none	none	10 DODX Flat	none	20
A-10	10 DODX Flat	none	none	none	10 DODX Flat	none	20
A-11	10 DODX Flat	10 DODX Flat	10 DODX Flat	none	10 DODX Flat	7 DODX Flat	47
A-12	16 Bilevels	17 Bilevels	18 bilevels	none	18 Bilevels	13 Bilevels	82
B-1	18 DF 60'	15 DF 60'	3 DF 60'	none	20 DODX Flat	13 DODX Flat	69
B-4	12 TOFC	13 TOFC	12 TOFC	14 TOFC	7 TOFC	8 TOFC	66
CB	6 COFC	5 COFC	none	none	none	none	11
RECAPITULATION BY TYPE							
DODX Flat	43	23	30	none	50	20	166
DF 60'	41	26	3	none	31	13	114
Bilevels	16	17	18	none	18	13	82
TOFC	12	13	12	14	7	8	66
COFC	6	5	none	none	none	none	11
Total	118 Cars	84 Cars	63 Cars	14 Cars	106 Cars	54 Cars	439 Cars*

* Does not include 5 DODX Guard Cars.

4. Summary.

a. The installation survey of Fort Campbell conducted by MTMC revealed that the Fort Campbell rail system required considerable maintenance and upgrading to accommodate the division's outloading requirements. The necessary rehabilitation was effected prior to the exercise.

b. The MILSTAMP documentation procedures used for REFORGER 76 placed an excessive workload upon the moving units and on the Fort Campbell ITO. Specific procedures for unit moves, briefly addressed in DOD Reg. 4500.32-R, MILSTAMP, and amplified in FMs 55-11, 55-61, and 55-65, were not used. Consideration should be given to streamlining the MILSTAMP documentation requirements for unit moves when dedicated shipping is employed.

c. Additional locomotive support from the servicing railroad should have been arranged prior to the outloading.

d. A problem was encountered initially in computing blocking and bracing requirements. In future operations this problem can be alleviated

by using the automated FORSCOM rail blocking and bracing system, which provides unit requirements based on the unit equipment list.

e. Railcar distribution in the early stages of outloading is extremely critical, and utmost care must be taken to prevent railcar congestion and system failure. Close coordination should be maintained with the serving railroad to hold empty railcars off the installation until they are required.

f. During training exercises prior to actual outloading, extreme care must be taken to insure that training and loading procedures comply with the AAR loading rules.

g. Specialty-type railcars should be used to the maximum extent possible during unit deployments. This reduces the requirement placed on the deploying unit as well as on the processing ocean terminal.

h. The tiedown points on the M880-series vehicles should be modified so that these vehicles can be secured with conventional tiedown devices.

Responsible for controlling and coordinating the movement of REFORGER 76 cargo into . . . . CONUS water terminals.

SECTION VII

CONUS LINE HAUL TO SPOE

1. General.

a. Representatives from the Directorate of Inland Traffic, MTMCEA, attended the REFORGER 76 Planning Conference from 11 through 14 May 1976 at the USREDCOM, MacDill Air Force Base, FL. A concept of the rail move from Fort Campbell to Norfolk was presented to the rail/sealift working group. During this planning conference, it was determined that guard cars would be utilized for the rail move, and that special train service and rates would apply to the deployment phase.

b. Subsequently, MTMCEA hosted a CONUS Rail Planning Conference to finalize the CONUS rail-move planning and to provide a detailed profile of the move from origin to destination. Numerous subjects were discussed at this conference, including the availability of both commercial and Government-owned railcars, the importance of close coordination among the three participating rail carriers (Illinois Central & Gulf, Norfolk & Western, and Louisville & Nashville), the need for portable equipment to offload railcars at NSC Norfolk, and railcar offloading constraints at NSC Norfolk. Deadlines were set for resolving the few remaining problems, such as final car requirements and definition of alternate routing.

2. Rail Communications Net.

a. Status charts were kept to facilitate control and to monitor the progress of the rail move from Fort Campbell to NSC Norfolk, a total of 1,040 rail miles (Figure 7-1). The communications net was opened on 22 July 1976, starting with the railcar loading operation at Fort Campbell and continuing until 1 August 1976, when the last train arrived at NSC Norfolk. MTMC representatives were dispatched to Fort Campbell, on 22 July 1986, to report all information relating to the loadout of railcars and departure of trains from Fort Campbell.

b. The communications net was established via telephone from the field reporting sites to the REFORGER 76 MTMC Operations Center at NSC Norfolk. Routine information was received at Norfolk daily at 0700 and 1600 EDT, for inclusion in situation reports (SITREPS) to HQ MTMC, Washington, DC. Once a train left Fort Campbell, the rail carrier became

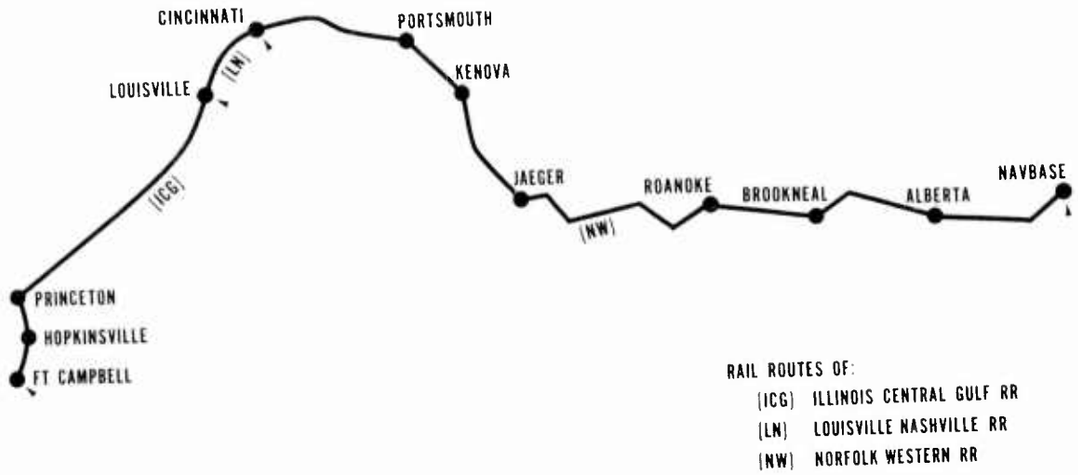

Figure 7-1. Deployment Rail Routes.

responsible for advising, on a 24-hour basis, the MTMC Operations Center of the train location, progress, and problems with individual bad-order cars. The actual flow of communications went according to plan and provided the operations center with complete and timely information on all phases of the CONUS rail move. Especially effective was the establishment of a single point of contact from each of the three participating railroads for all information concerning the progress of the trains.

3. Rail Operations.

a. All five special trains that transported REFORGER 76 cargo from Fort Campbell to NSC Norfolk arrived well within the scheduled transit time of 85 hours. (Table 7-1).

TABLE 7-1
TRAIN TRANSIT TIMES

Train (No.)	Transit Times (Hours)
1	66-1/4
2	60
3	61
4	64
5	49-1/2

b. The trains consisted of 195 Department of Defense (DODX) and 249 commercial railcars. The DODX cars included 24 chain-tiedown flatcars, 166 heavy-duty flatcars, and 5 guard cars. Twenty-three additional DODX railcars were provided as a reserve, at the request of the installation transportation officer at Fort Campbell. These additional railcars were to be used instead of commercial railcars if some of the commercial cars ordered were not received on schedule. They incurred no additional monetary expenditures.

c. In general, the maintenance condition of the 414 DODX cars (except guard cars) used for the deployment and redeployment moves was good, and no cars were rejected as bad-order cars prior to loading. Only three DODX flatcars became bad-ordered en route for the combined deployment and deployment moves.

d. The general interior condition of the DODX guard cars was unsatisfactory. Refrigerators and air-conditioning systems were inoperative in some. Thus, the guards were subjected to considerable discomfort during the trip. In February 1976, MTMCEA and New Cumberland Army Depot (NCAD) entered into an agreement for NCAD to perform organizational and direct support maintenance on the cars. Insufficient time and nonavailability of spare parts did not permit the cars to be adequately prepared for REFORGER.

e. Variations in the estimated weight scheduled to be shipped caused equal variations in the estimate of funds required for the move, since costs were based on a rate per hundred pounds of cargo. The last Domestic Release Request (DD Form 1085), dated 30 June 1976, received from Fort Campbell, KY, contained an estimated weight of 13.386 million pounds to be shipped, whereas 15.301 million pounds were actually shipped. All flatcars had a carload minimum weight of 24,000 pounds, and bilevel cars had a minimum weight of 40,000 pounds.

f. A special operation for the offloading of military-owned demountable containers (MILVANs) on chassis was arranged early in the planning stages of REFORGER 76. MTMCEA was informed by NSC Norfolk that, due to the curvature of the trackage on Pier 4, 89-foot railcars could not be offloaded. The use of the NSC "circus" ramps was considered. However, the addition of this requirement to the already congested operation would have unduly tasked NSC's capability to provide the necessary level of support. To overcome these constraints and still utilize cost-effective 89-foot railcars (Figure 7-2), it was planned that the TOFC MILVANs on 89-foot cars be offloaded at the N&W TOFC Yard at Portlock (23 highway miles from the Norfolk Naval Station). A local drayage company drayed the MILVANs to the Naval Station. The Portlock container facility opened at 0700 hours, and the MILVANs were given top priority as the trains

Figure 7-2. 89-Foot Trailer-on-Flatcars.

arrived. Commercial armed guards were provided for drayage security. Security for the Portlock area was provided by three military policemen from the 101st Airborne Division. During this operation 190 MILVANs and 4 semitrailers were delivered from Portlock to the Naval Station (Figure 7-3). A few minor problems were encountered:

Figure 7-3. Container Staging Area at the Norfolk Naval Station.

(1) Four M750 semitrailers were mixed with the MILVANs, and, contrary to plans, had to be discharged from the railcars at Portlock. The M750 electrical system is not compatible (24-volt versus 12-volt) with the commercial tractors used for drayage. The civilian drivers did, however, agree to pull the trailers. (Note: US Army 5-ton tractors, which are compatible with M750 vans, were used to dray these vans during the remaining REFORGER 76 operations.)

(2) The US Marine guards at the Naval Station security gate would not permit the armed guards accompanying the MILVANs to enter the base. The guards had to remain at the gate until the drivers offloaded the MILVANs and returned to the gate.

4. Summary.

a. The planning for and execution of the CONUS line-haul segment of the REFORGER 76 deployment was excellent. The movement was carefully monitored with an effective communications net, and all trains arrived within the scheduled transit time.

b. The general interior condition of the DODX guard cars was unsatisfactory. A more extensive maintenance program needs to be initiated to upgrade these cars.

Responsible for arranging the utilization of ocean terminal (common-user and commercial) within CONUS.

Responsible for supervising CONUS water terminal operations to include REFORGER cargo receipt, segregation, staging and loading aboard ship. Responsible for supervising and managing ocean terminal operations in Europe to include the unloading and loading of REFORGER cargo and the associated handling, processing, accounting, and documenting functions.

SECTION VIII

PORT OPERATIONS

1. General.

a. Exercise REFORGER 76 CONUS deployment and redeployment water port operations were conducted at Norfolk, VA, and Beaumont, TX. The European ports of debarkation were Ghent, Belgium, and Vlissingen, the Netherlands. Bremerhaven, Germany, was the European POE for the redeployment of the REFORGER 76 units.

b. The MSC-controlled roll-on/roll-off (RORO) vessels (GTS Admiral Wm. M. Callaghan, USNS Meteor, and USNS Comet) and one break-bulk vessel (USS American Ranger) was employed to transport over 85,000 measurement tons of cargo totalling 3,356 pieces (2,246 vehicles and trailers, 348 helicopters, 245 MILVANs, and 515 general-cargo items) of the REFORGER unit equipment to Europe and return.

c. The dates of the operational phases of the REFORGER 76 port operations were as follows:

(1) Deployment:

24 Jul through 1 Aug	Rail/highway movement to ports
31 Jul through 4 Aug	Helicopter fly-in
4 Aug through 12 Aug	Vessel loading
10 Aug through 20 Aug	Vessel voyage time
20 Aug through 23 Aug	Vessel discharge
23 Aug through 27 Aug	Port clearance

(2) Redeployment:

10 Sep through 4 Oct	Rail/highway movement to ports
19 Sep through 26 Sep	Helicopter fly-in
24 Sep through 6 Oct	Vessel loading
28 Sep through 18 Oct	Vessel voyage time
7 Oct through 21 Oct	Vessel discharge
9 Oct through 27 Oct	Port clearance and return to home station

2. Background.

a. The Commander, MTMCEA was appointed by MTMC as the REFORGER 76 exercise director, on 30 March 1976. The Hampton Roads, VA, port area was recommended by MTMC Report 75-6 as the primary CONUS water terminal for REFORGER 76. This recommendation was made on the basis of a comparison of various east coast and gulf coast ports and took into consideration line haul, terminal tariffs, and port facilities. When the study was prepared, onsite liaison visits with commercial and Governmental terminal operators and physical inspections of port facilities were not conducted. It was the responsibility of MTMCEA to select and negotiate for a specific terminal within Hampton Roads for the receipt, staging, and loading of REFORGER 76 equipment. Consequently, MTMCEA conducted a survey of the Hampton Roads area during the week of 5 April 1976, and determined that the facilities at the Norfolk Naval Station, specifically Pier 12, were the most suitable to support REFORGER 76 port operations. Although the facilities at the Norfolk International Terminals were adequate for a division deployment, their use would have unduly disrupted commercial container operations.

b. On 16 April 1976, MTMCEA formally requested from the Naval Supply Center, Norfolk, the exclusive use of Pier 12 and the staging areas adjacent to Hughes Drive for RORO operations and a berth and staging area for a break-bulk vessel. Navy approval for the use of these areas was not readily forthcoming, since Pier 12 was scheduled for use by the Atlantic Fleet aircraft carriers. After a lengthy series of negotiations with various elements in the Navy chain of Command (Chief Naval Operations; Commander in Chief, Atlantic Fleet; CO, Norfolk Naval Base; CO, Naval Supply Center), conditional approval was obtained for the use of the south side of Pier 12 (if not needed for an aircraft carrier), the Hughes Drive staging areas, and a berth for the break-bulk vessel. (Note: During the actual deployment in August 1976, all of Pier 12 and adjacent areas were available exclusively for REFORGER 76 operations.)

c. The apparent lack of coordination between MTMC and the Norfolk Naval Base during the conceptual planning delayed MTMCEA port operations planning. Once the Navy facilities were selected for REFORGER 76 terminal operations, the subsequent lower to higher staffing of this requirement, which the Navy required, further increased the uncertainties at the operating level. In a joint exercise of this nature, lateral coordination at the highest level, followed by directives from higher to lower echelons within each service, is necessary before coordination at lower levels can be successfully accomplished.

d. On 23 June, MTMCEA decided that the USNS Meteor would be double-ported. Fort Hood REFORGER units would ship their equipment to the port of Beaumont, Texas, where it would be loaded on the Meteor before proceeding to Norfolk for loading of Fort Campbell units. Beaumont was selected on a cost-analysis basis, considering the proximity of the port to Fort Hood and the availability of a MTMCEA port detachment at Beaumont to provide contractual representation for stevedoring and other terminal services.

e. European terminal operations were planned by the MTMC Transportation Terminal Group, Europe (MTMC-TTGE). Port selection for REFORGER 76 was based on the requirement to test the Belgium, Netherlands, and Luxembourg line of communications (BENELUX LOC) under the host nation support concept. In view of this objective and the nature of the cargo, MTMC-TTGE recommended that the port of Vlissingen in the Netherlands and the port of Antwerp in Belgium be used for the exercise. However, Antwerp could not be made available because of the large volume of commercial traffic scheduled during the exercise timeframe; therefore, the Belgium Ministry of Defense offered the port of Ghent. After joint US/host nation representatives conducted onsite surveys of the port facilities, Vlissingen and Ghent were confirmed as the SPOD for REFORGER 76.

f. The port of Bremerhaven, Germany, was selected as the redeployment SPOE because the necessary personnel and facilities, required to properly supervise and support the return move, were readily available at the nearby US Army installation.

3. Concept of Operations.

a. As previously mentioned REFORGER 76 was conducted as a peacetime exercise in which the speed of operations was governed by considerations of handling care, safety, and economics to minimize damage to helicopters and equipment. These considerations prevailed throughout the exercise.

b. The various types of water terminals used to load and unload the REFORGER vessles included a Navy terminal operating under an inter-service support agreement (ISSA) with MTMCEA for DOD common-user ocean terminal functions (Norfolk, VA); a commercial port with a military ocean outport detachment (Beaumont, TX); oversea commercial terminals supported by host nation agreements (Ghent, Vlissingen, and Bremerhaven).

c. The primary terminal functions relevant to the normal movement of DOD cargo are outlined below:

(1) Military ocean terminals (MOTs) are responsible for receiving, staging, and loading DOD cargo. Information concerning cargo receipt, lift, and shipment of cargo through the terminal is reported by the MOT to the water terminal clearance authority of the MTMC area command. Advance TCMDs are received from the shipper through the WTCA and are maintained by the MOT in order to provide the basis for ship stow planning, documentation, and loading operations. Ocean documentation required to control cargo movement is prepared and distributed by the terminal. Within CONUS the WTCA prepares and distributes the ocean manifests to the SPODs based on data received from the loading terminal. Vessel papers, stowage plans, cargo traffic messages, and ocean bills of lading are prepared and distributed by the MOT.

(2) Military ocean outports and detachments, located at commercial terminals, act as contractual representative for stevedoring and other contractual terminal services; they also initiate agreements with other Government agencies for necessary local administration and supply support. They are distinguished from MOTs in that they do not operate on Government facilities.

(3) DOD cargo transshipped through commercial ports comes under the jurisdiction of the area DOD terminal representative, which may be a MOT, an outport, or an outport detachment. DOD cargo is processed through commercial ports under three types of contractual arrangements:

(a) A contract with the port authority. Such contracts permit ships to tieup at a dock and longshoremen employed by the port to handle the cargo.

(b) A contract with a city. For a fixed cost per ton, the city provides pier space and a building for use by a MTMC team that supervises the operation. MTMC contracts separately for longshoreman services.

(c) A contract with a commercial company. A private company, with its own terminal and warehouse facilities, performs all services for MTMC. Only a small MTMC team is present for coordination, administration, and manifesting.

(4) Under the terms of a specifically drafted ISSA, another service, such as the Navy, may perform all the normal terminal service functions that a MOT performs. As in the case of all MTMC terminals, commodity rates are established for billing reimbursable expenses related to the processing of DOD cargo.

(5) Oversea commercial terminals operate under host nation support agreements. The foreign government provides the terminal services and facilities that are contracted by the MTMC terminal unit. The terminal unit, in turn, provides liaison and contract supervision as well as documentation for DOD cargo.

d. The utilization of these various types of water terminals during REFORGER 76 provided many insights into the adequacy of terminal organizations to meet the port responsibilities related to a unit move of this volume. The complexities of a large unit move require supporting organizations beyond those associated with the normal movement of resupply cargo through CONUS and oversea ports. Port organization and the division of port responsibilities for unit moves are not clearly defined in existing publications. AR 220-10, Preparation for Oversea Movement of Units (POM), para 6-9, does state that the CDR MTMC is responsible for all activities relating to the transportation of troops and equipment arriving at water terminals under MTMC control, in addition to the normal terminal functions already mentioned including:

(1) Issuing a port call for personnel and equipment.

(2) Requesting the deploying unit to send a unit representative to the port.

(3) Providing transportation assistance at home station.

(4) Arranging transportation for guard personnel returning to their home station.

(5) Maintaining transportation surveillance on items moving to the terminal to insure on-time arrival and proper consolidation for oversea movement.

(6) Insuring shipment status information is made available to appropriate commands.

(7) Inspecting unit equipment, and making necessary repairs to correct damages or failure occurring during movement.

(8) Reprocessing improperly processed equipment for ocean travel.

(9) Coordinating the movement when unit personnel and equipment are moved through separate terminals.

e. MTMC and the terminals used in REFORGER 76 successfully accomplished the normal terminal functions as well as those prescribed in AR 220-10. However, MTMC terminals are not staffed to perform many of the necessary port support functions that were not previously listed, such as: billeting and mess, vehicle maintenance, air traffic control, administrative transportation, additional security, fire fighting, and general troop support. The cost of contracting for these services can be prohibitive. In the case of Norfolk (the most complex situation), MTMCEA arranged for the First Corps Support Command (1st COSCOM) from Fort Bragg, NC, to provide most of these port support functions. Throughout the exercise, the 101st Airborne Division was responsible for helicopter reception, preservation, disassembly, staging, and movement to shipside for loading. The 1st COSCOM coordinated the port support functions with the commanding officer of the naval base (CONAVBAS), who was the installation commander. MTMCEA established a REFORGER operations center at Norfolk, on 24 July 1976, to monitor and coordinate terminal service functions with the commanding officer of the naval supply center (CONSC), who was the DOD terminal commander for the common-user terminal services in Norfolk. However, all waterfront property, particularly Pier 12, did not belong to CONSC. This combination of commands operating in the port area created difficulties in day-to-day planning, coordination, and execution of port operations. The degree of cooperation and responsiveness among the various elements was directly dependent upon the particular personalities involved and their willingness to meet requirements. Norfolk terminal operations were adversely affected, at times, by the lack of clear-cut command arrangements and the reliance on the voluntary cooperation of many diverse elements (Norfolk Naval Base, Naval Supply Center, 1st COSCOM, 101st Airborne Division) for the necessary port and port support functions.

f. At Beaumont, TX, the MTMC port detachment arranged for all terminal services for REFORGER 76. The Fort Hood units provided all other port support requirements. The MTMC detachment was not staffed to perform functions beyond its role as contractual representative.

g. Port support functions at Ghent, Belgium, and Vlissingen, the Netherlands, were provided primarily by the host nations in accordance with existing host nation agreements. Terminal services and documentation contracts were arranged and supervised by MTMC-TTGE.

h. Bremerhaven terminal provided terminal services for the redeployment SPOE REFORGER 76 operations. The port support functions were provided by the 21st Support Command. Bremerhaven terminal's collocation with the port of Bremerhaven and its close working relationship with the stevedore contractor greatly facilitated the conduct of SPOE operations.

i. Port organization and the division of responsibilities for large unit moves should be reviewed, and comprehensive guidance should be provided to all commands involved in planning the transshipment of large units through the ocean terminals. The following should be considered:

(1) Provide the MTMC port commander with overall command and control of port functions and port support functions. Operational control should be exercised over all assigned support elements.

(2) Minimize the requirement for deploying unit personnel at the port. Port support could be provided by a tailored provisional support unit(s) from TRADOC or FORSCOM and attached to MTMC when and where requested.

4. Execution of Port Operations.

a. General.

(1) In general, REFORGER 76 port operations were an unqualified success in that every piece of equipment was shipped on schedule and with very minor damage. The planning dates (Tables 8-1 and 8-2) for actual on-berth, start, and completion times were met.

TABLE 8-1

DEPLOYMENT TERMINAL OPERATIONS

Vessel	On Berth Planned/Actual	Start Operations Planned/Actual	Complete Operations Planned/Actual
	NORFOLK		
Callaghan	7 Aug/021425 Aug	8 Aug/040730 Aug	12 Aug/121545 Aug
Ranger	7 Aug/030706 Aug	8 Aug/040815 Aug	12 Aug/111530 Aug
Meteor	7 Aug/031630 Aug	8 Aug/050830 Aug	12 Aug/111430 Aug
Comet	7 Aug/051045 Aug	8 Aug/060700 Aug	10 Aug/101545 Aug
	BEAUMONT		
Meteor	29 Jul/291100 Jul	29 Jul/291415 Jul	30 Jul/302300 Jul
	GHENT		
Callaghan	20 Aug/201620 Aug	21 Aug/210613 Aug	23 Aug/231200 Aug
Meteor	20 Aug/201730 Aug	21 Aug/210625 Aug	23 Aug/221940 Aug
	VLISSINGEN		
Ranger	20 Aug/201009 Aug	21 Aug/201415 Aug	24 Aug/230430 Aug
Comet	20 Aug/201130 Aug	21 Aug/201830 Aug	22 Aug/221200 Aug

TABLE 8-2

REDEPLOYMENT TERMINAL OPERATIONS

Vessel	On Berth Planned/Actual	Start Operations Planned/Actual	Complete Operations Planned/Actual
		BREMERHAVEN	
Callaghan	23 Sep/241500 Sep	25 Sep/242230 Sep	27 Sep/281745 Sep
Meteor	26 Sep/271400 Sep	28 Sep/271400 Sep	30 Sep/301600 Sep
Comet	30 Sep/301430 Sep	1 Oct/301430 Sep	2 Oct/021700 Oct
Ranger	2 Oct/300800 Oct	3 Oct/030600 Oct	7 Oct/062300 Oct

NORFOLK

Vessel	On Berth	Start	Complete	Vessel Free Planned/Actual
Callaghan	7 Oct/070750 Oct	8 Oct/071015 Oct	9 Oct/110800 Oct	10 Oct/111815 Oct
Meteor	10 Oct/100800 Oct	11 Oct/110700 Oct	12 Oct/121725 Oct	Sailed 13 Oct/132400 Oct
Comet	14 Oct/140300 Oct	14 Oct/140800 Oct	15 Oct/151125 Oct	Free 16 Oct/151200 Oct
Ranger	18 Oct/181530 Oct	19 Oct/180800 Oct	21 Oct/211445 Oct	22 Oct/211700 Oct
		BEAUMONT		
Meteor	18 Oct/180700 Oct	18 Oct/180900 Oct	18 Oct/181800 Oct	18 Oct/181800 Oct

(2) The vessel load plans were designed to take maximum advantage of the limited ocean transportation assets available. REFORGER 76 tested as many methods of vessel loading and unloading as possible to include the use of mobile, gantry, and floating cranes, as well as the ship's gear and the drive-on/drive-off of the RORO ships.

b. Helicopter Procedures.

(1) The most unusual aspect of REFORGER 76 terminal operations was the shipment of a large number of minimally disassembled helicopters. Minimum disassembly for REFORGER 76 was the removal of main rotor blades from the CH-47 helicopters; removal of synchronized elevator and FM antenna from the UH-1 helicopters; removal of synchronized elevators and wings from the AH-1 helicopter; and removal of a minimum number of OH-58 horizontal stabilizers. Removal of main rotor

blades on UH-1, AH-1, and OH-58 was accomplished only when vessel overhead clearances required it or when the nose of the helicopter was facing a bulkhead. The degree of helicopter disassembly depended upon combat readiness requirements in the operational theater, the ocean ship system used, and the number of vessels available for the move.

(2) The following discussion of the port organization for processing and loading helicopters, as well as methods employed to load, stow, handle, and restrain the helicopters, applies throughout the report since the organization and methods used were similar throughout the exercise.

(a) Helicopters were the responsibility of the terminal commander during actual loading and discharge operations only. As previously mentioned, the 101st Airborne Division provided personnel to perform all helicopter disassembly, preservation, and staging prior to shiploading. Helicopters were released to the division immediately after ship discharge. This arrangement, along with the manner in which 101st Airborne Division personnel and offloading equipment were organized and controlled, hampered the overall conduct and coordination of helicopter loading and discharge operations.

(b) The division tasked each unit to assist in loading and unloading its own helicopters (that is, to provide offloading equipment such as lifting eyes, tow tractors, lifting straps, ground-handling wheels, and personnel to hook up helicopters (Figure 8-1) and to install ground-handling wheels). This procedure caused problems since a central point of contact from the division was not always available to effectively respond to changes in operational requirements. (This problem was further complicated by the distance between the two vessles, Callaghan and Meteor, at Ghent, Belgium.) Attempts to deal directly with the individual unit commanders proved inadequate when loading and discharge plans or sequences had to be revised and helicopters from several units were involved. Often a unit would have no command personnel onsite. This caused stevedore standby time until the required helicopter loading and discharge material and desired sequence of helicopters could be arranged.

(c) The control of special-loading equipment and the flow of helicopters to and from the staging areas in the desired sequence should be the responsibility of the port commander, since he is ultimately responsible for stevedore operations and the stow of the ship. Furthermore, to preclude personnel control problems on the vessel, it would be advisable to train the stevedore personnel to perform the functions of hooking up the helicopter and installing the ground-handling wheels. One unit observer per vessel hatch would be sufficient monitoring for the deploying unit to note helicopter damages.

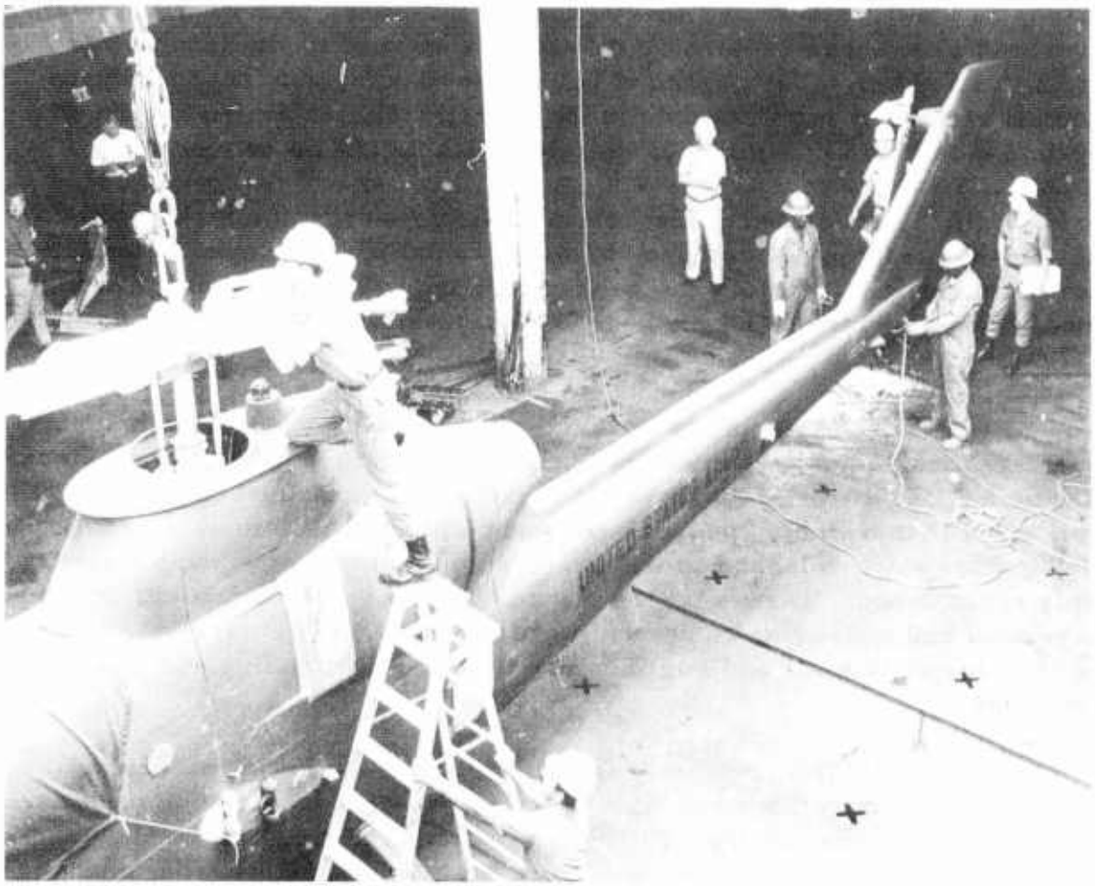

Figure 8-1. Division Personnel Hooking Lifting Shackle to Helicopter.

(d) As previously mentioned the division personnel assembled and disassembled the helicopters at the SPODs and SPOEs throughout the exercise. AR 220-10, paragraph 5-4, states that in CONUS the deploying unit is responsible for the packing, crating, preservation, and assembly/disassembly of aircraft at ports specified by the MTMC area commander. In oversea areas the major Army commander is tasked to provide these technical skills. The REFORGER 76 deploying unit, however, agreed to perform these functions at the oversea terminals as it did at the CONUS ports. If another unit were to accomplish these tasks at the ports, the deploying unit's role at the port could be further reduced. A FORSCOM or TRADOC port support unit could contain a helicopter direct support/general support (DS/GS) maintenance unit for helicopter disassembly and preservation. In an apparent conflict with the basic regulation, FORSCOM Supplement 1 to AR 220-10 supports this procedure. The supplement, which is referred to as Appendix J to AR 220-10 and entitled "Logistical Support for Aviation and Aviation Support Units," tasks the Aviation Systems Command

with providing technical assistance to the port facility for aircraft disassembly, preservation, packaging, loading, and stowage aboard the vessels, but states quite clearly that the actual work will be performed by the port. This procedure would relieve the unit from a major responsibility during the actual unit move, and would assign the port commander the overall responsibility for helicopter handling from fly-in to loading aboard the vessel. The DS/GS maintenance unit should be attached to the port commander for the duration of the exercise.

(3) Helicopter loading, handling, stowing, and restraint were handled as follows:

(a) Helicopters were loaded aboard the Callaghan and the Meteor by a variety of methods, using ship's gear as well as floating and mobile cranes (Figures 8-2 and 8-3). Double handling of most CH-47's on the Callaghan was necessary to place them in the final stow position on the main deck (Figure 8-4) but was not necessary on the Meteor. As described earlier in this report, the technique of lowering the UH-1 and AH-1 helicopters diagonally through the hatch proved to be sound. Untieing the main rotor tiedown on UH-1 and AH-1 helicopters and turning the rotor blade while lowering the helicopter through the hatch grealy reduced the probability of damage to the main rotor blade and generally improved the loading

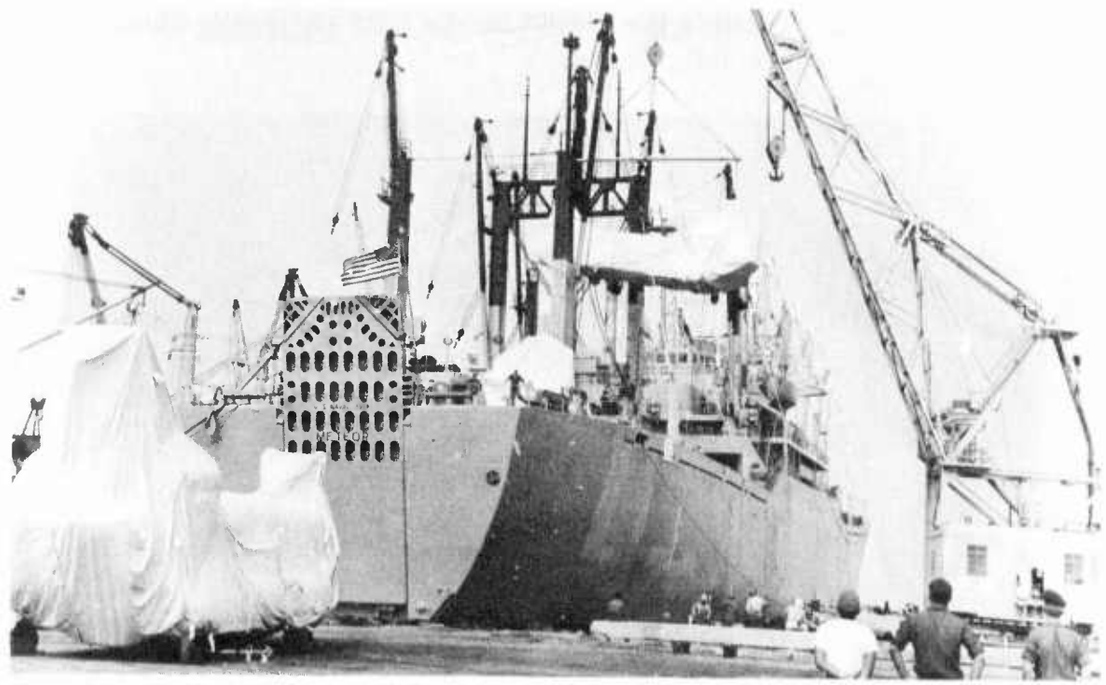

Figure 8-2. Loading the CH-47 on the Meteor Using a Floating Crane.

process. The OH-58 was loaded diagonally through the hatches on both the Callaghan and the Meteor, with no part of the helicopter overhanging the square of the hatch.

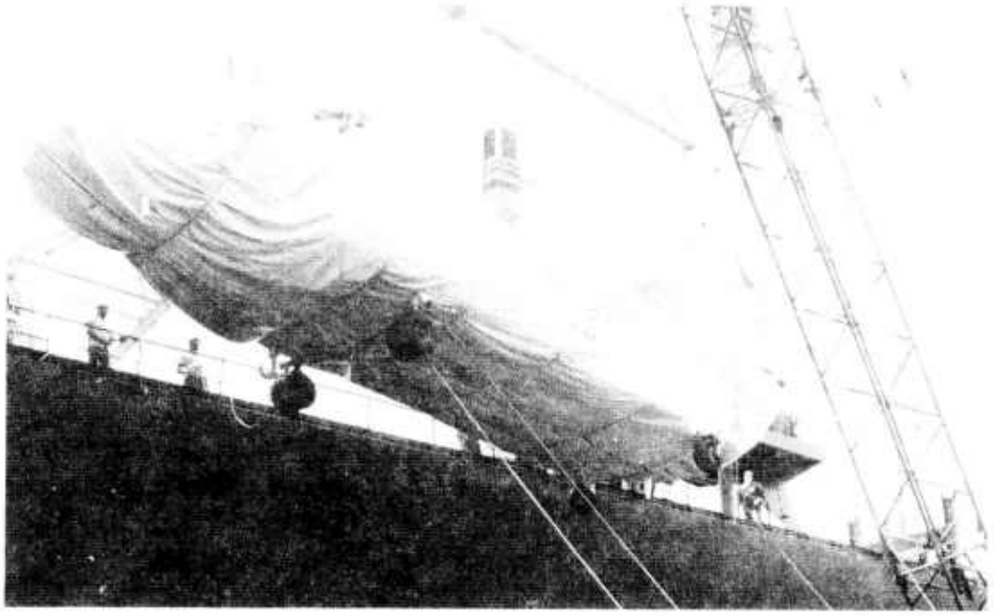

Figure 8-3. Loading the CH-47 on the GTS Callaghan Using a Mobile Crane.

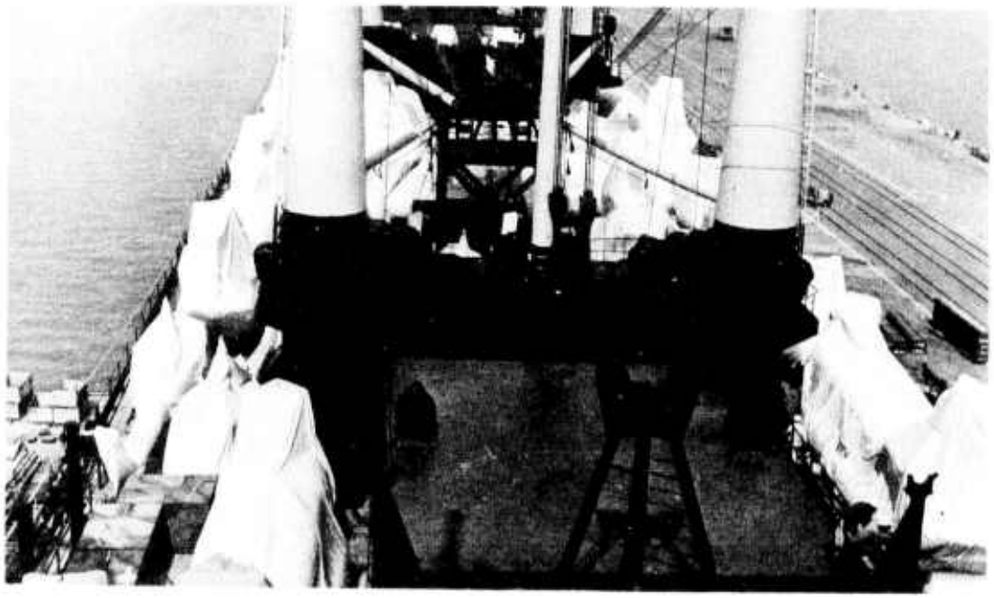

Figure 8-4. Main Deck Stow of CH-47 Helicopters on the Callaghan.

(b) Helicopters were moved and positioned below deck on the REFORGER vessels by using a combination of positioning devices; namely, ground-handling wheels, caster wheels, and roller conveyors (Figures 8-5 and 8-6). These caster wheel devices, developed by the 101st Airborne Division, were not of sufficient strength and mobility to stow the UH-1 and AH-1 helicopters in a timely manner. Neither were they strong enough to withstand the weight of the helicopter over a long period of use, nor could they negotiate obstructions on the deck. They were severely bent during loading operations and were unsuitable for further use. Stevedore standby time was experienced while the positioning devices needed to move the helicopters in the desired direction were affixed to or under the helicopter skids. Ground-handling wheels developed excessive hydraulic problems and could not provide for lateral movement of the helicopter. Although the roller conveyor provided lateral mobility, it would not negotiate deck obstructions, and was difficult to remove from under the helicopter when the tail of the helicopter could not be completely lowered. These experiences during deployment loadout identified the requirement for a new omnidirectional positioning device for UH-1 and AH-1 helicopters. Therefore, during the interim between deployment and redeployment, MTMCTEA developed a new device to improve handling and positioning of the UH-1 and AH-1 helicopters (Figure 8-7 and 8-8). The new device, employed during the redeployment phase of REFORGER 76, was a significant improvement over the three previously used devices. It was especially effective in the final positioning of the helicopters. The device does have some limitations: it does not negotiate deck obstructions (D-rings, raised cloverleaves, and deck seams), is heavy and cumbersome to maneuver, and cannot be used on UH-1 helicopters with cargo hooks installed. However, the basic design concept is excellent, and its improvement and redesign should be explored to overcome its shortcomings and make it usable on transport aircraft as well as on vessels. An omnidirectional helicopter positioning device that can be easily installed and can negotiate deck obstructions will significantly reduce helicopter loading and unloading times.

(c) Despite the tight stow required to insure that all aircraft should be shipped as planned, no helicopter sustained significant transit damage. (Figures 8-9 to 8-13).

(d) All helicopters were restrained using the standard shipboard tiedown devices with Peck and Hale gear (Figures 8-14 and 8-15). The deck toedown points proved adequate for helicopter restraint. Extra "D" rings installed on the Callaghan and Meteor assisted in achieving the tiedown patterns. The tight helicopter stow required caution when tiedown devices were installed to insure that the devices did not chafe delicate surfaces of the helicopters.

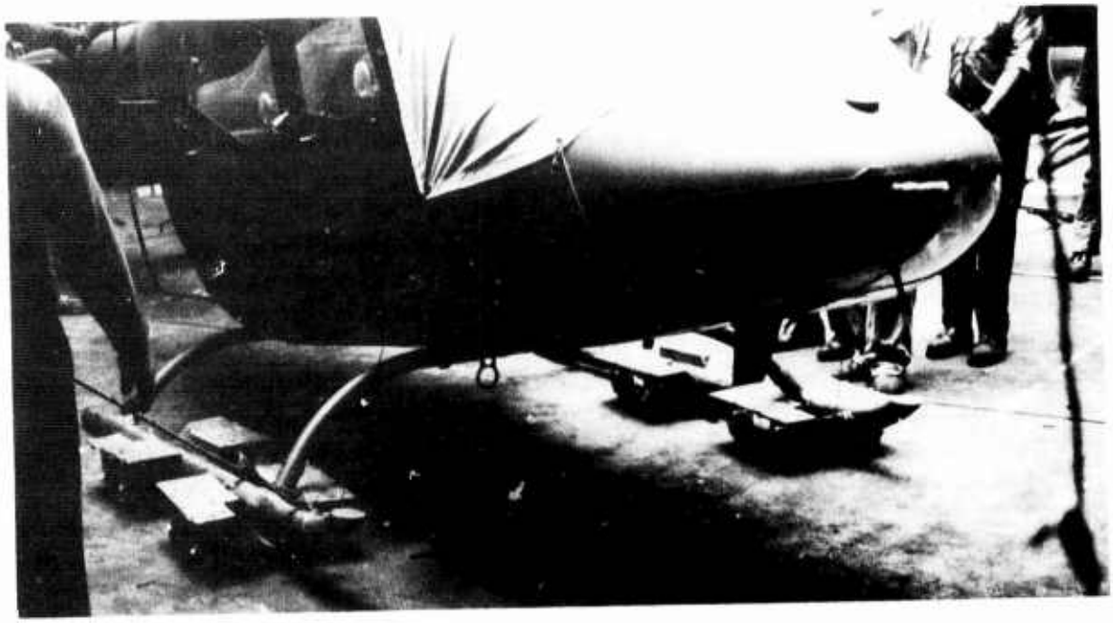

Figure 8-5. Helicopter Positioning Device (Caster Wheels).

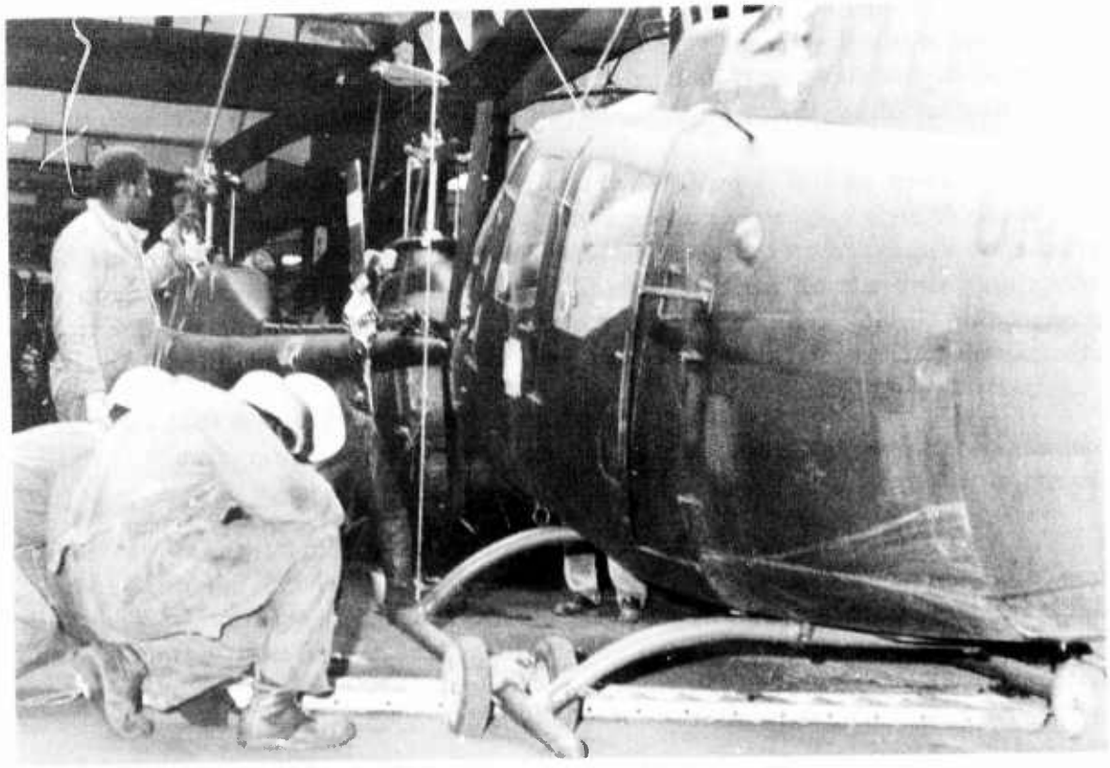

Figure 8-6. Helicopter Positioning Device (Roller Conveyor).

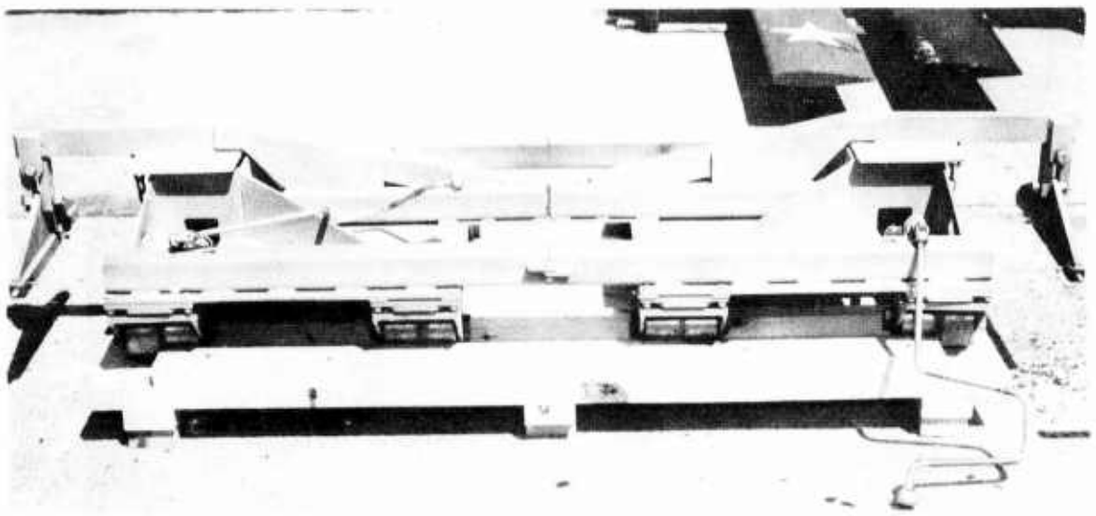

Figure 8-7. Helicopter Positioning Device (MTMC Device).

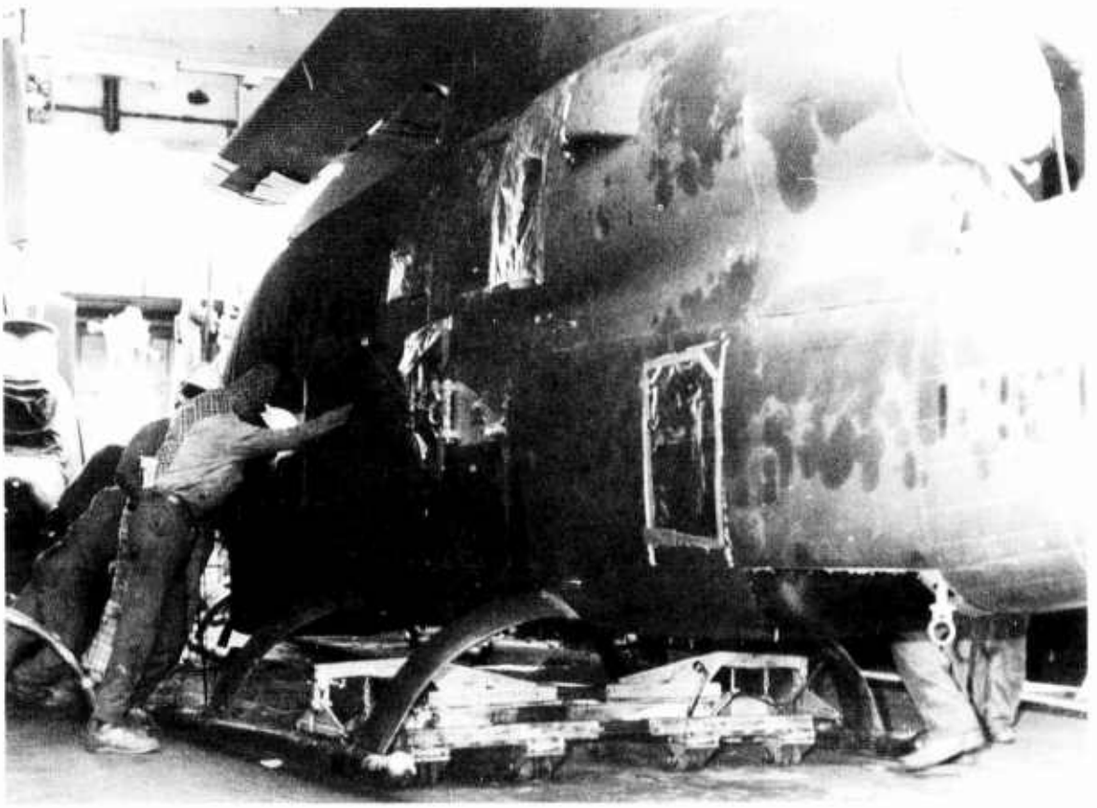

Figure 8-8. Helicopter Positioning Device (MTMC Device).

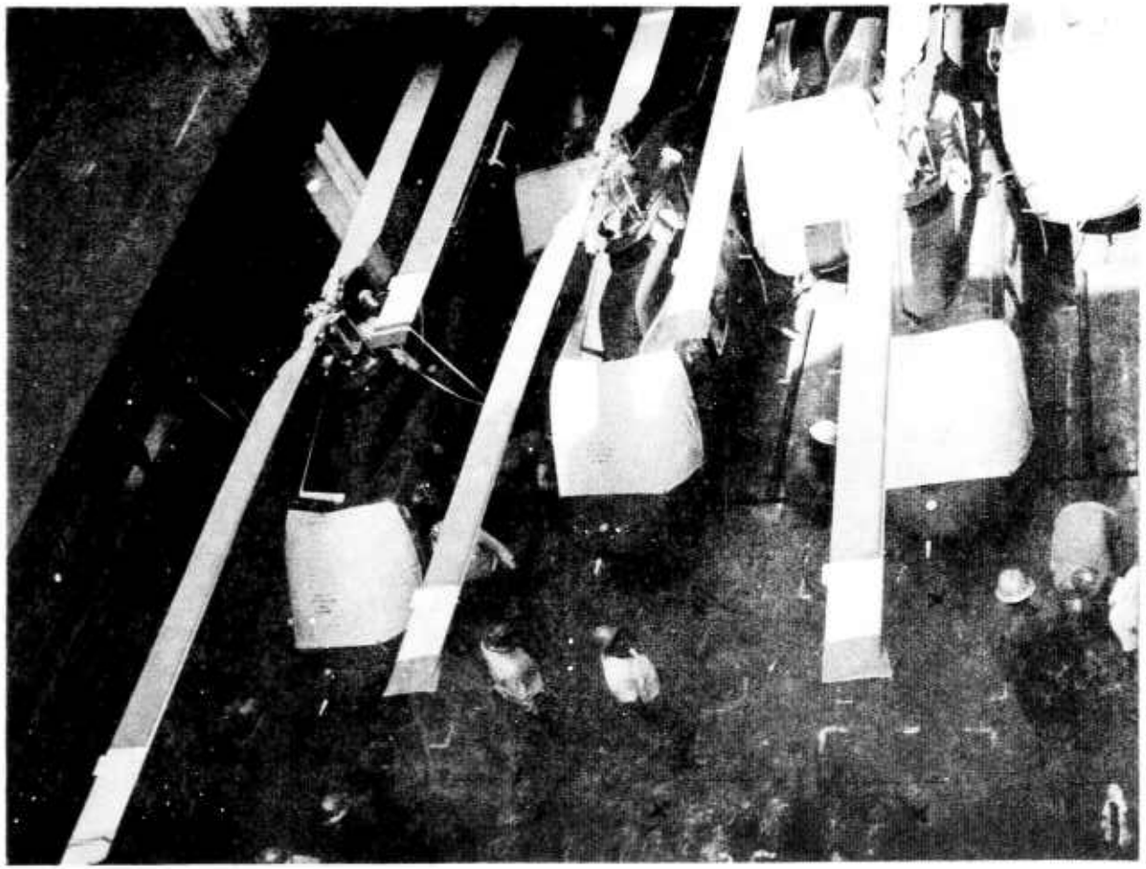

Figure 8-9. Typical Tight Helicopter Stow (OH-58).

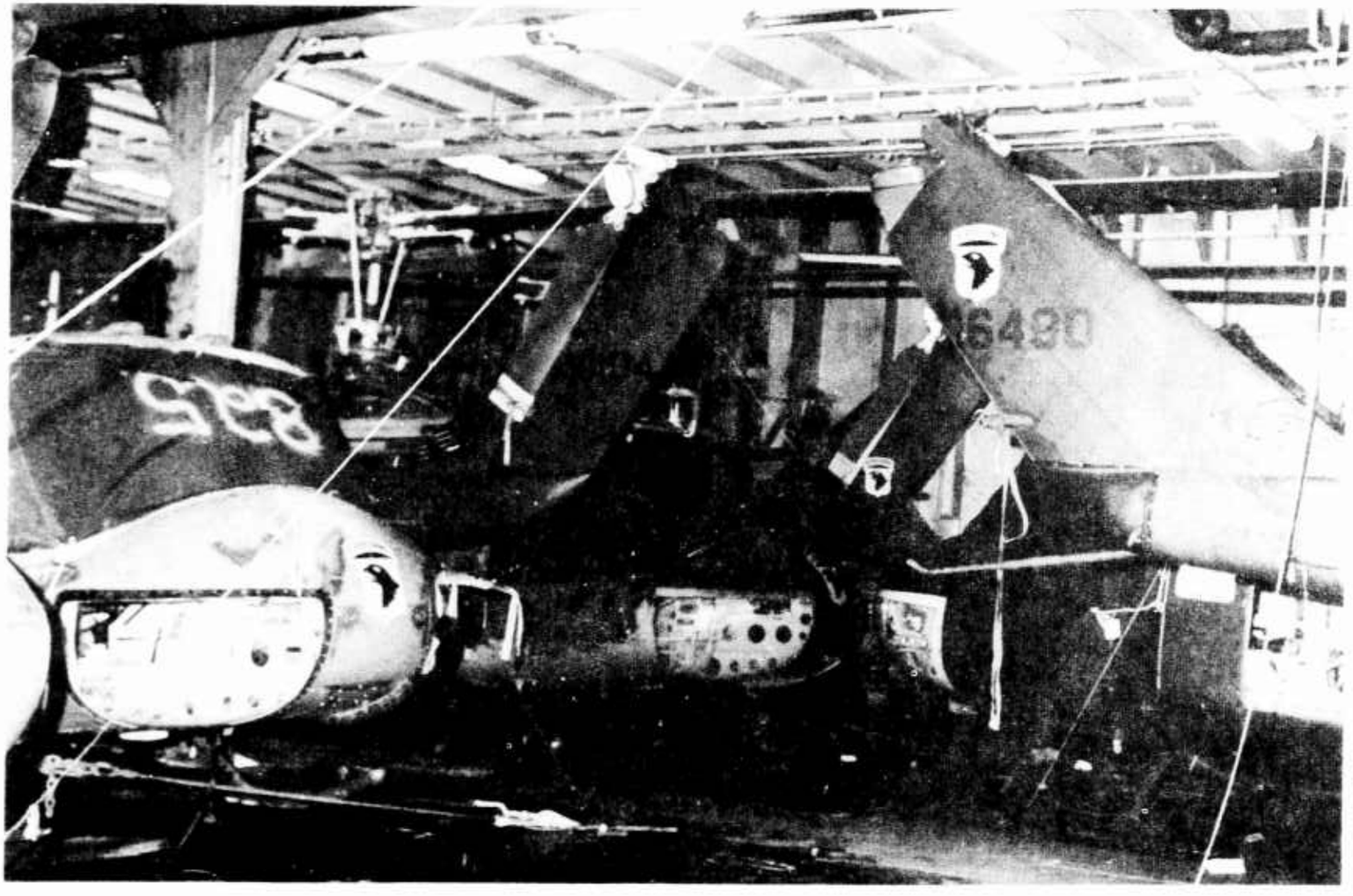

Figure 8-10. Tight UH-1 Stow.

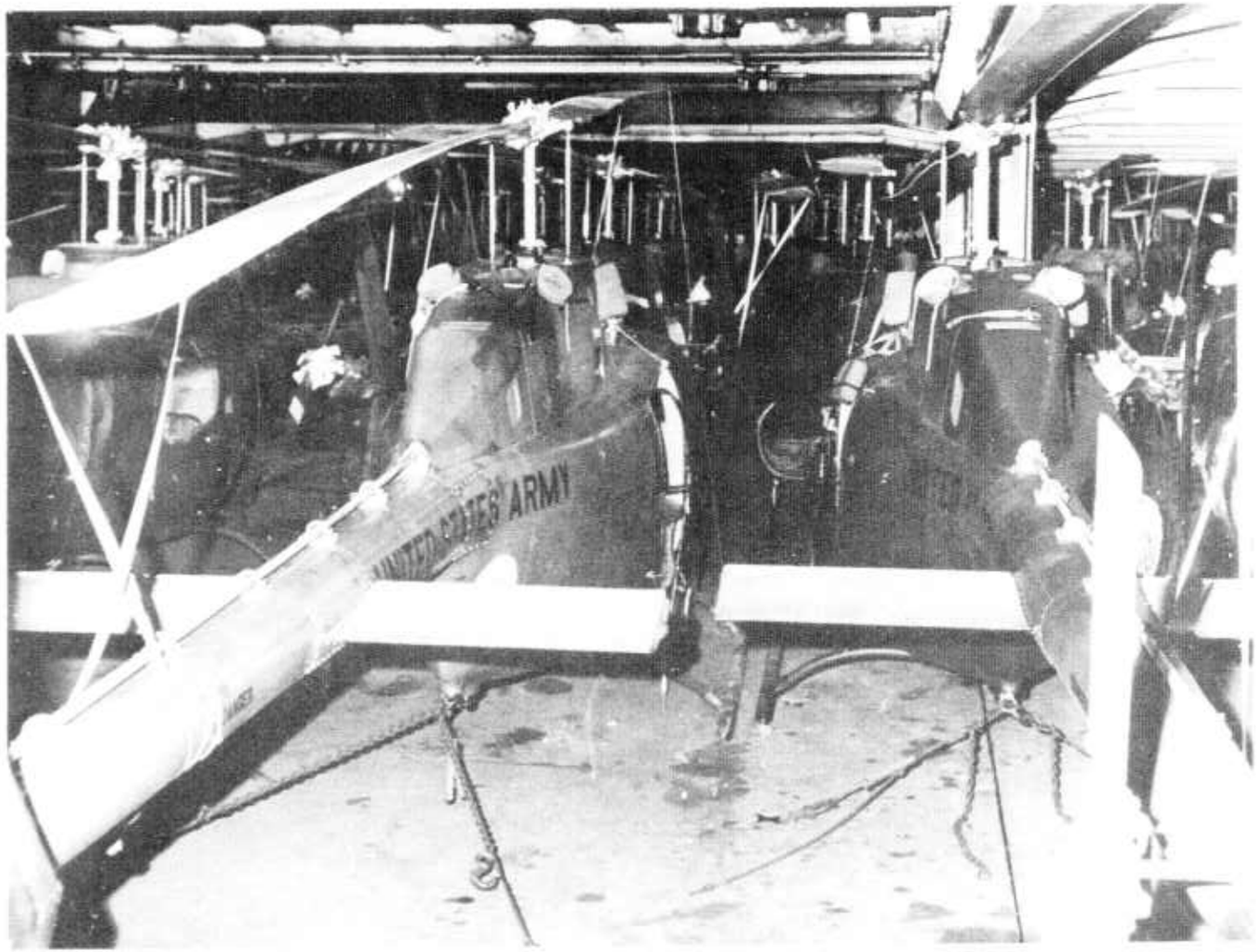

Figure 8-11. Below Deck Stow of OH-58 Helicopters With Rotor Blades Installed.

Figure 8-12. Below Deck Stow of UH-1 Helicopters With Rotor Blades Installed.

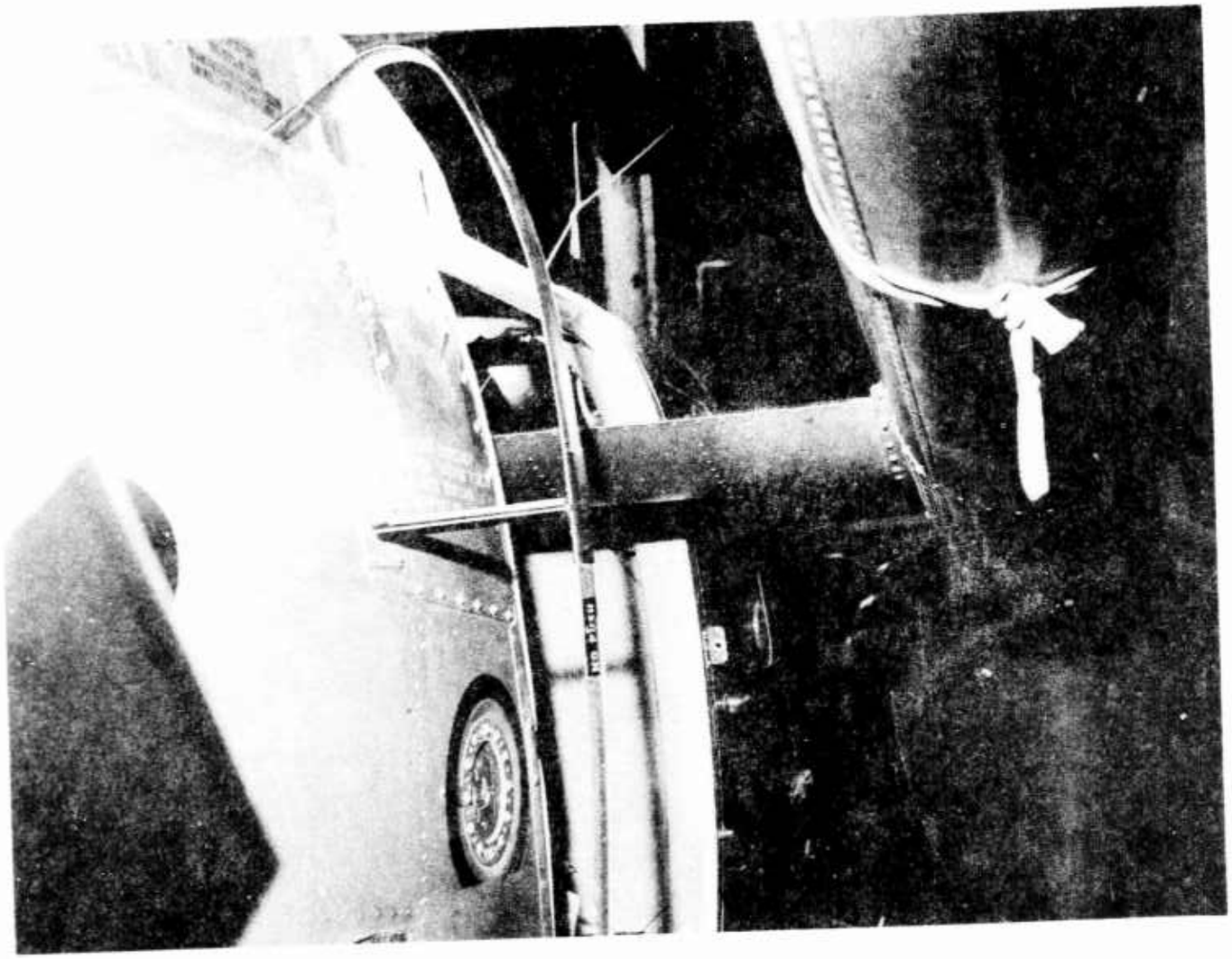

Figure 8-13. OH-58 Helicopters Stowed With Interlocking Horizontal Stabilizers.

Figure 8-14. CH-47 Tiedown on the Main Deck of the GTS Callaghan, Stabilizers.

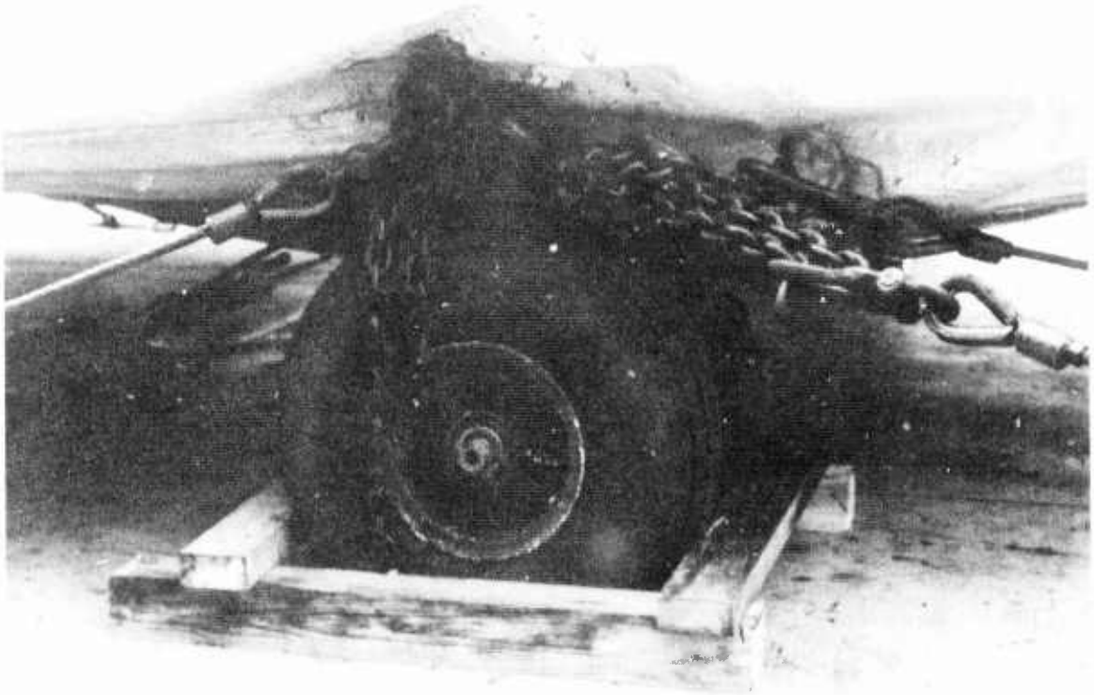

Figure 8-15. CH-47 Wheel Chocking Technique.

c. Deployment Documentation.

(1) MTMCEA utilized normal MILSTAMP documentation for DOD cargo control and manifesting for REFORGER 76 equipment. A separate TCMD was attached to each piece of equipment at home station. Normally this function is performed at the port. The hard copy TCMDs were used at Norfolk for terminal inventory control and manifesting.

(2) NSC Norfolk received advanced TCMD cards transmitted from the Fort Campbell ITO. NSC used these cards for advanced terminal planning. Upon receipt of cargo, TCMDs were pulled from the envelope on the vehicle, annotated with receiving data, and distributed in accordance with normal port inventory procedures. Receipt, change of status, and lift information (preplanned ship and stow location) were keypunched and transmitted to MTMCEA for entry into the terminal cargo inventory and manifest systems. Approximately 5 percent of the vehicles arrived at Norfolk without TCMDs. Through coordination with Fort Campbell, NSC was able to identify and document these vehicles.

(3) The documentation for the helicopters was controlled at NSC Norfolk. The TCMDs, submitted in one package to NSC for port processing, were properly completed, and the necessary copies were placed aboard each aircraft prior to movement from the staging area.

(4) Although the manifests for the REFORGER 76 vessels were transmitted to and received by the European ports within the time frames required by MILSTAMP, the manifests could have been received earlier if the SPOD designators had been included in the MTMCEA manifest program. Special followup of manifests should be conducted to insure delivery to the SPODs as soon as possible. Twenty-one TCNs had to be supplemented to the deployment manifest because of technical difficulties encountered in the MTMCEA surface export cargo system. Stow plans for the REFORGER vessels were handcarried to the unloading ports by a MTMC-TTGE representative who was at Norfolk to observe the vessel loading.

(5) The use of normal MILSTAMP documentation for REFORGER 76 port operations required significant extra time by both management and labor to make the system work. The benefits of individual piece control at the port were not worth this extra effort. The simultaneous processing and control of over 3,000 TCMDs proved to be too cumbersome and too vulnerable to error.

5. SPOE Operations.

a. Beaumont Port Operations.

(1) The receipt, staging, and loading of Fort Hood REFORGER 76 equipment was conducted without major complications (Figures 8-16 and 8-17). Helicopters were self-deployed to the port, and other equipment was moved via commercial highway.

(2) MTMC supervision of port operations was provided by the MTMCEA Beaumont Detachment. Technical advisors for vessel loading of helicopters and other equipment were provided by MTMCTEA and MTMCEA.

(3) Commercial stevedores loaded the Meteor, using a 12-hour shift per day, with ship's gear and a mobile crane. No RORO operations were conducted at Beaumont.

(4) Helicopters were stowed in the upper tween deck of hatches three and four and in the lower tween deck of hatch four. Other equipment was loaded in hatch number one and on the main deck.

Figure 8-16. Beaumont, TX, Staging Area.

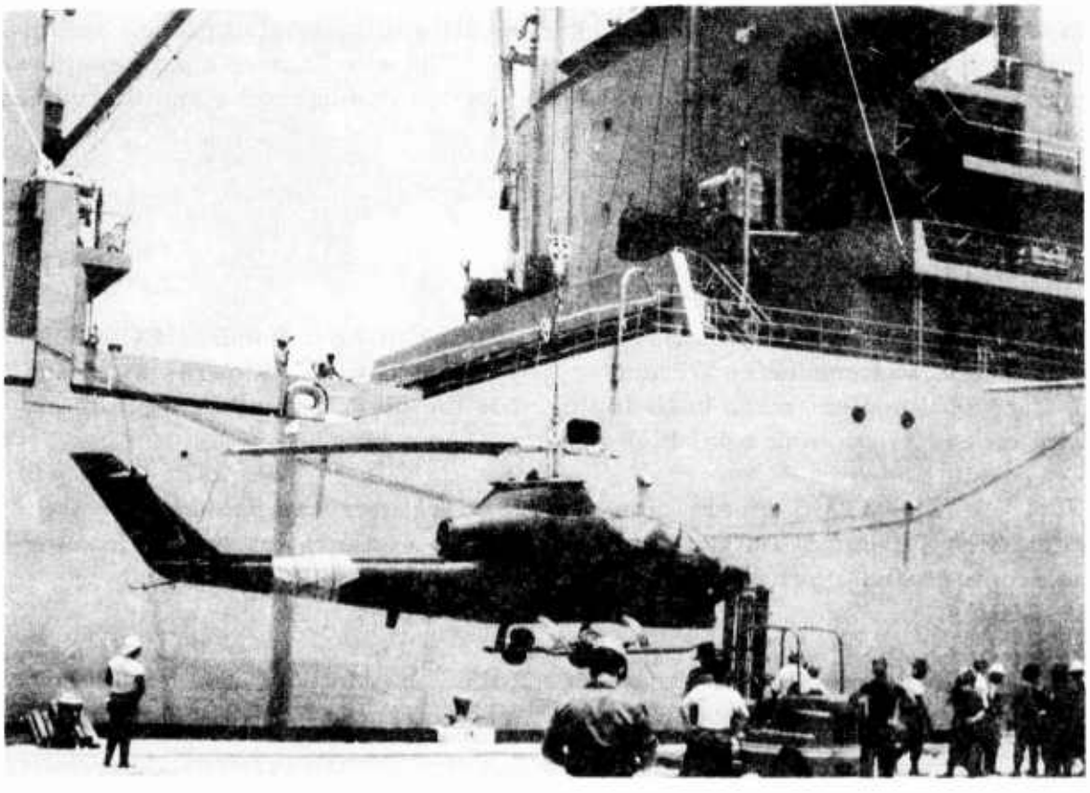

Figure 8-17. Beaumont, TX, Loading Operations.

(5) The double porting of the USNS Meteor proved the necessity for communication between loading ports to coordinate the overall loading plan. Four problems resulted from the failure to properly communicate information between ports.

(a) At Norfolk, vehicles on the main deck of the Meteor had to be moved from the port to the starboard side in order to load hatch two. This double handling would have been unnecessary had the vehicles been loaded originally on the starboard side.

(b) Helicopters were loaded in the aft instead of the forward portion of No. 3 hold. This adversely affected the loading at Norfolk.

(c) Since there was some question as to which berth the Meteor would use at Norfolk, MTMCEA directed that the helicopters be loaded at Beaumont in a manner that would not restrict the use of the port side ramps or interfere with RORO operations. Advance notice that only the stern ramp would be used at Norfolk would have facilitated the loading of the entire Beaumont load.

(d) The aft side ramp was placed on the deck where a CH-47 was to be loaded at Norfolk (Figure 8-18). Had the location of the ramp been known in advance at Norfolk, the stow plan could have been modified to load vehicles, instead of a CH-47 helicopter, on the ramp.

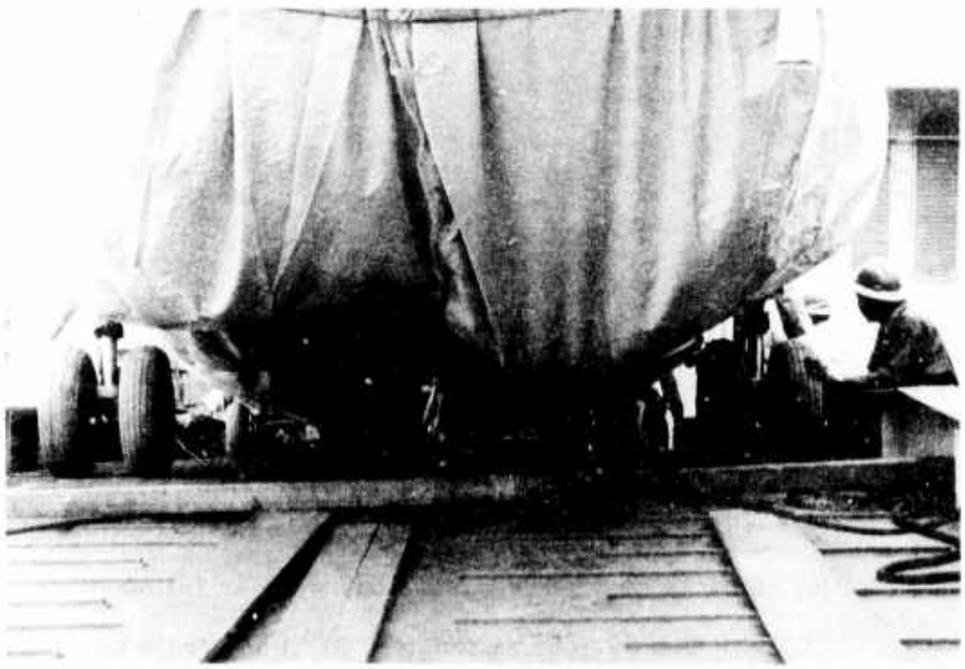

Figure 8-18. Loading CH-47 on the Side Ramp of Meteor.

b. Norfolk Port Operations.

(1) Cargo Receipt.

(a) With the exception of the helicopters and three small road convoys (one from Fort Bragg, NC, one from Fort Campbell, KY, and one from Fort Eustis, VA), all equipment arrived in Norfolk on five special trains from Fort Campbell.

(b) Aircraft arrived in flights of five every 30 minutes (Figure 8-19) and were directed to their disassembly area (Figure 8-20).

Figure 8-19. Helicopter Fly-In at Norfolk Naval Station.

(c) Railcar discharge operations were as follows:

1. Ten 89-foot railcars (TOFC) per train were discharged at the off-base commercial facility, Portlock. The MILVANS-on-chassis were drayed by commercial tractors to the Naval Supply Center open storage area.

Figure 8-20. Helicopters Directed to Staging and Preparation Area.

2. Bilevel cars were offloaded at the Naval Supply Center open storage area with the use of a mobile bilevel ramp rented from the Norfolk and Western Railroad (Figure 8-21).

Figure 8-21. Bilevel Railcars Unloading Utilizing Mobile Ramp Provided by the Norfolk & Western RR.

3. Nonrolling stock was lifted off by mobile cranes at Pier 4 and the open storage areas (Figures 8-22 and 8-23).

4. Dunnage-free railcars were discharged at the permanent naval station roll-off ramps (Figure 8-24).

(d) Each of the five special trains was offloaded within 24 hours after arrival at Norfolk. However, the following problems were encountered during the receipt phase:

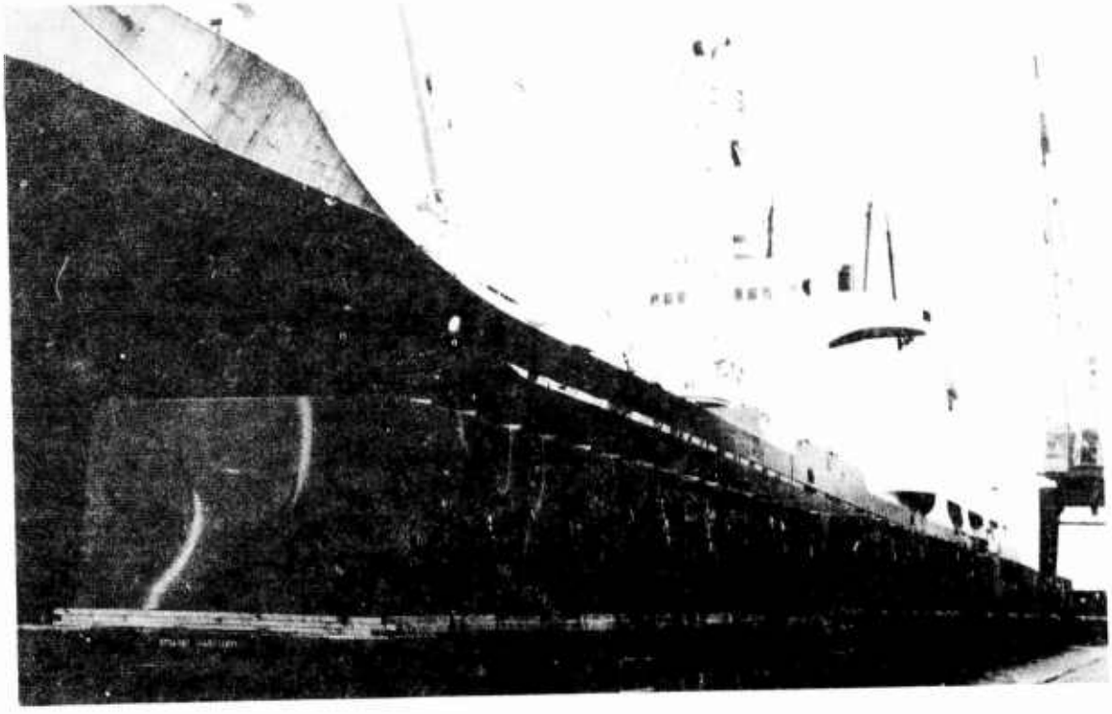

Figure 8-22. REFORGER Cargo Discharged Directly From Railcars to the American Ranger.

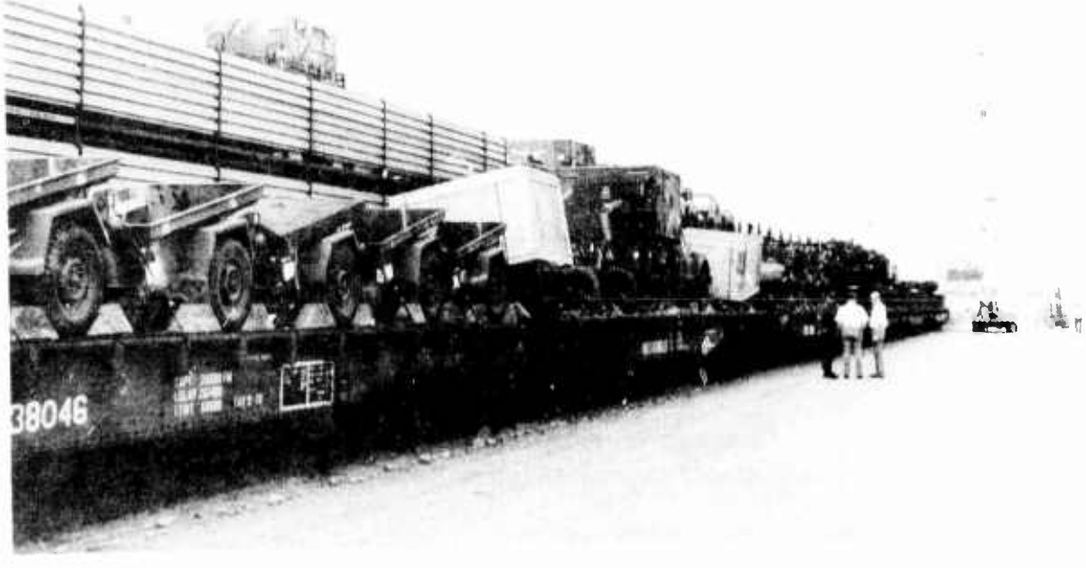

Figure 8-23. Equipment Discharged From DODX Flatcars Using Mobile Cranes.

Figure 8-24. Vehicles Driven Off Flatcars at the Norfolk Naval Station Railhead.

1. The condition of the cargo upon arrival at the SPOE had some adverse impact on operations. Most significant, the trains were not loaded in compliance with the port call message; that is, the cargo had not been shipped according to the vessel on which it would be transported, nor was it completely marked with the stow location. Therefore port receipt plans had to be revised and additional personnel had to be assigned to accomplish the correct staging of cargo.

2. Approximately 50 percent of the cargo stowage space in vehicles such as cargo trucks, gamma goats, and trailers was not used for storing break-bulk cargo (Figure 8-25). Army regulation 220-10, para 7-6, and FORSCOM Regulation 55-1 require that the moving unit use vehicle cargo space to the maximum for storing miscellaneous organization equipment and supplies. The moving unit's noncompliance with these regulations required substantial manpower at the SPOE to consolidate equipment and make better use of vessel stowage space (Figures 8-26 and 8-27). It also increased the number of MILVANs needed to transport the miscellaneous break-bulk cargo. It is estimated that, if vehicle cargo stowage space had been fully utilized, the number of MILVANS could have been reduced by 25 percent and over $50,000 of line haul and port handling

Figure 8-25. Empty Unnested Trailers, Arriving at Norfolk.

Figure 8-26. Trailers Were Nested at Norfolk.

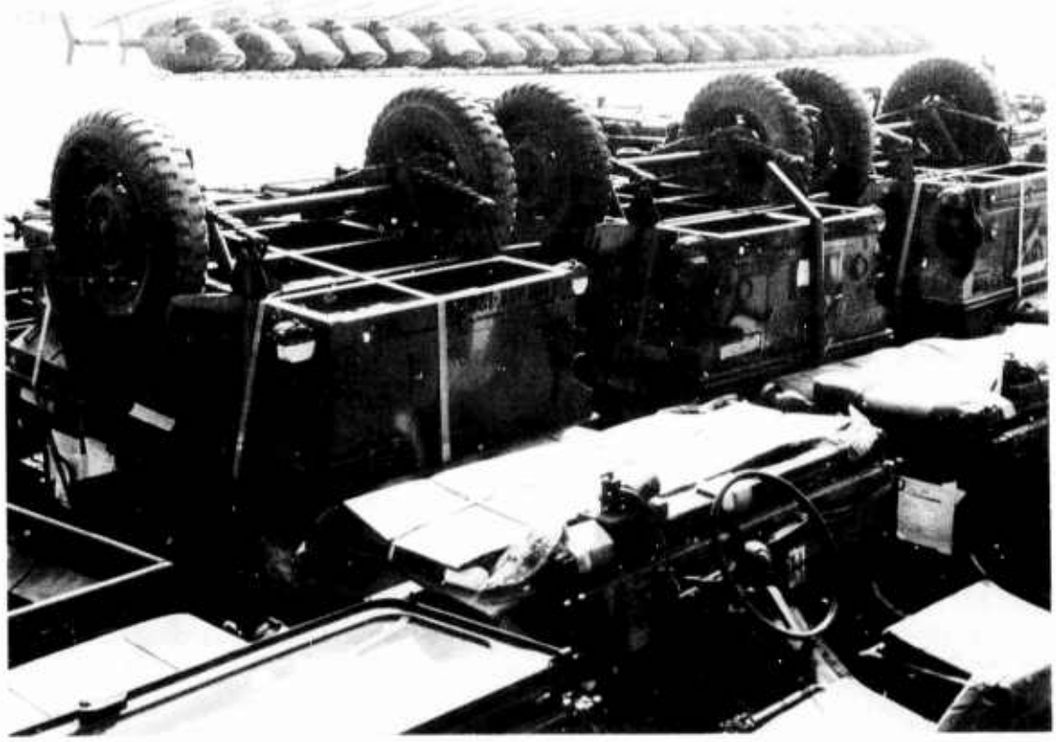

Figure 8-27. Nested Trailers Staged for Loading on the Meteor.

costs could have been avoided in CONUS alone. In future operations, equipment must be consolidated to insure maximum economy in vessel stowage space and MILVAN utilization. Possible pilferage during transit was cited as a reason for failing to load cargo vehicles. However, the use of special trains and tight security at the SPOE and SPOD minimized opportunities for pilferage.

3. Improper stowage of aircraft engine containers on the front of M750 maintenance vans resulted in front-end chafing and puncturing of some vans. This was corrected at the port by placing a 1/4-inch piece of plywood between the van and container.

4. The keys of many M880 cargo trucks were not in the ignitions. This caused considerable delay in loading and offloading throughout the entire exercise. Keys should be placed in a predetermined location on the vehicle to insure availability during port operations.

5. Gas cans were chained to vehicle steering wheels and were locked in place. Again, delays were incurred while the locks were cut and steering wheels freed to permit rail discharge.

6. Vehicles that would not start and those with flat tires required maintenance contact team support for quick repairs to minimize delays in railcar offloading.

c. Cargo Staging.

(1) Figure 8-28 depicts the staging areas at NSC Norfolk.

(2) Vehicles and other equipment were staged by vessel and stow location (Figures 8-29 and 8-30). The staging areas, assigned by NSC, proved sufficient. Although extra effort was required to stage vehicles in such precise locations, this staging method facilitated the call forward of the cargo of the vessel.

(3) The area that was provided for helicopter preservation, disassembly, and staging was adequate (Figure 8-31). Its proximity to the pier facilitated bringing the aircraft pierside, and the sodded surface maintained its firmness despite heavy rains. Helicopter preservation and disassembly times were less than pretest REFORGER times, due to the systematic production line used by the 101st Airborne Division personnel. (Figures 8-32 to 8-35).

Figure 8-28. Naval Supply Center Staging Plan.

Figure 8-29. Staging Area Comet.

Figure 8-30. Staging Area Callaghan.

Figure 8-31. Helicopter Staging Area.

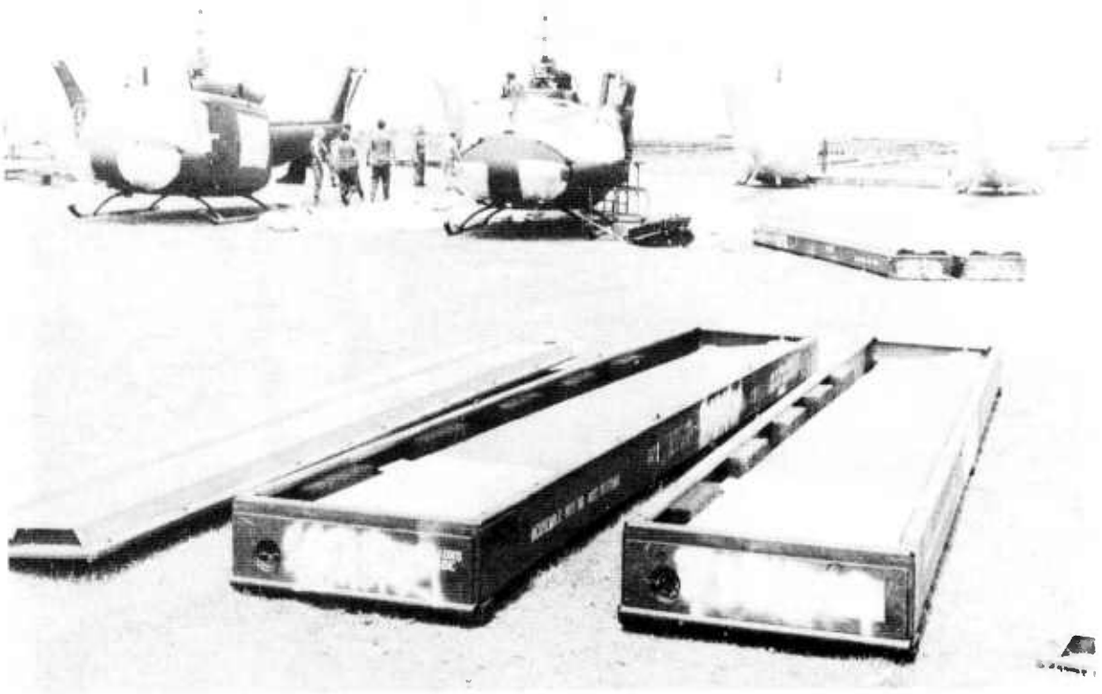

Figure 8-32. Disassembly of UH-1.

Figure 8-33. Installing Redi-Covers on the UH-1.

Figure 8-34. CH-47 Landing and Preparation Area.

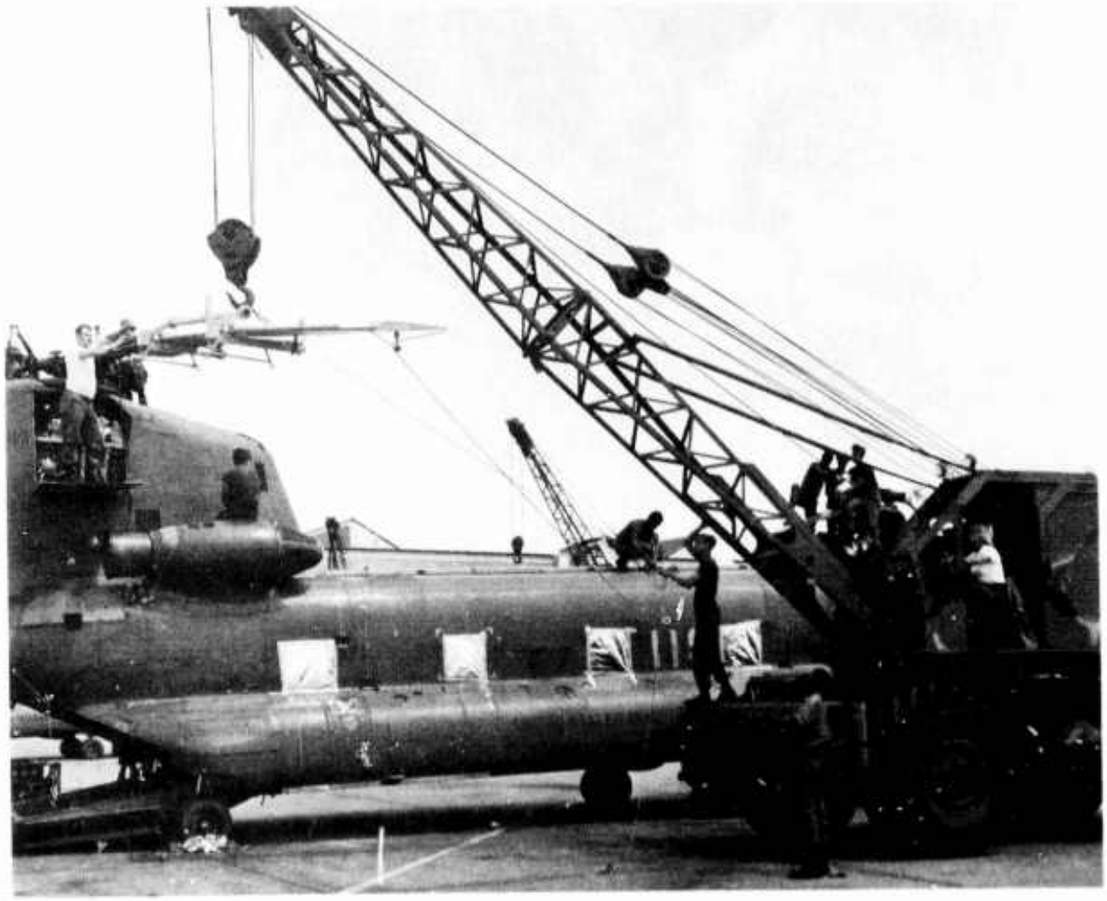

Figure 8-35. Disassembly of CH-47.

(4) Some problems were encountered during the cargo staging:

(a) Since the moving unit failed to comply with the port call message, MTMC personnel had to mark the arriving equipment with correct vessel and stow locations (Figure 8-36). This task required additional personnel at all vessel staging areas.

Figure 8-36. MTMC Personnel Mark Equipment With Correct Vessel and Stow Location.

(b) Correct equipment staging was complicated by the switching of vehicles between units without informing the port operations center.

(c) The staging of vehicles by vessel and stow location provided port operators with a steady flow of cargo to the ship and insured that the prestow plan could be closely followed. Although this procedure (staging by stow location) was not actually required, it gave port planners confidence that all equipment would fit on the four REFORGER vessels.

(d) Marking equipment by vessel and stow location should not be incorporated into future unit moves. If the vessel that the equipment is

to be loaded on is known to the unit, the DD Form 1387 (shipping label) attached to each piece of equipment, should be annotated with the vessel name. This procedure can be accomplished readily by the deploying unit and will provide the port staging personnel with the information needed to properly stage the equipment.

d. Vessel Loading.

(1) A very tight stow was necessary on all four vessels (Figures 8-37 to 8-40). Normal RORO loading was modified by using forklifts and stevedore personnel to lift and push vehicles into spaces impossible to drive into. All tiedowns were doublechecked to insure a stable, damage-free ocean voyage (Figure 8-41).

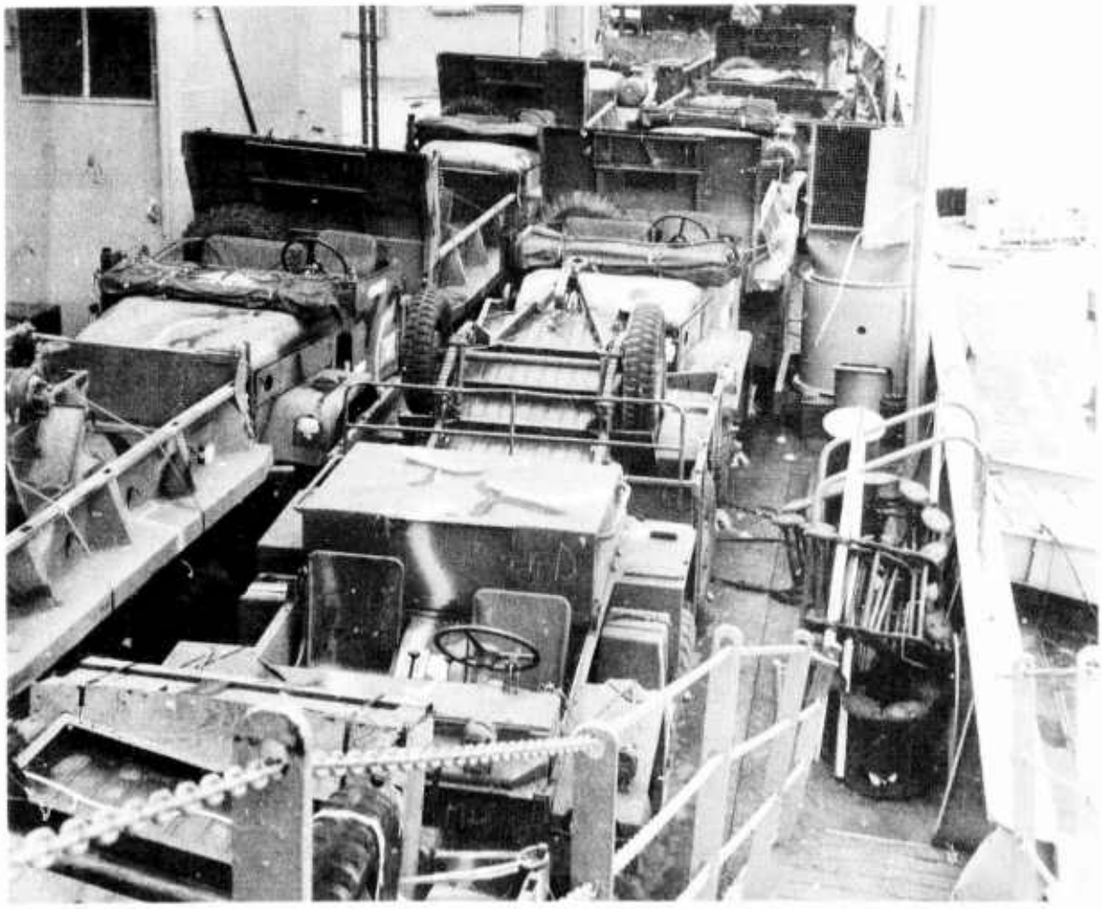

Figure 8-37. Typical Tight Stow of Vehicles on Comet.

Figure 8-38. Typical Tight Stow of Trailers on Comet.

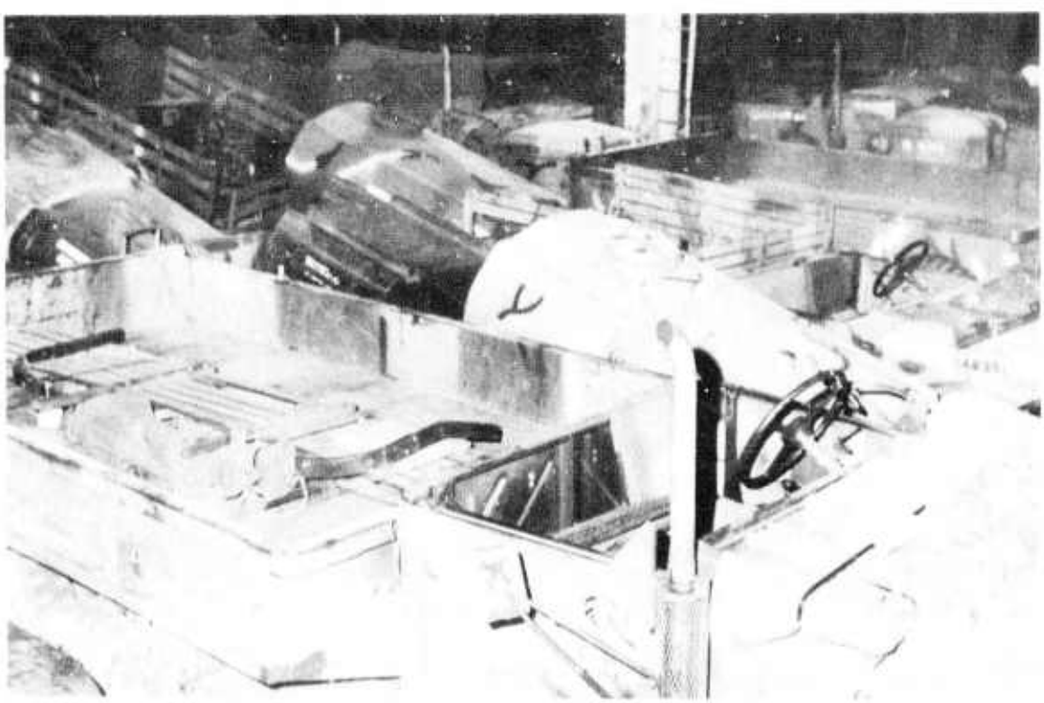

Figure 8-39. Typical Tight Stow of Vehicles and Trailers Below Deck.

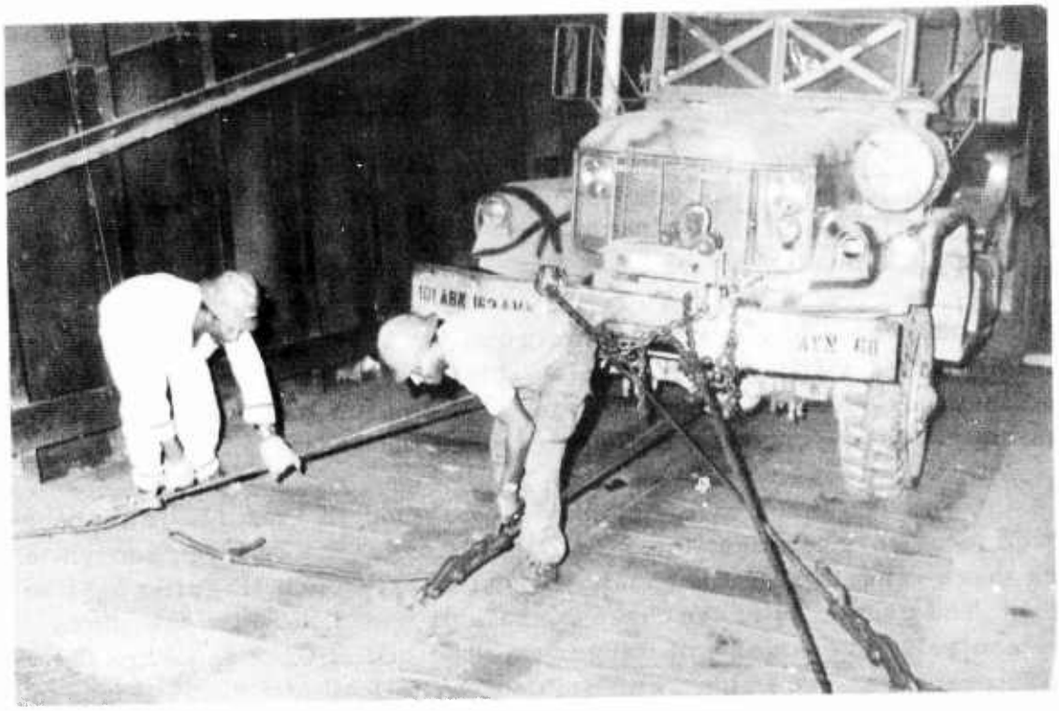

Figure 8-40. Interior Ramps Utilized for Stowing Vehicles.

Figure 8-41. Tiedown Restraints Were Carefully Checked.

(2) CONUS loading time data on each vessel:

Vessel	Start	Complete	Elapsed Time
Callaghan	040730 Aug	121545 Aug	200-1/4 hrs
Ranger	040815 Aug	111530 Aug	175-1/4 hrs
Meteor	040830 Aug	111430 Aug	150 hrs
Comet	060700 Aug	101545 Aug	104-3/4 hrs

(3) Stevedores, both commercial and civil service, worked basically 1-1/2 shifts (12 hours) per day except on the night of 8 August, when they worked around-the-clock in an attempt to load as much cargo as possible because Hurricane Belle threatened the area.

(4) The three RORO ships were berthed on Pier 12. This pier proved to be very efficient for RORO operations. It was large enough to work three vessels simultaneously without interference (Figures 8-42 to 8-48). The proximity of the three vessels provided the port operators with easy control. The American Ranger was berthed at Pier 4, where the gantry crane was used along with ship's gear to load MILVANs (Figures 8-49 to 8-52 and break-bulk cargo.

Figure 8-42. Pier 12 With Three Berthed RORO Vessels.

Figure 8-43. Pier 12 was Sufficiently Wide to Provide for the Simultaneous Loading of Three REFORGER Vessels.

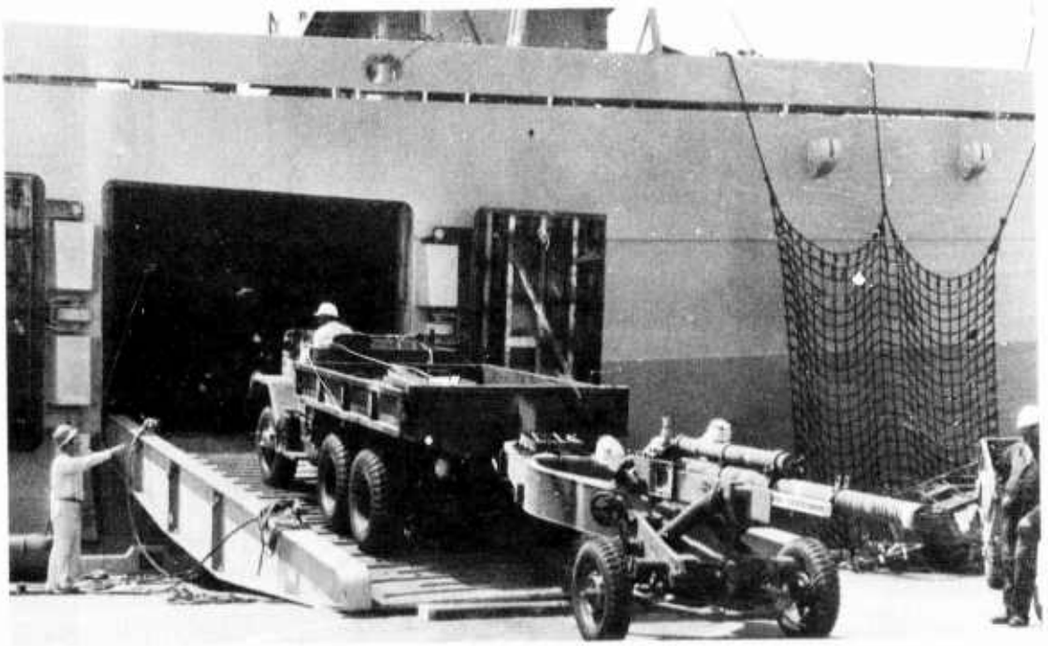

Figure 8-44. RORO Operations USNS Comet.

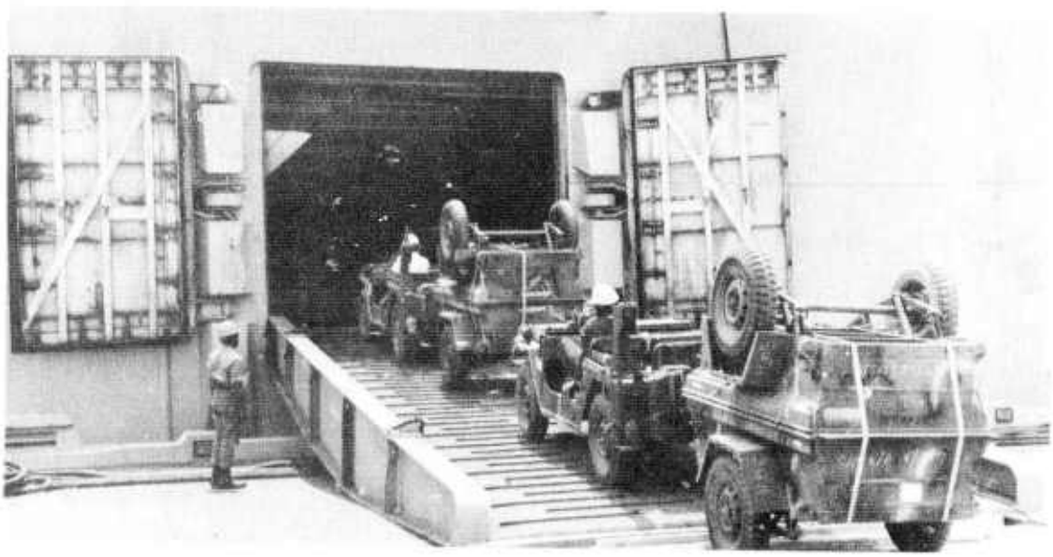

Figure 8-45. RORO Operations USNS Comet.

Figure 8-46. RORO Operations GTS Callaghan.

Figure 8-47. Vehicles Driven Through the Upper Tween Deck USNS Meteor.

Figure 8-48. RORO Operations USNS Meteor.

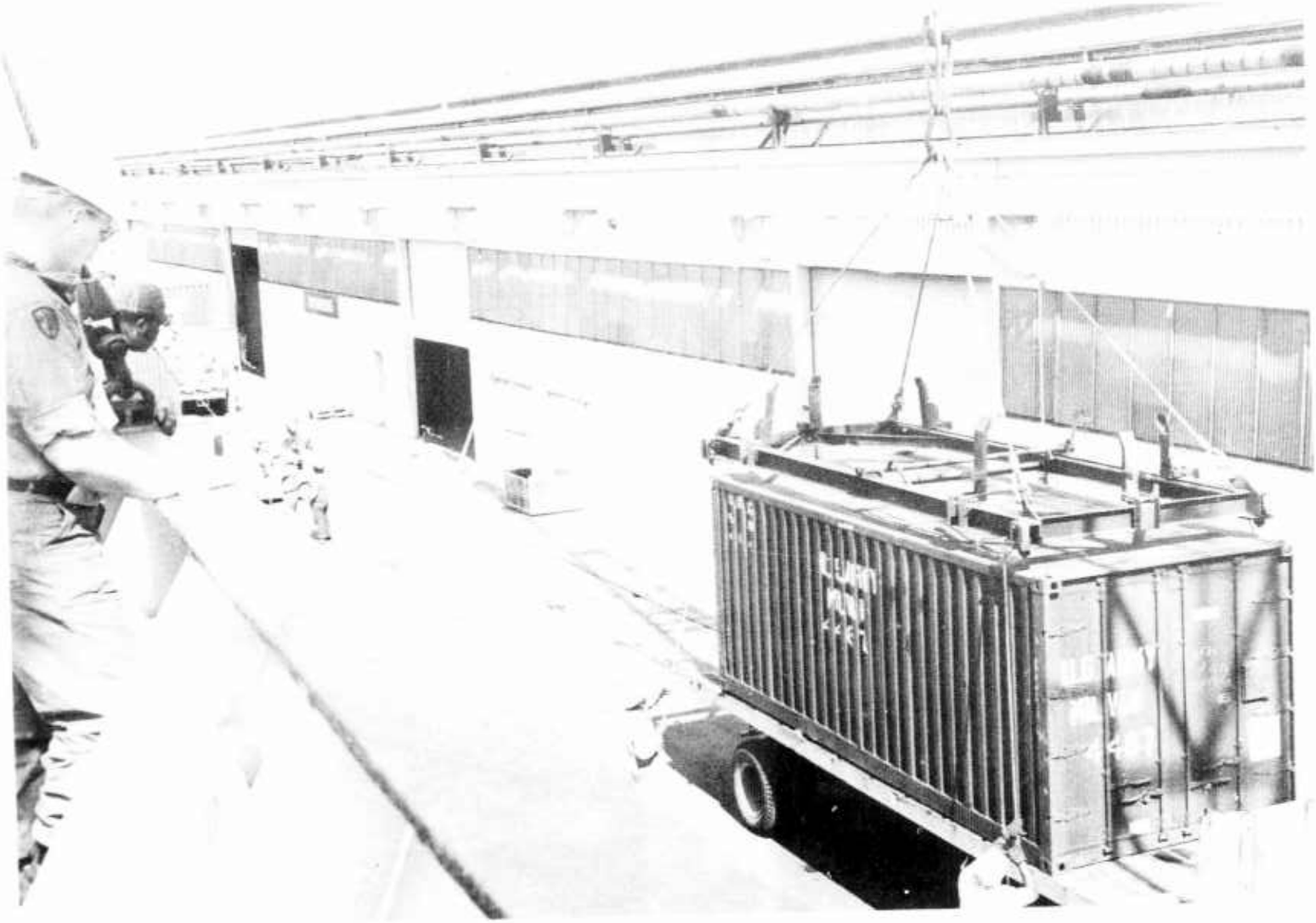

Figure 8-49. MILVANs Were Transported to the Pier on Flatbed Trucks and Chassis.

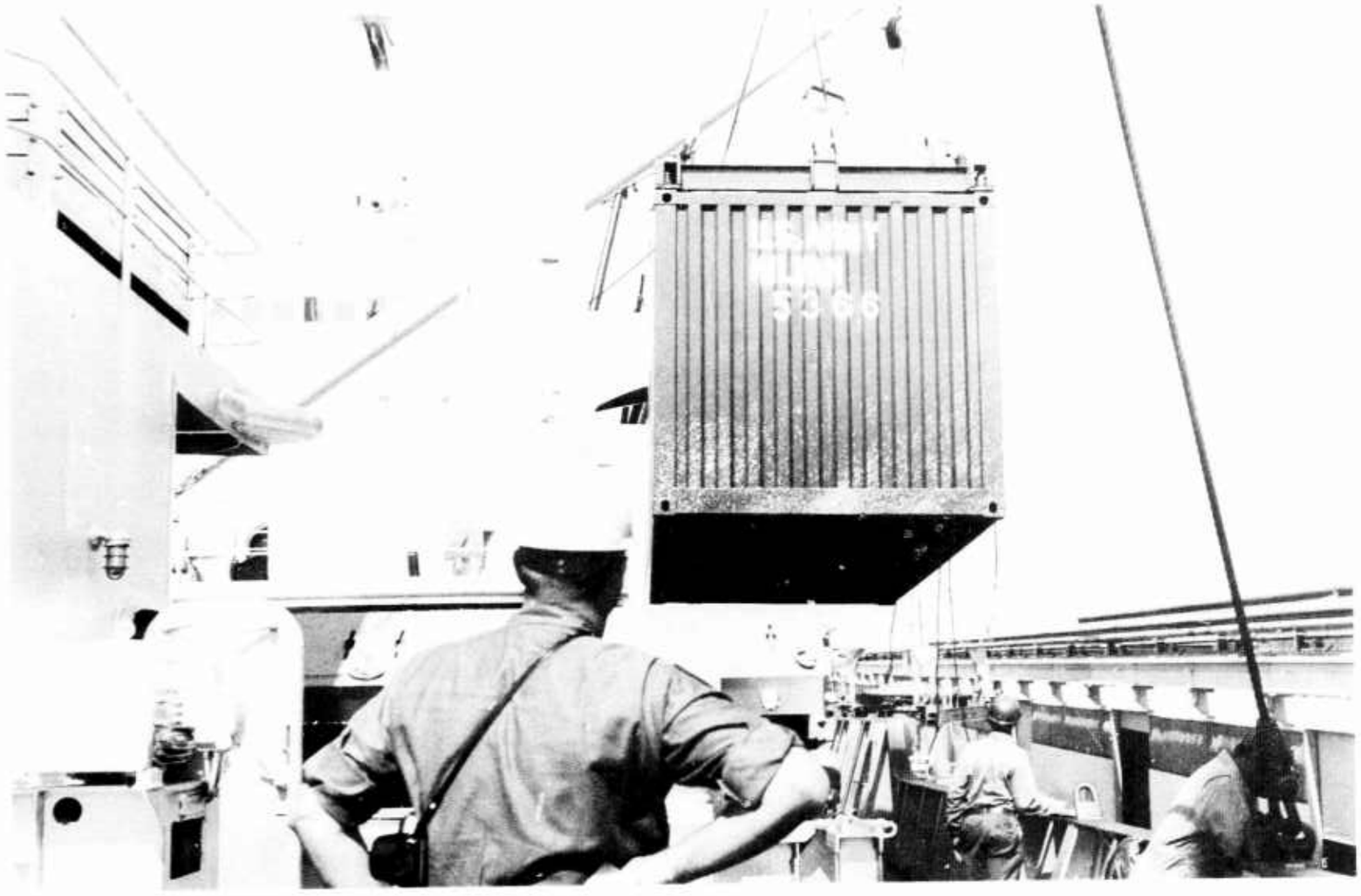

Figure 8-50. MILVAN Loaded on American Ranger Using the Manually Locked Container Top Lifting Device.

Figure 8-51. MILVAN Container Cells Hatch Number 3 USS American Ranger.

Figure 8-52. MILVANs Stowed Three High on Deck USS American Ranger.

(5) A strict visitor-control procedure, adapted from pretest experience, was effective in precluding interference with port operations. Better control, however, of unit and port personnel is needed for future operations.

(6) Problems encountered during this phase were as follows:

(a) The Meteor number four upper tween deck does not have sufficient overhead clearance in the wings to maneuver UH-1H helicopters with blades installed (Figure 8-53). Accordingly, 15 AH-1 helicopters from the Callaghan were exchanged for 9 UH-1 helicopters from the Meteor. The redeployment stow plans also were thus modified.

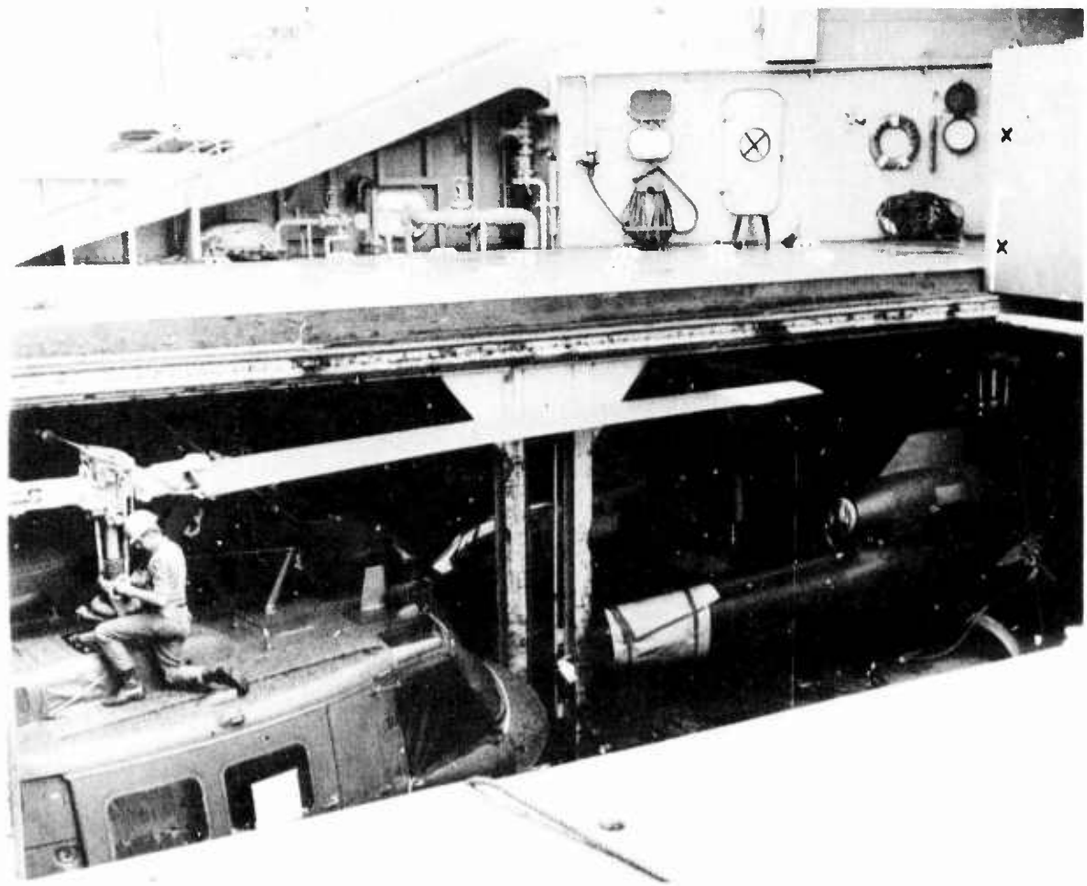

Figure 8-53. Overhead Clearance Restricted Stowage of UH-1 Helicopters in Number 4 Hatch of Meteor.

(b) Because of improper unloading techniques, eight coupled MILVAN chassis received minor damage during vessel loading operations.

When the forward MILVAN was removed from the coupled MILVAN chassis the landing gear on the rear chassis was not lowered, which caused the coupled MILVAN chassis to bow in the middle (Figures 8-54 to 8-56). Subsequently, the landing gear on the MILVAN chassis were lowered to preclude further damage.

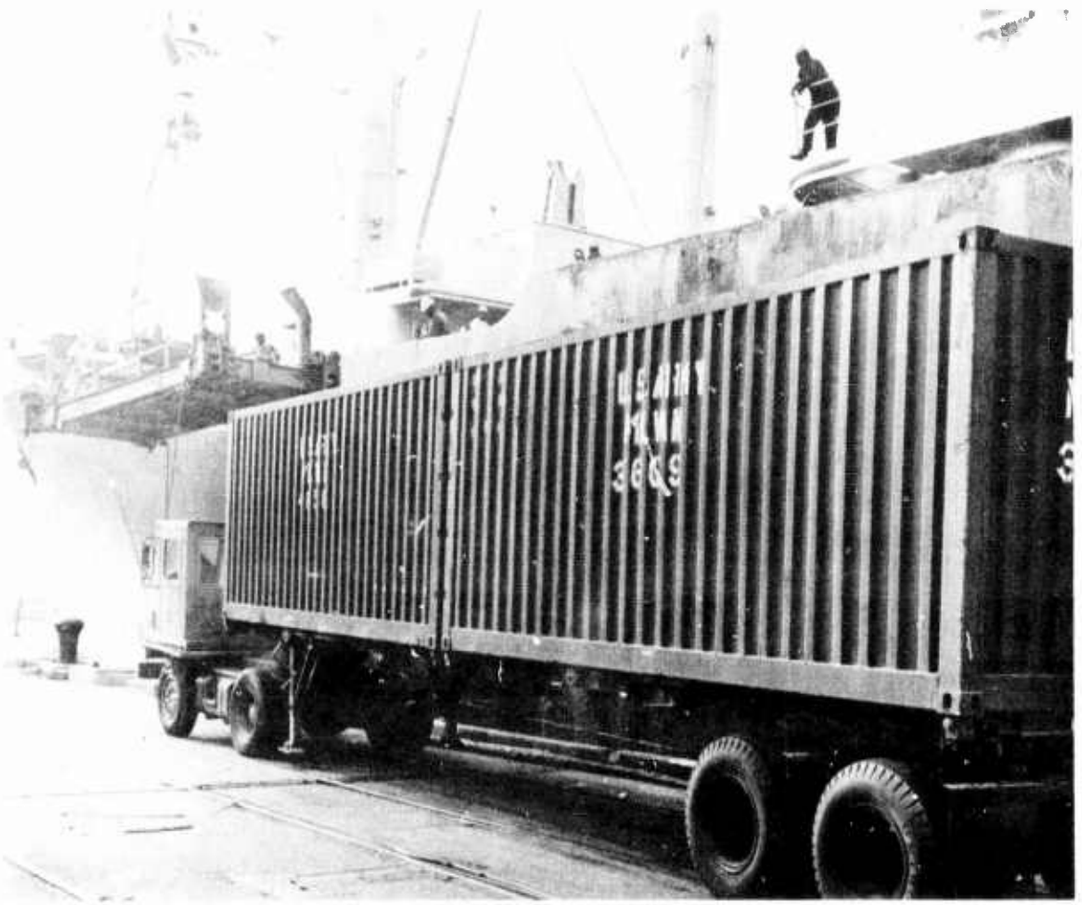

Figure 8-54. MILVANs on Double Boggie Chassis Moved Pierside by Tractor.

(c) Incomplete information on the contents and weight of each MILVAN complicated the loading of MILVANs on the American Ranger. DOD Reg 4500.32-R (MILSTAMP) requires a complete inventory (including hazardous and label cargo designation) for each MILVAN, so that the vessel can be loaded in accordance with Coast Guard safety requirements and the proper weight distribution on the vessel can be achieved. Training in the proper procedures for loading and documenting MILVANs should be conducted at the outloading installation during the planning phase of future exercises.

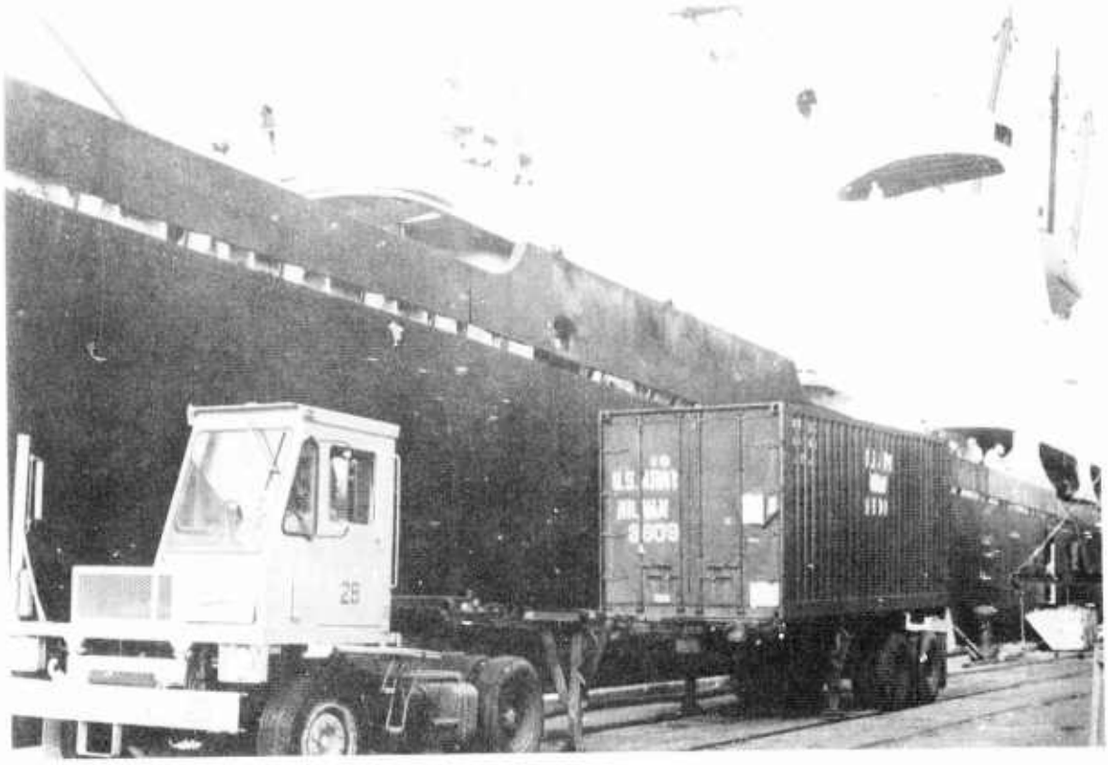

Figure 8-55. To Preclude Damage to the MILVAN Chassis, the Landing Legs on the Second Chassis Must be Installed Prior to Lifting the MILVANs.

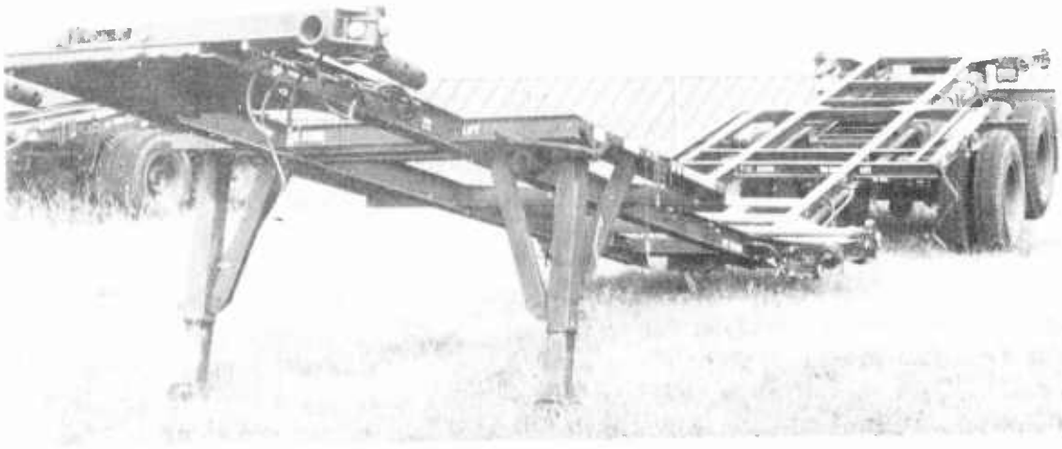

Figure 8-56. MILVAN Chassis Damaged Due to Failure to Install Landing Legs.

(d) Determining the contents of MILVANs was further complicated by failure of the shipper to remove old "dangerous cargo" markings and old shipping labels prior to using the MILVANs for REFORGER 76. Removal of old markings is required procedure in container operations.

(e) Because of their flexible suspension system (Figure 8-57), the M880s required stowage with at least a 9-inch clearance to avoid in-transit damage to the vehicles. One hatch on the Callaghan was already loaded with M880s when the 9-inch clearance requirement was received by the MTMC REFORGER operations center. An extra labor force was required to effect the proper stow.

Figure 8-57. Commercial Pickup Trucks (M880) Must Be Stowed With 9-Foot Clearance.

(f) During the deployment phase, the information flow among all personnel concerned with CONUS port operations was hampered by the lack of a daily operations meeting. Representatives from MTMC, the port, MSC, the deploying unit, supporting elements, and the stevedore contractor must coordinate the work schedule, readiness of vessel, availability of

cargo, labor assignments, starting times, and availability of special-handling gear and material to insure efficient operations. The lack of a port organization with definitive command channels contributed to this problem. For the redeployment phase of REFORGER 76, a daily operations meeting was instituted at Bremerhaven and Norfolk which vastly improved port operations.

(g) Vehicles that would not start and those with flat tires caused delays in loading operations. Hence, a maintenance contact team (Figures 8-58 and 8-59), consisting of a minimum of six personnel per vessel, should be readily available to correct maintenance problems.

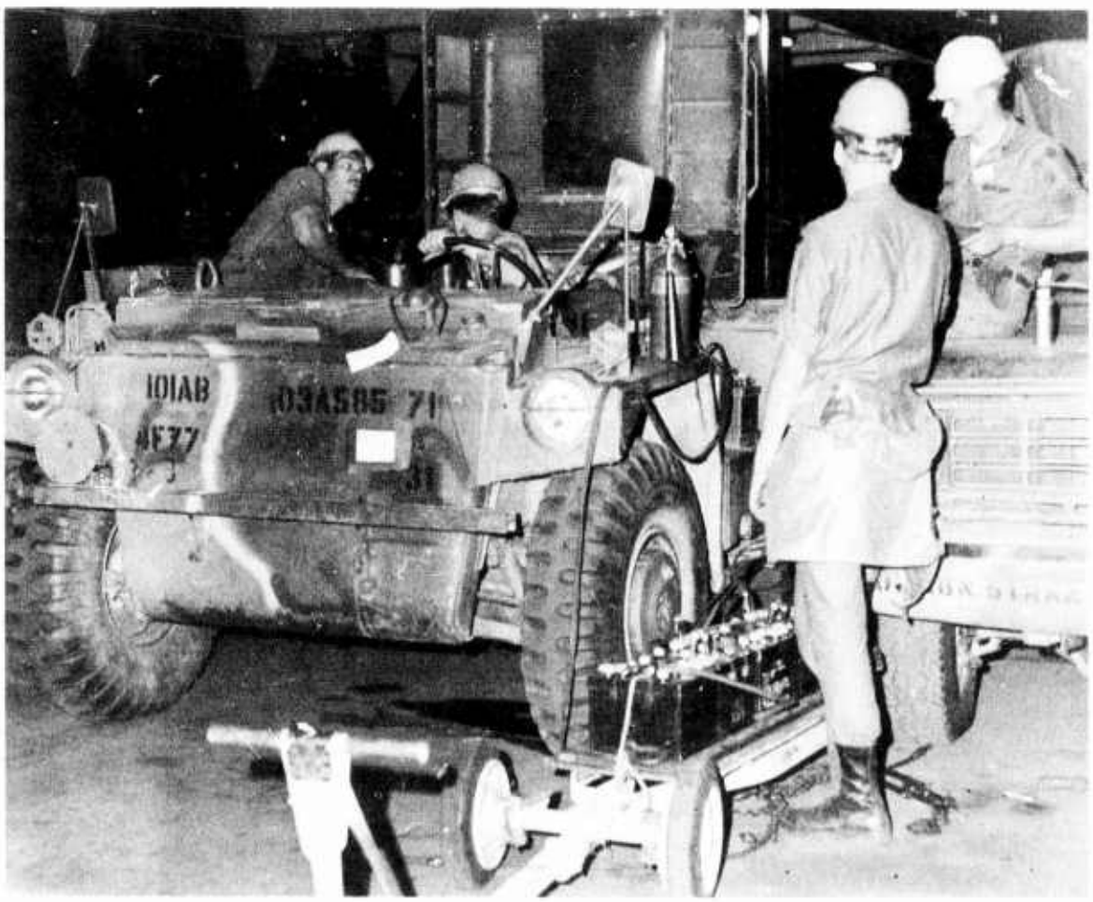

Figure 8-58. Vehicle Maintenance Teams on the REFORGER Vessels.

(h) Based on a reported shortage of MILVAN chassis in Europe, extra MILVAN chassis were banded together by the Naval Supply Center labor force for shipment to Europe. These chassis were loaded only after all other division cargo was assured stowage aboard a vessel.

Figure 8-59. Vehicle Maintenance Teams Were Required During Railcar Offloading.

(i) The helicopter redi-covers were deemed inadequate for the ocean voyage; extra lashings to secure the redi-covers as tightly as possible were ordered by the MTMCEA commander. In addition, 101st Airborne Division personnel accompanying the cargo were instructed to repair any covers that ripped during the voyage.

(j) A 20-hour delay in vessel loading was caused by weather. With hurricane Belle expected to hit Norfolk on the afternoon of 9 August, around-the-clock vessel loading was effected on 8 August to load as much cargo as possible before the storm; 113 helicopters had to be moved from the staging area into hangars to preclude storm damage (Figures 8-60 and 8-61). Winds in excess of 30 mph and rain forced helicopter loading to cease at 091000 August; loading resumed at 0700 the next day.

(k) Tiedown points on the American Ranger were inadequate to secure MILVANs stacked three-high on the main deck, so extra D-rings and securing points were welded onto the main deck and hatch covers (Figure 8-62).

(l) Stowing UH-1 and AH-1 helicopters with rotor blades in the square of the hatch proved to be time-consuming (Figure 8-63). To facilitate loading and discharge operations, these helicopters had their rotor blades removed during redeployment loading operations.

Figure 8-60. Hurricane Belle Delayed Vessel Loading Operations by 24 Hours.

Figure 8-61. One Hundred and Thirteen Helicopters Were Moved to Covered Storage for Protection From the Storm.

Figure 8-62. Extra "D" Rings Were Installed for REFORGER to Provide Needed Securing Points for MILVANs and Helicopters.

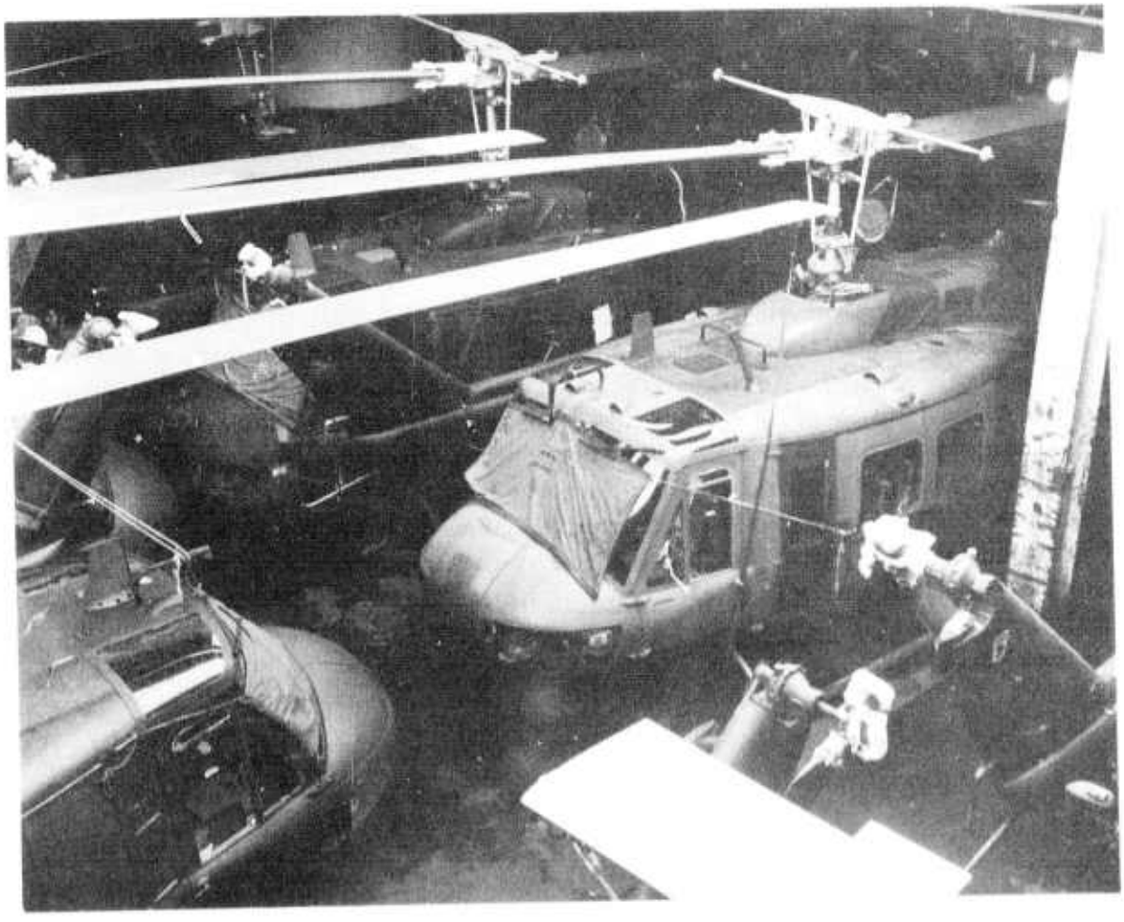

Figure 8-63. UH-1 Helicopter Stowed in Hatch Square (GTS Callaghan).

(m) Damage to equipment during receipt, staging, loading, and discharge must be documented at the time to insure proper discrepancy reporting. This was not done and led to difficulty in later identifying the circumstances under which damage occurred.

6. Ocean Voyage.

a. Transit time data for transatlantic sailings.

Vessel	Sailed	Arrived	Elapsed Time
Callaghan	122000	201620	7.9 days
Meteor	111840	201730	8.9 days
Comet	102010	201130	9.6 days
Ranger	120900	201009	7.1 days

b. With the exception of strong northerly winds, the weather was not a factor during the transatlantic crossing. During the voyage, the captain of the Callaghan stopped the vessel and sheltered the port side from the winds so that the division personnel accompanying the helicopters could attempt to repair damaged redi-covers.

7. SPOD Operations.

a. General.

(1) One of the primary objectives of the REFORGER 76 Exercise deployment phase, was to test the BENELUX LOC under the host nation support concept. The deployment phase in Europe was essentially a host nation operation, with the US Army providing liaison, port supervision, and documentation for US cargo. To accomplish this objective, the MTMC Transportation Terminal Group, Europe (MTMC-TTGE), with its subordinate BENELUX terminal command, provided liaison to the Royal Netherlands Army and the Belgian Army for the reception and discharge of the REFORGER vessels (USNS Meteor and GTS Callaghan at Ghent, Belgium, and USS American Ranger and USNS Comet at Vlissingen, the Netherlands).

(2) The MTMC-TTGE BENELUX terminal documented all US cargo clearing the ports of Vlissingen and Ghent with the assistance of the 140th and 160th Contract Supervision Teams and the 491st and 172nd Cargo Documentation Teams deployed from CONUS.

(3) Damage to equipment during stevedore operations at the POD, as well as at the POE, was minimal and consisted primarily of dents, scratches, and scrapes. The tight stowage and unfamiliarity with equipment contributed to the minor damage that did occur. One UH-1 was damaged when a boom guide wire broke loose from a defective D-ring and struck the aircraft (Figures 8-64 and 8-65). During all port operations, the presence of a MTMC deck officer was required to provide supervision and to preclude damage whenever possible.

Figure 8-64. Defective "D" Ring on the Main Deck GTS Callaghan.

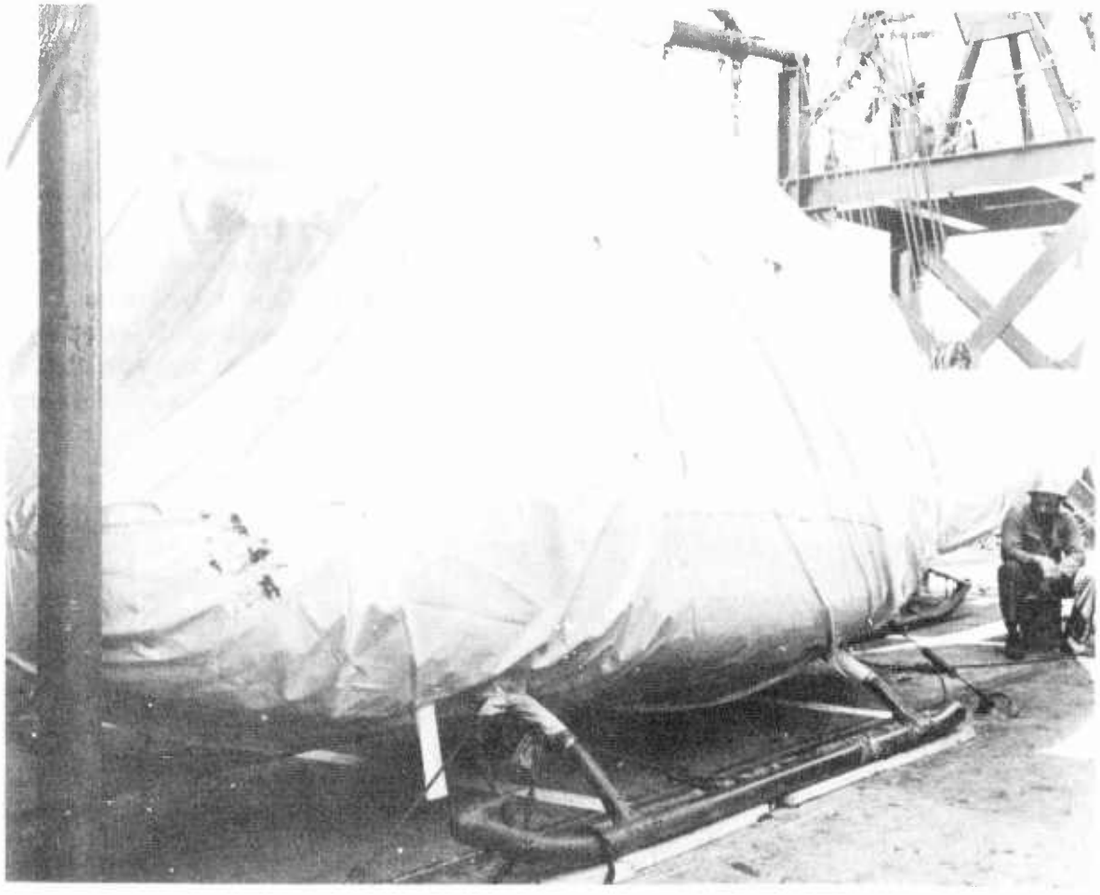

Figure 8-65. UH-1 Helicopter Inadvertently Damaged When Boom Guide Broke Loose From a Defective "D" Ring.

(4) Safety was emphasized at all times during port operations, but accidents still occurred. The most serious injury was to a Belgian stevedore who received serious head injuries when a 3-foot-long steel pipe fell into the hatch and landed on his head. His injury could have been less serious had he been wearing a hard hat. None of the Dutch or Belgian stevedores wore hard hats.

(5) The tight stow of vehicles restricted immediate drive-off access on the RORO vessels. Some vehicles had to be moved into position for drive-off discharge (Figures 8-66 through 8-69). When a tight stow is used on RORO vessels, SPOD stevedore gangs should be notified in advance so that appropriate special equipment (forklifts and tow tractors) will be on hand.

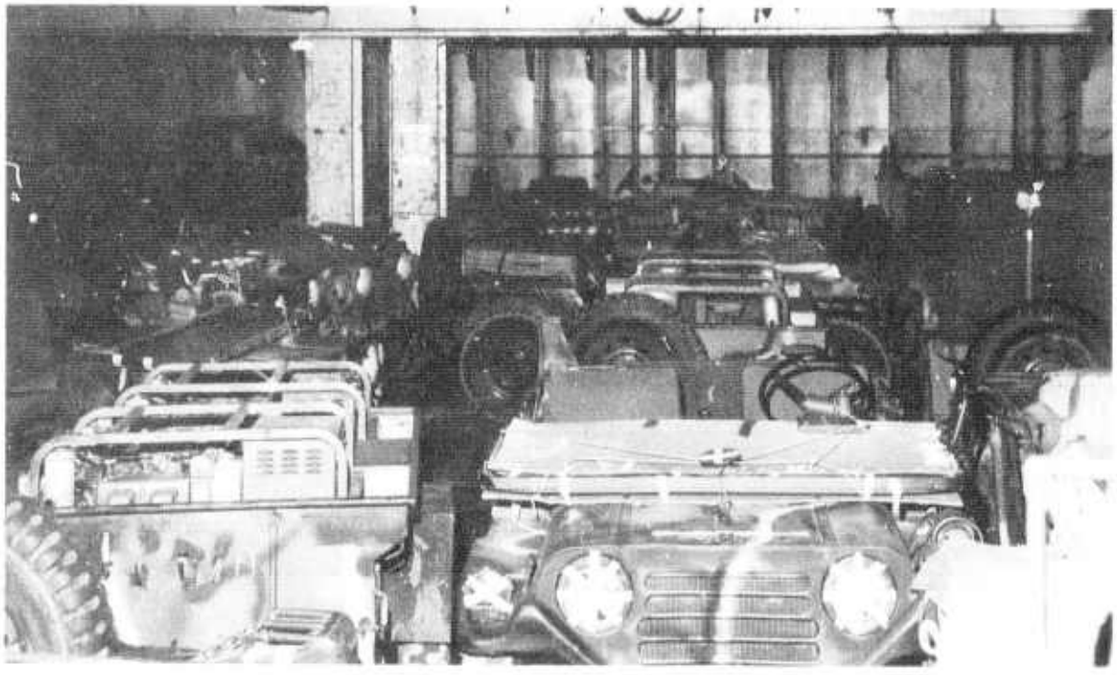

Figure 8-66. Forklift Placing Vehicle in Final Stow Position.

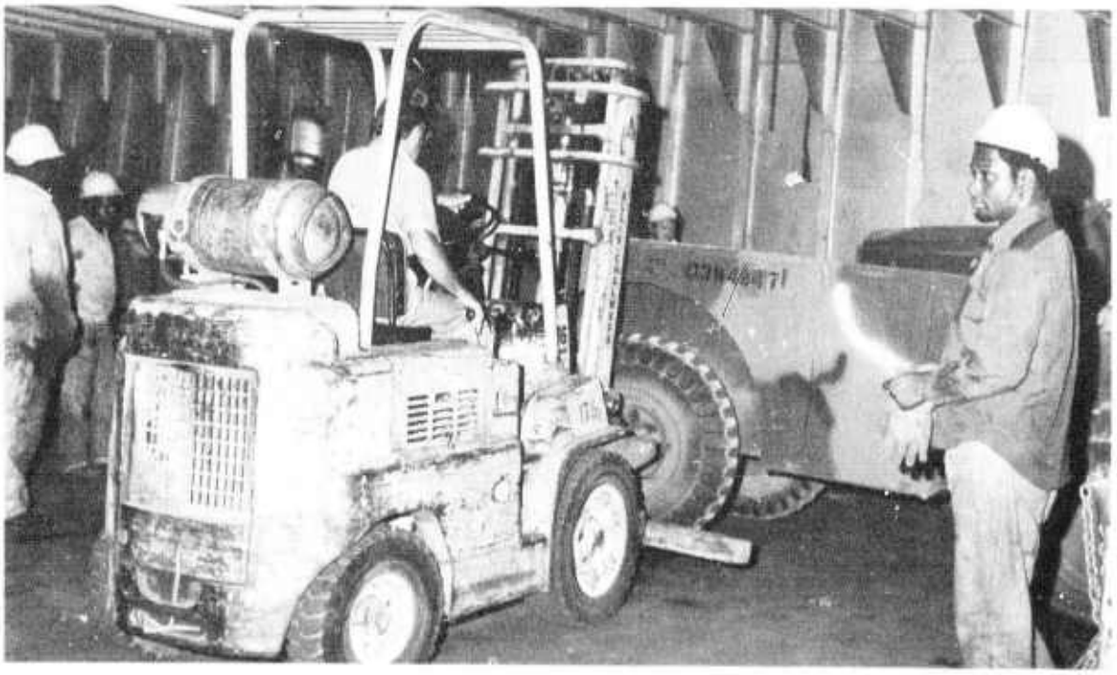

Figure 8-67. Typical Tight Stow of Vehicles.

Figure 8-68. Typical Tight Stow of Vehicles.

Figure 8-69. Typical Tight Stow of Vehicles.

(6) Vessel stow plans that combine vehicles and helicopters, such as those for the Callaghan and Meteor during REFORGER 76, should provide for as rapid vehicle discharge as possible. This necessitates careful load planning so as not to block side and stern ramps and hatch covers. If that is not possible, the stow plans should be designed to provide rapid access to these areas. This may require some sacrifice of helicopter loading space, depending on the number of helicopters to be shipped and the type vessel utilized. The need to selectively discharge vehicles before completing helicopter discharge was apparent twice during the operations. The first time was in Ghent, when it appeared that not enough vehicles would be discharged in time to meet the initial vehicle convoy schedule. The second instance was in Norfolk, when weather interrupted the discharge of helicopters but not of vehicles. Loading plans, for both helicopters and vehicles, that incorporate a selective discharge capability will provide the port commander with the flexibility to adjust the discharge sequence to meet operational requirements.

(7) The advantages of using side ramps on RORO vessels for unloading when a stern ramp berth is available are minimal. The side ramps facilitate unloading of the upper tween deck and, at the same time, reduce the number of turns a vehicle from below the upper tween deck must negotiate to exit the vessel. However, during REFORGER 76 the flow of vehicles from the lower decks never was sufficient to tax the capacity of the stern ramp. Thus, the side ramps were used only for loading and discharging the USNS Comet at Norfolk, where a stern ramp berth was not available. Future stow plans should, nevertheless, offer ready access through both stern and side ramps to provide the port commander with the option of side and/or stern ramp discharge.

(8) The 101st Airborne Division provided driver personnel in Ghent and Vlissingen to offload vehicles from REFORGER vessels. When sufficient stevedore contract labor was not available to place the vehicles in a drive-off position, the 101st Division personnel performed this function until contract labor could be obtained.

(9) Preplanned procedures to color code vehicles by the major unit assembly area (MUAA) were not effectively followed by the division. Hence, some problems were encountered in staging vehicles for rail loading and shipment to the three MUAAs. However, port clearance operations in the European theater were managed on a predetermined and coordinated basis, and met the requirements of the deploying forces and the exercise planners.

(10) Standardization Agreement (STANAG) formats were not used for managing transportation movements and for ordering transportation

assets to accomplish cargo movements during REFORGER 76. These agreements were designed to standardize transportation movement planning, procedures, and operations and are applicable to NATO nations. Thus, US military operations, in both peacetime and wartime (unless a reservation is contained in the STANAG), are governed by these agreements when US Forces operate within the NATO geographical area. DA Pamphlet 310-35, which is currently being updated, lists all STANAGs which are binding upon the US Army. The agreements that should have been employed for REFORGER 76 include STANAGs 2154, 2155, 2156, 2158, and 2166. Information on applicability of STANAGs can be obtained in Europe from HQ, USAREUR DCS-OPS AEAGC-DO in Heidelberg, Germany, and in CONUS from the Office of International Research and Development and Standardization of the US Army Materiel Development and Readiness Command (DARCOM) in Washington, DC. Copies of all STANAGs can be obtained from the Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA, 19120, (use of DD Form 1425, Specifications and Standards Requisition, will speed service). In future exercises of this nature, the use of the applicable STANAG and related formats should be an objective to insure thorough coordination of transportation requirements with the host nation.

b. Ghent Port Operations.

(1) Port facilities at Ghent were well suited for the simultaneous discharge of the Callaghan and the Meteor (Figure 8-70 and 8-71).

(a) A permanent RORO ramp was used to discharge vehicles from the Meteor's stern ramp, but it was necessary to use a camel (small wooden barge used for spacing) between the pier and starboard side of the Meteor's bow to bring the stern of the ship into the ramp. The Volvo ramp, with additional barge and bridging network, was used to connect the stern ramp of the Callaghan for discharge operations.

(b) The port's gantry cranes, used to discharge helicopters, were limited to 10 tons but were married to form a "yo-yo" sling to discharge CH-47's, MILVANs, and 5-ton trucks (Figure 8-72). These gantry cranes were considerably faster than the ship's gear or mobile cranes and resulted in helicopter discharge rates of five and six per hour on the Meteor and Callaghan, respectively.

(2) The professional, efficient conduct of terminal discharge operations by the Belgian stevedores was a significant aspect of this NATO host nation operation. The language barrier was not a factor since most stevedores spoke English well enough to communicate. However, the size of the gangs (6 men with 2 forklift drivers) was not adequate for handling

Figure 8-70. Ghent Port Facilities (Meteor).

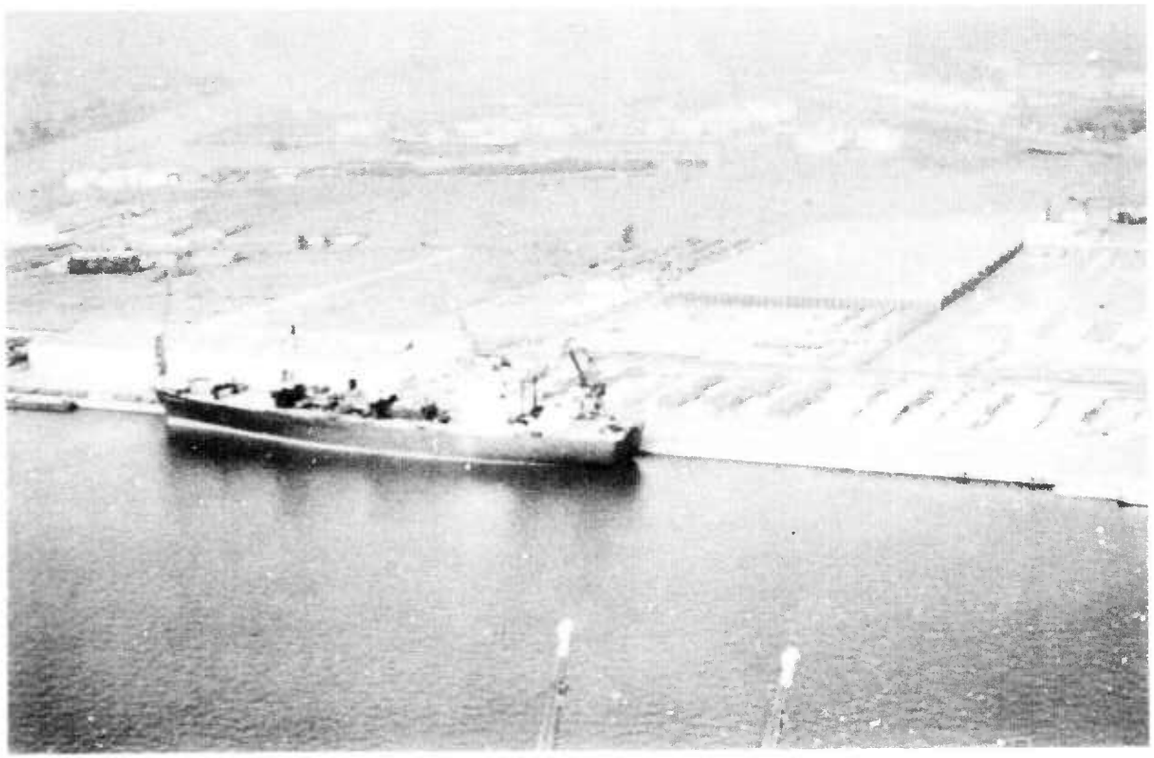

Figure 8-71. Ghent Port Facilities (GTS Callaghan).

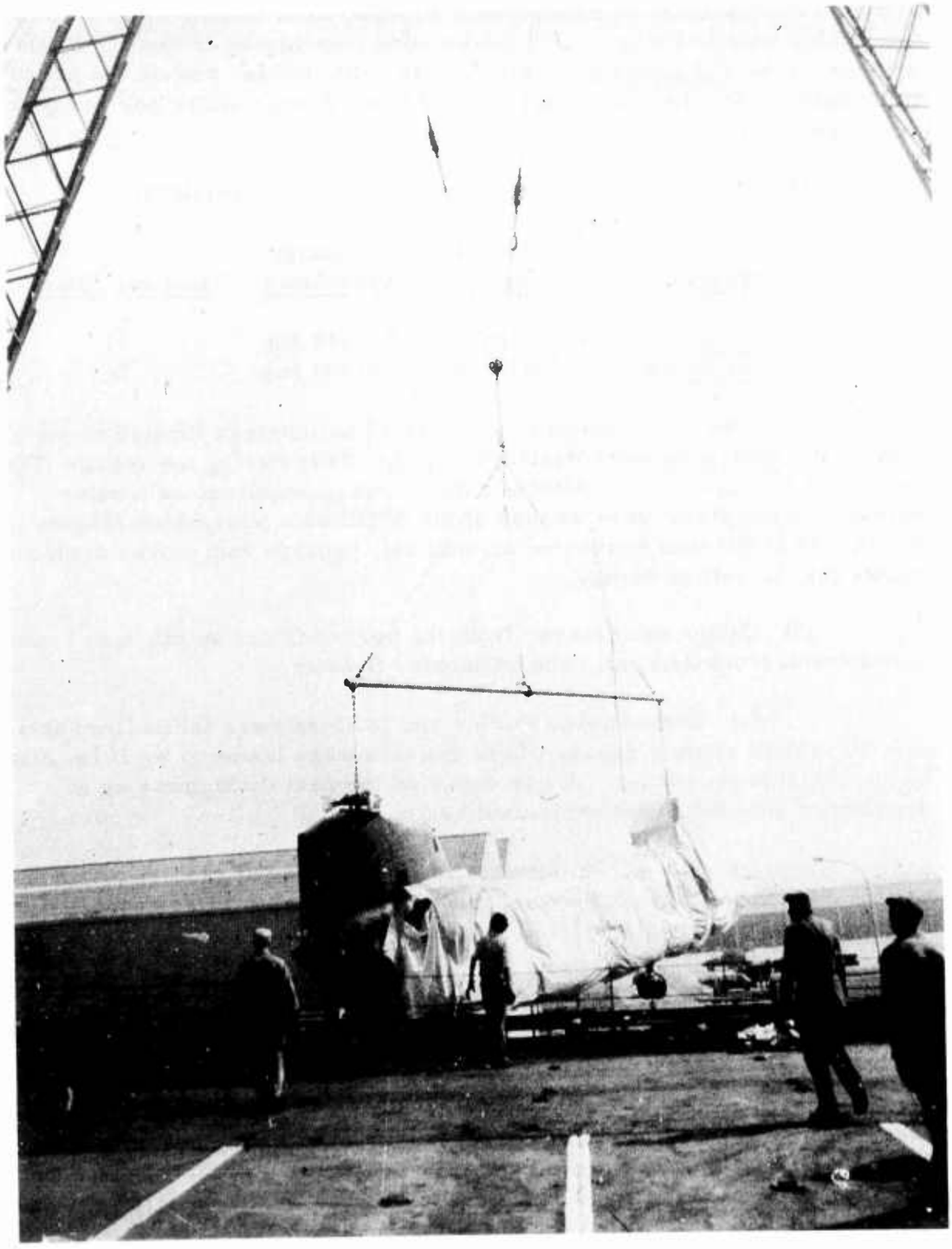

Figure 8-72. Unloading CH-47 With "Yo-Yo" Sling at Ghent, Belgium.

helicopters. At least 10 hatch men are required to maneuver helicopters from their stow position, using the existing positioning devices. The helicopters on the Callaghan were discharged in 36 hours, and on the Meteor in 20 hours. The Belgian gangs worked three 8-hour shifts per day during discharge operations.

(3) Total discharge times (helicopters and vehicles):

Vessel	Discharge Began	Discharge Completed	Elapsed Hours
Meteor	210625 Aug	221940 Aug	37
Callaghan	210613 Aug	231200 Aug	54

(4) The redi-covers of nine CH-47 helicopters located on the port side of the Callaghan were destroyed by the winds during the voyage (Figures 8-73 through 8-76). Although there was no apparent salt water damage, helicopters were washed at the SPOD as a precaution (Figure 8-77). AVSCOM was requested to, and did, provide redi-cover replacements for the return voyage.

(5) Cargo was cleared from the port of Ghent by military convoy, commercial truck and rail, and helicopter flyaway.

(a) Convoyable vehicles and trailers were taken from shipside to vehicle staging areas, where convoys were made up by 101st Airborne Division personnel. These departed the port by highway on a preplanned scheduled and controlled basis.

(b) The M750 semitrailer vans were not electrically compatible with European commercial tractors. Hence, military truck-tractors were procured and used to move the M750s.

(c) Four MILVANs on chassis were discharged from the USNS Meteor. These MILVANs cleared the port of Ghent, using European commercial trucks.

(d) The helicopters discharged from the GTS Callaghan and USNS Meteor were released to the 101st Airborne Division at shipside. From this location they were taken to the preparation areas where they were assembled, test flown, and then deployed to Ursel, Belgium.

(e) All nonconvoyable vehicles, trailers, general cargo and MILVANs cleared the port of Ghent by rail. Shore and mobile cranes were used to load the railcars.

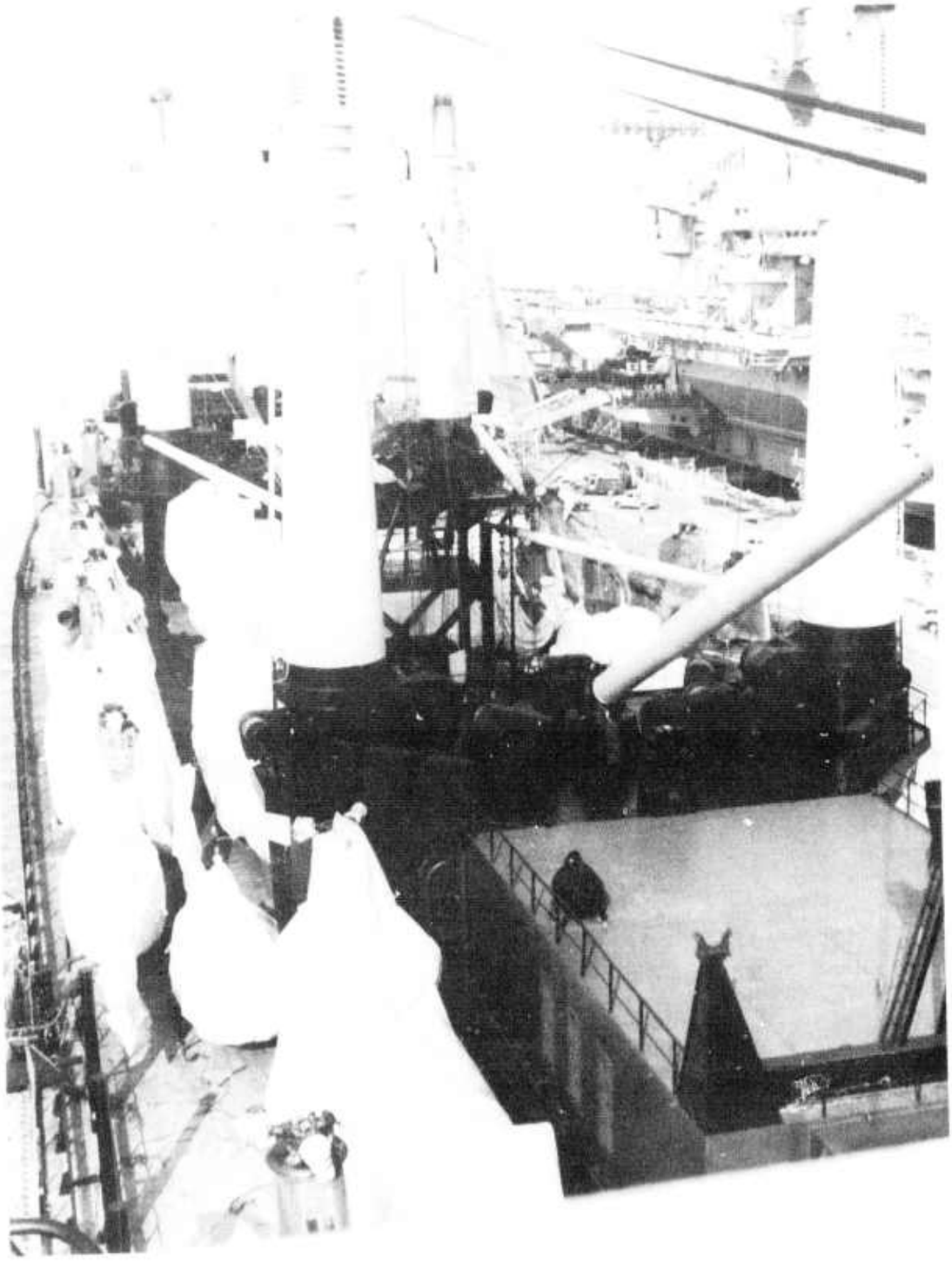

Figure 8-73. Damaged CH-47 Redi-Covers.

Figure 8-74. Damaged CH-47 Redi-Covers.

Figure 8-75. Damaged CH-47 Redi-Covers.

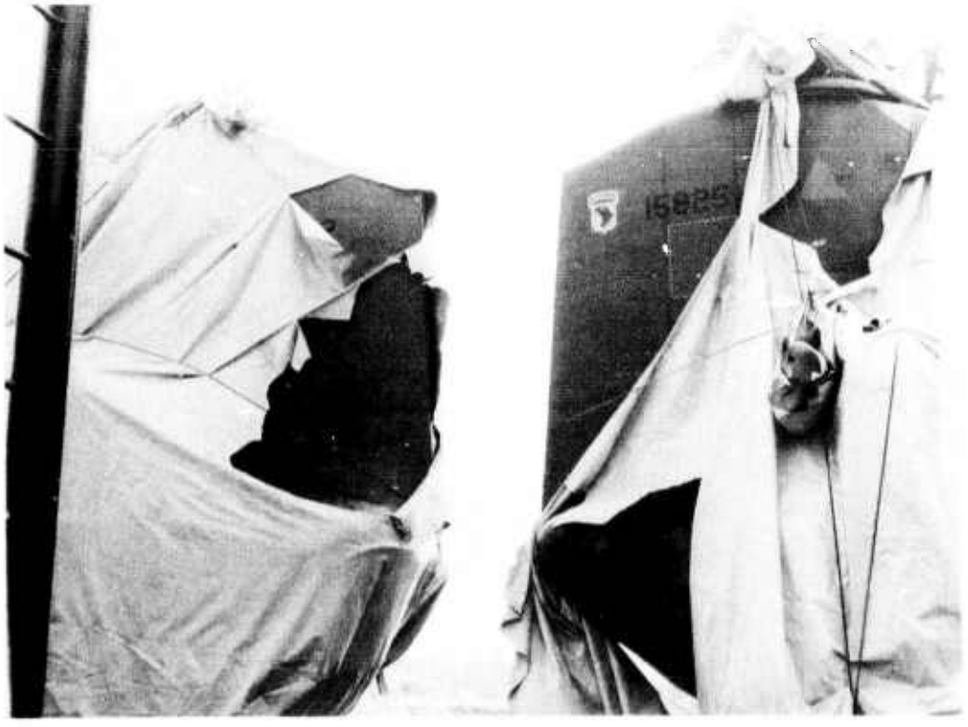

Figure 8-76. Damaged CH-47 Redi-Covers

Figure 8-77. All Helicopters Were Washed to Remove Salt Spray Residue.

c. Vlissingen Port Operations.

(1) Vlissingen is a container port (Figure 8-78) that is not accustomed to discharging break-bulk vessels. MILVANs were handled extremely well since the container-handling equipment was available. However, the size (only eight men) and availability of the stevedore gangs, as well as their inexperience with ship's gear, adversely affected the quality of the break-bulk discharge.

(2) The requirement to sort both MILVANs and break-bulk cargo by MUAA was hampered by the lack of definite MUAA markings. However, the vessel was discharged on time and all port clearance schedules were met.

(3) Total discharge time:

Vessel	Start	Completed	Elapsed Time
Ranger	201415 Aug	230430 Aug	62-1/2 hrs
Comet	201830 Aug	221200 Aug	41-1/2 hrs

(4) The RORO discharge of vehicles from the USNS Comet was a adversely affected by the extreme tidal changes at Vlissingen. The stern ramp had to be adjusted continually to allow for the discharge of vehicles. At extremely low tide, RORO discharge of vehicles was precluded.

(5) Cargo was cleared from the port of Vlissingen by highway and commercial rail.

8. Vessel Interim Use.

a. The four vessels utilized to transport the REFORGER 76 equipment were fully employed by MTMCEA in normal Department of Defense cargo movements during the period between deployment and redeployment. This procedure partially offset the cost for vessel utilization during the exercise. The REFORGER 76 MSC sealift was funded by the Department of the Navy at $4.1 million. However, $5.1 million per diem costs could have resulted if the vessels had not been utilized during the interim period.

b. The schedule in Table 8-3 was arranged by MTMCEA and maintained in coordination with the Military Sealift Command.

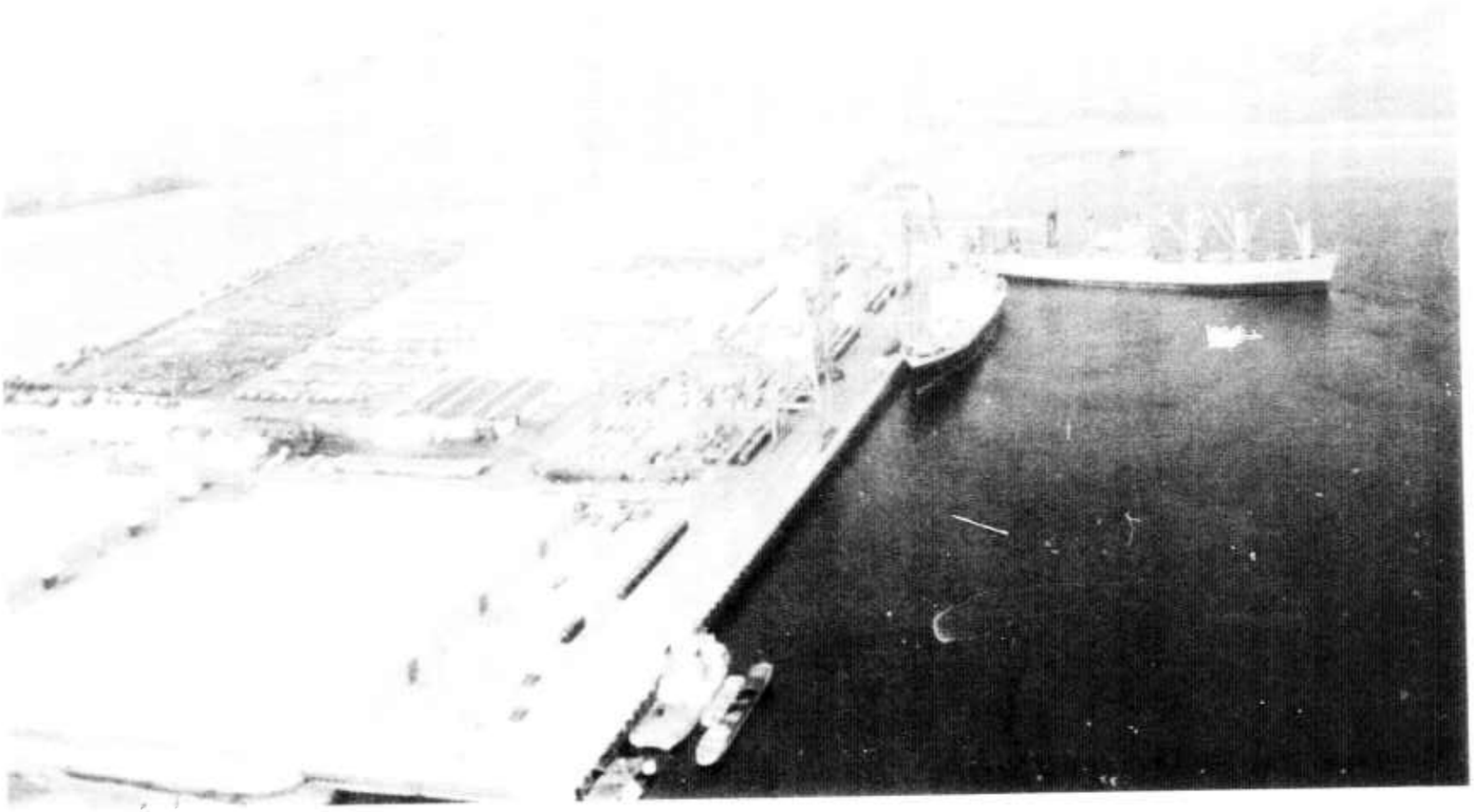

Figure 8-78. Vlissingen Port Facilities.

TABLE 8-3

REFORGER VESSEL INTERIM USE

Vessel	Europe POD	ATD	Interim Ports of Call	Europe POE	ATA
GTS Callaghan	Ghent	23 Aug	---------- Bremerhaven Bayonne, NJ Bremerhaven	Bremerhaven	23 Sep
USS American Ranger	Vlissingen	23 Aug	---------- Nordenham Sunny Point, NC Nordenham Bremerhaven	Bremerhaven	2 Oct
USNS Meteor	Ghent	23 Aug	---------- Bremerhaven Charleston Mobile Bremerhaven	Bremerhaven	26 Sep
USNS Comet	Vlissingen	22 Aug	---------- Bremerhaven Mobile Bremerhaven	Bremerhaven	30 Sep

9. SPOE Port Operations. Redeployment.

a. Bremerhaven port operations.

(1) The redeployment phase of REFORGER 76 was planned by MTMC-TTGE. The receipt and loading of all 101st Airborne Division cargo was accomplished at Bremerhaven Terminal (Figures 8-79 through 8-81). The cargo was loaded aboard the GTS Admiral Wm. M. Callaghan, USNS Meteor, USNS Comet, and the USS American Ranger, between 24 September and 6 October 1976, using Bremer Lagerhaus Gesellschaft (BLG) stevedore contractors.

(2) The MTMC-TTGE Bremerhaven terminal was responsible for documenting all REFORGER 76 cargo arriving at the port. The physical documentation sites were Schwanewede and Altenwalde (convoy wash points) for convoyable equipment; the Bremerhaven port container terminal for aircraft; and various rail sites within the Bremerhaven port area for equipment and cargo arriving by train.

(3) The MTMC-TTGE Bremerhaven terminal was augmented by the 140th and 160th Contract Supervision Teams and the 491st and 172nd Cargo Documentation Teams deployed from CONUS. These teams assisted the terminal in performing around-the-clock REFORGER operations as well as maintaining normal day-to-day terminal activities.

(4) Six CH-54 nondivisional aircraft, due for CONUS retrofit, arrived at Bremerhaven between 18 and 21 September 1976. The aircraft were landed on the US Army, Bremerhaven, helicopter landing pad where blades were removed and the helicopters towed to the BLG container terminal for processing and bagging. All work was accomplished by members of the 295th Aviation Company (Heavy Helicopter). The 101st Airborne Division helicopters began arriving at Bremerhaven on 19 September and closed on 26 September 1976. These helicopters were landed on hardstand in the port area and towed a short distance to the staging area for final processing.

(5) Bridge cranes were used to load OH-58, UH-1, and AH-1 helicopters. CH-47s were loaded using a 250-ton floating crane. All helicopters were loaded aboard the Callaghan and Meteor in accordance with prestowage plans. All handling of the helicopters aboard each vessel was performed by contract stevedores.

(6) Convoy vehicles arrived at the US Army Carl Schurz Kaserne (CSK) in Bremerhaven from final wash points at Schwanewede and Altenwalde. The convoy vehicles were put through a final inspection by US MP

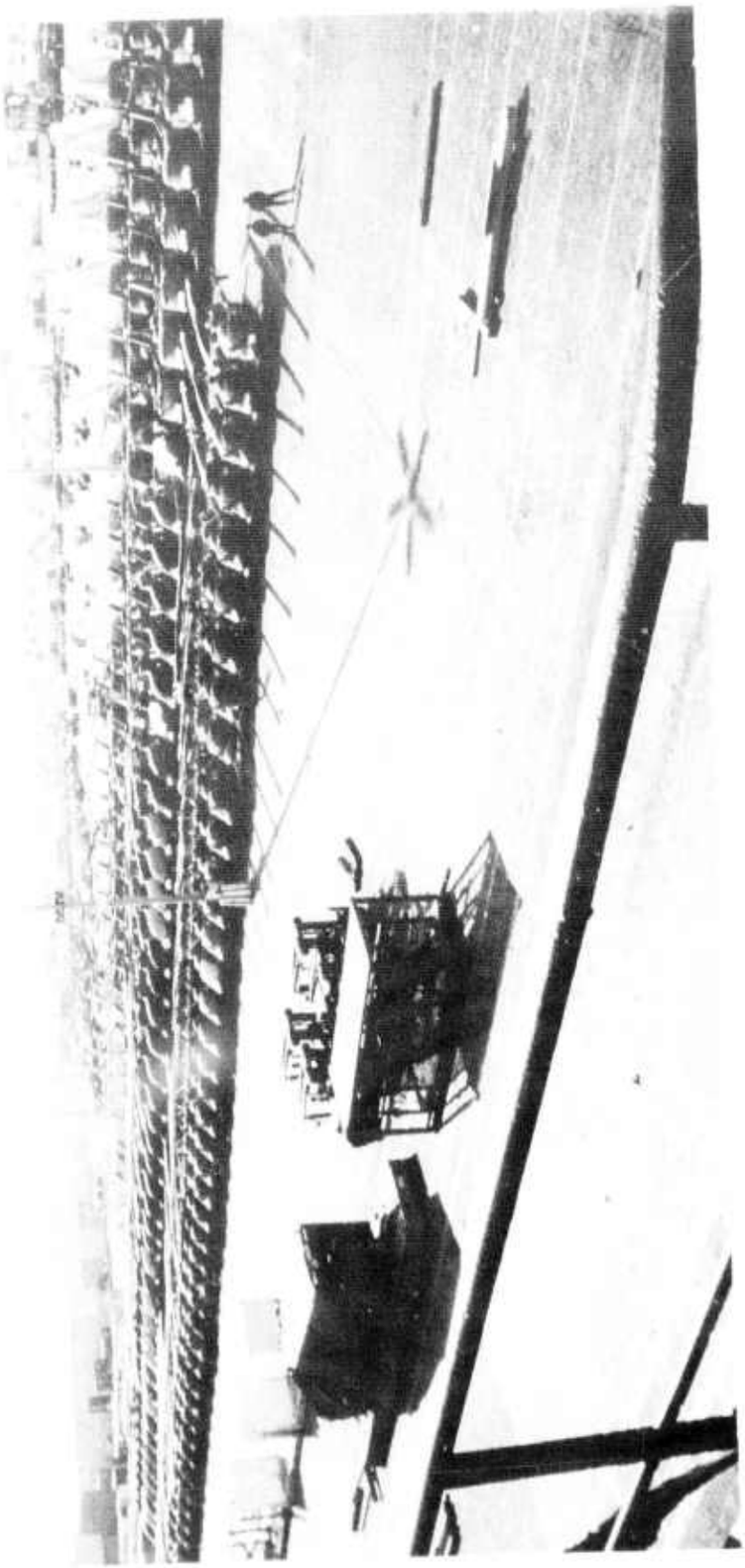

Figure 8-79. Bremerhaven Helicopter Staging Area.

Figure 8-80. Bremerhaven Vehicle Staging Area.

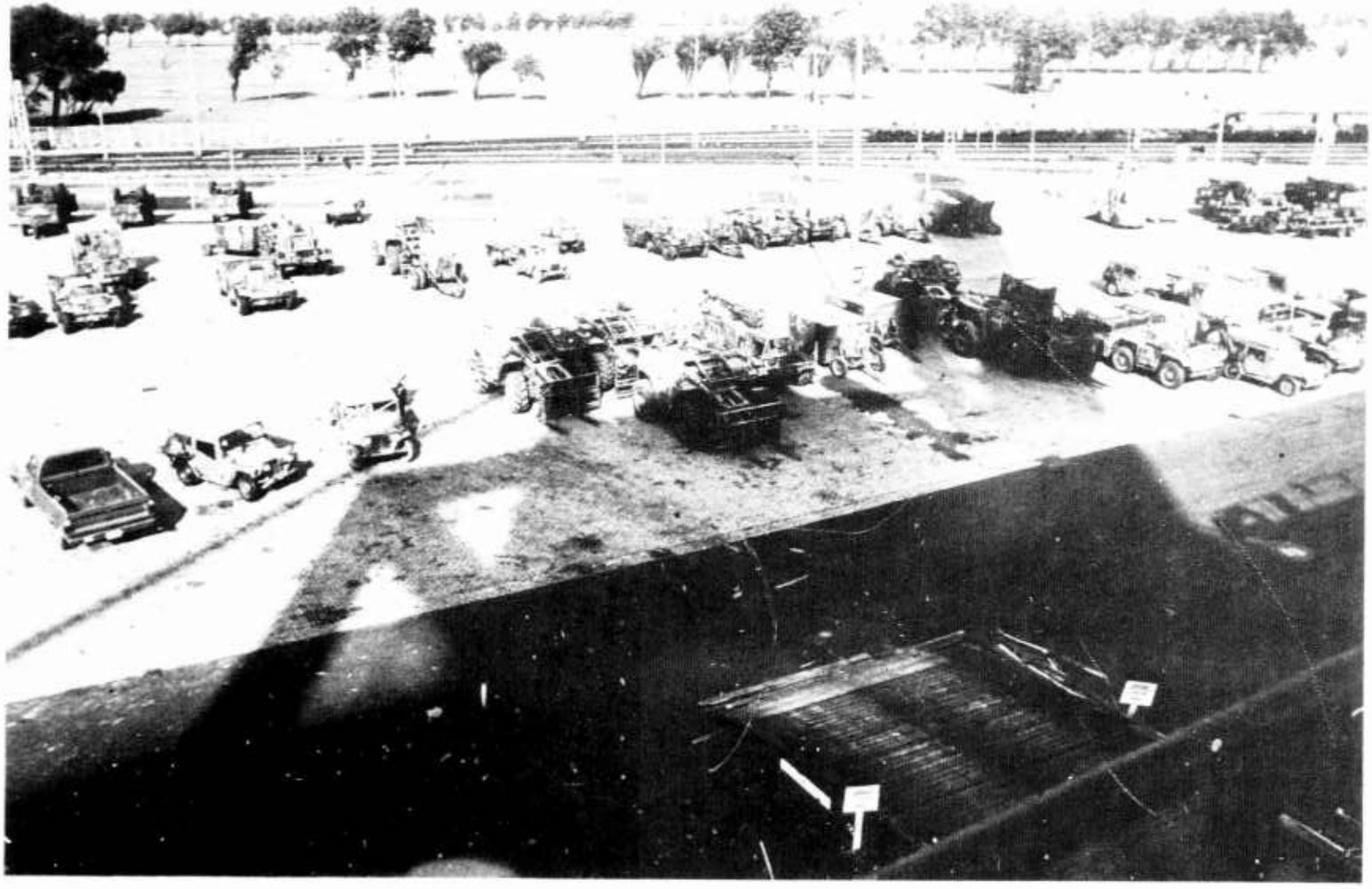

Figure 8-81. Bremerhaven Vehicle Staging Area.

customs and US Department of Agriculture inspectors at CSK. The convoys began arriving 23 September and closed 30 September 1976. All convoy vehicles were staged the day prior to scheduled shiploading dates. Bremerhaven terminal accepted vehicles only after they successfully passed final customs and agriculture inspection. Drivers furnished by the 101st Airborne Division were used to shuttle the vehicles from Carl Schurz Kaserne to the container terminal in the port, where they were staged in the vehicle staging area. Vehicles were staged by type and by vessel. In order to make the most efficient use of vessel stowage space, empty 2-1/2-ton trucks were loaded with trailers. Empty 1-1/4-, 3/4-, and 1/4-ton trailers were dropped from their prime movers and subsequently were piggy-backed on empty trucks.

(7) Equipment arriving via rail was primarily nonconvoyable; that is mules, gamma goats, forklifts, howitzers, airmobile transporters, and airmobile shelters. Trains started arriving 19 September and closed 4 October 1976. All trains arrived prior to scheduled ship backloading dates, with the exception of the trains for the American Ranger.

(8) Vessels were loaded on ship at a time in the following sequence:

Vessel	Start Load	Complete Load	Elapsed Time
Callaghan	242230 Sep	281745 Sep	89-1/4 hrs
Meteor	271400 Sep	301600 Sep	74 hrs
Comet	301430 Sep	021700 Oct	50-1/2 hrs
Ranger	030600 Oct	062300 Oct	89 hrs

(9) Stevedores worked around the clock 24-hours a day, three 8-hour shifts per day except during weekends; the third shift on Saturdays and the second and third shift on Sundays were not worked. All REFORGER 76 vessel-loading operations were completed within the scheduled times.

b. REFORGER 76 Redeployment Documentation Procedures.

(1) Prior to deployment, TCMD cards and hard copy DD Form 1384s were prepared by the Fort Campbell transportation office, and were given to a representative of the 101st Airborne Division for delivery to the Bremerhaven terminal and for subsequent use in redployment. These documents were lost or mislaid and never received by the terminal. Ocean terminals normally export cargo based on the source documentation received from the requesting shipper, which was the 101st Division in this case. However, in this instance, Bremerhaven terminal provided this documentation for all REFORGER cargo. The documentation plan was as follows:

(a) Receive import REFORGER manifests from the CONUS ports.

(b) Run manifest cards through the computer for production of TCMDs to document cargo.

(c) Send documentation teams to the field staging sites to process the incoming equipment.

(d) Place machine-produced TCMDs on the equipment as it arrived at the sites; pull and forward the 5th and 6th copies to the terminal transportation branch.

(e) Annotate stowage location, and forward original TCMD to the terminal transportation branch for production of the final ship manifest.

(f) Check contractor master load list prior to final manifesting to insure that all equipment loaded was properly accounted for and manifested.

(g) Produce final manifest, and transceive cards to CONUS ports.

(2) The improvised documentation procedure used for the redeployment caused the following difficulties:

(a) Shipping documents were mechanically produced from the deployment ocean cargo manifest, but the standard port system failed to extract trailer card data. This resulted in incomplete documentation. Therefore, manual TCMDs were prepared by Bremerhaven terminal.

(b) Individual TCMDs for cargo arriving by rail on a particular train were bundled together in an envelope, and given to 101st Airborne Division personnel to place on each piece of equipment. These personnel had to search through the bundle to find the proper TCMD for each vehicle, wasting much time and effort.

(c) The shipping documents were distributed according to convoy and rail staging sites, but all equipment did not arrive at the planned locations. Convoy sites received cargo that was to be transported by rail; similarly, rail sites received convoy cargo. This caused a large amount of additional manual TCMD preparation.

(d) The amount of time and effort expended to meet current documentation requirements substantiates the need for special procedures for large unit moves.

10. Ocean Voyage.

a. Transit time for the transatlantic voyage.

Vessel	Sailed	Arrived	Elapsed Time
Callaghan	281755 Sep	070750 Oct	8.6 days
Meteor	010020 Oct	100800 Oct	9.3 days
Comet	031505 Oct	140300 Oct	10.5 days
Ranger	070800 Oct	180530 Oct	10.9 days

b. Despite the efforts of the 101st Airborne Division personnel to preclude damage by wrapping the CH-47 redi-covers with rope and tape, 19 were destroyed by high winds. Three of the CH-54 covers were also destroyed. Fortunately, the aircraft did not sustain damage.

c. Once again, no equipment damage was sustained during the redeployment ocean voyage.

11. SPOD Port Operations.

a. Norfolk.

(1) Norfolk discharge operations were successfully accomplished with minimal complications (Figure 8-82 through 8-85). Damage to equipment was minimal and operations were smoothly conducted. The expertise gained in the deployment outloading was evident in the redeployment phase.

(2) Discharge operations began 7 October 1976 with the offloading of the Callaghan, followed consecutively by the Meteor, Comet, and Ranger. Stevedores worked one and one-half shifts per day (12 hours). Discharge of the Ranger was completed on 21 October 1976. The Meteor sailed from Norfolk on 13 October and arrived at Beaumont, TX, on 18 October.

(3) Vehicle and helicopter staging areas were generally the same as those used in the deployment. Sequencing of the vessels required that only the south side of Pier 12 be used for RORO vessel discharge.

(4) Weather was a factor during two days of offloading operations. Helicopter discharge from the Callaghan was suspended 9 October because of high winds and rain. However, 2 hours later, the gangs were

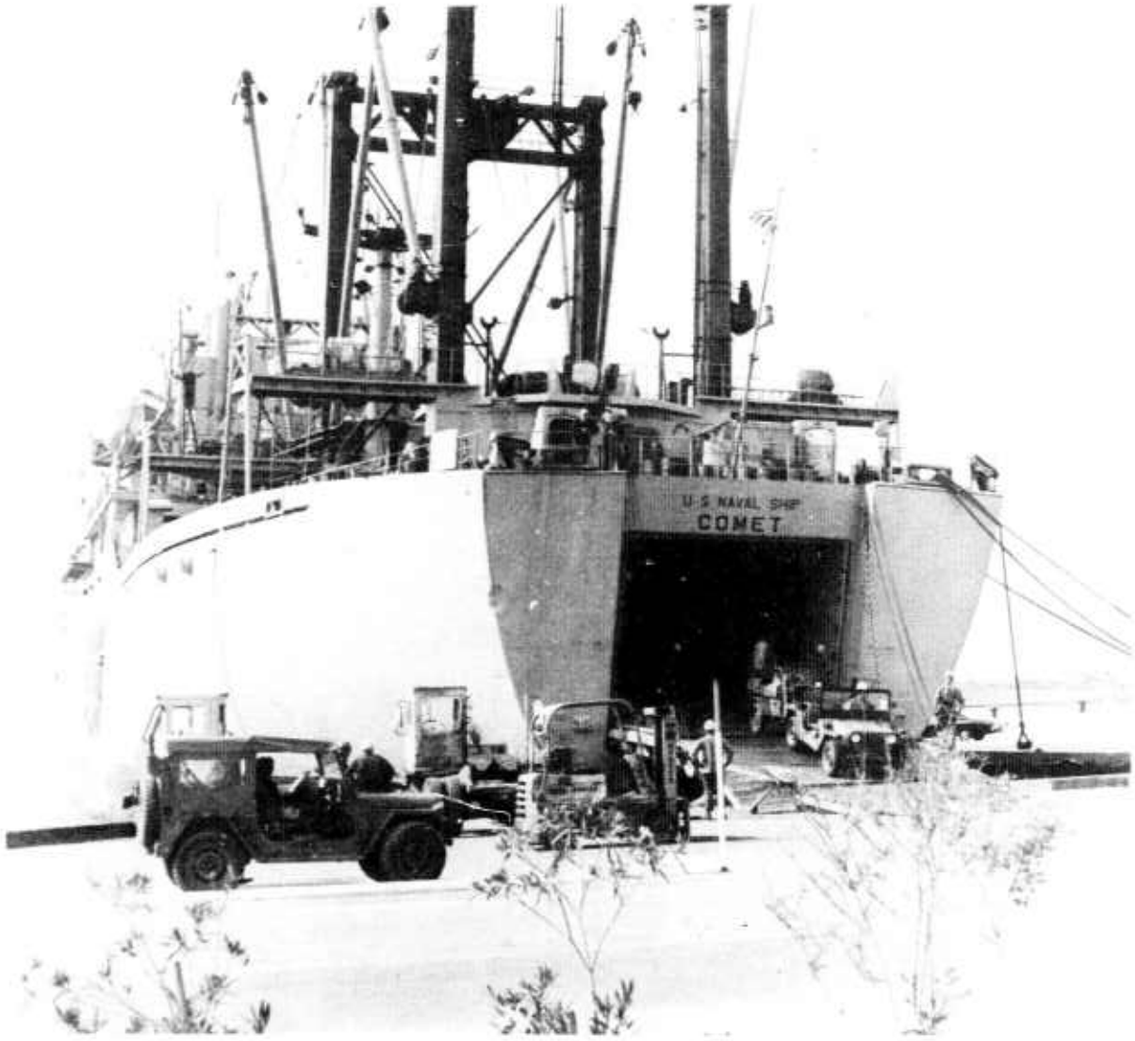

Figure 8-82. Redeployment Discharge RORO Operations.

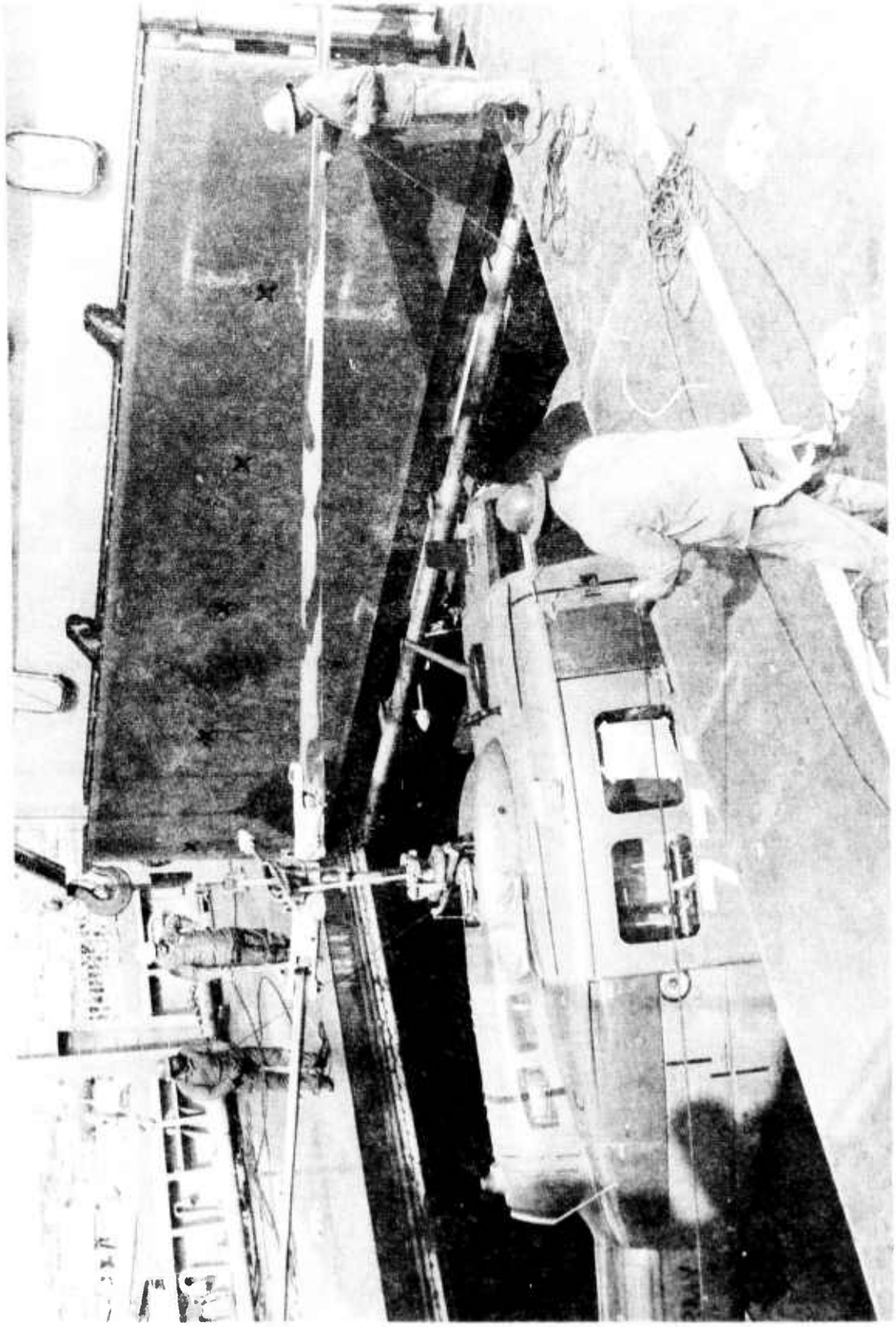

Figure 8-83. UH-1 Helicopter Discharge from USNS Meteor.

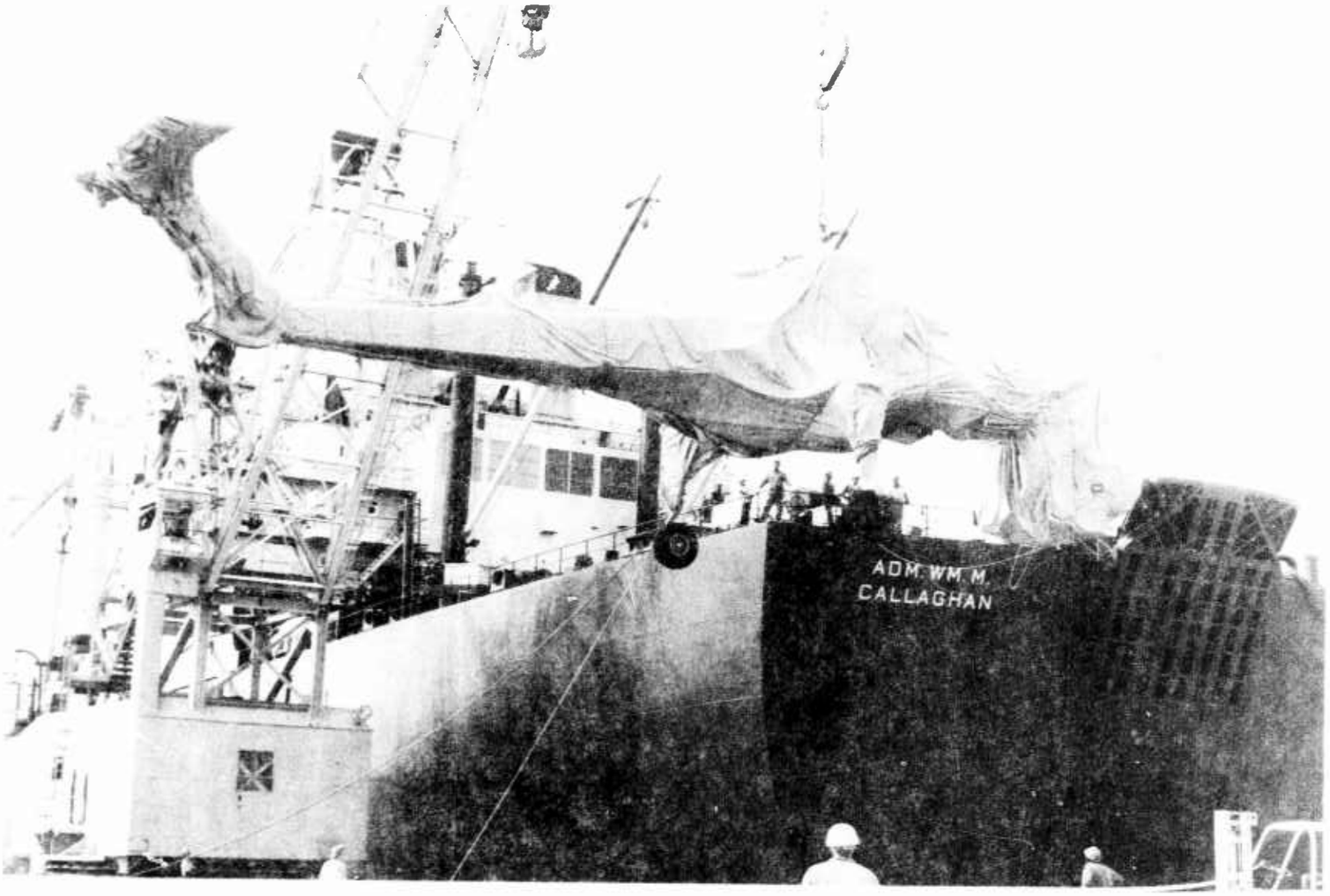

Figure 8-84. CH-54 Helicopter Discharge from GTS Callaghan.

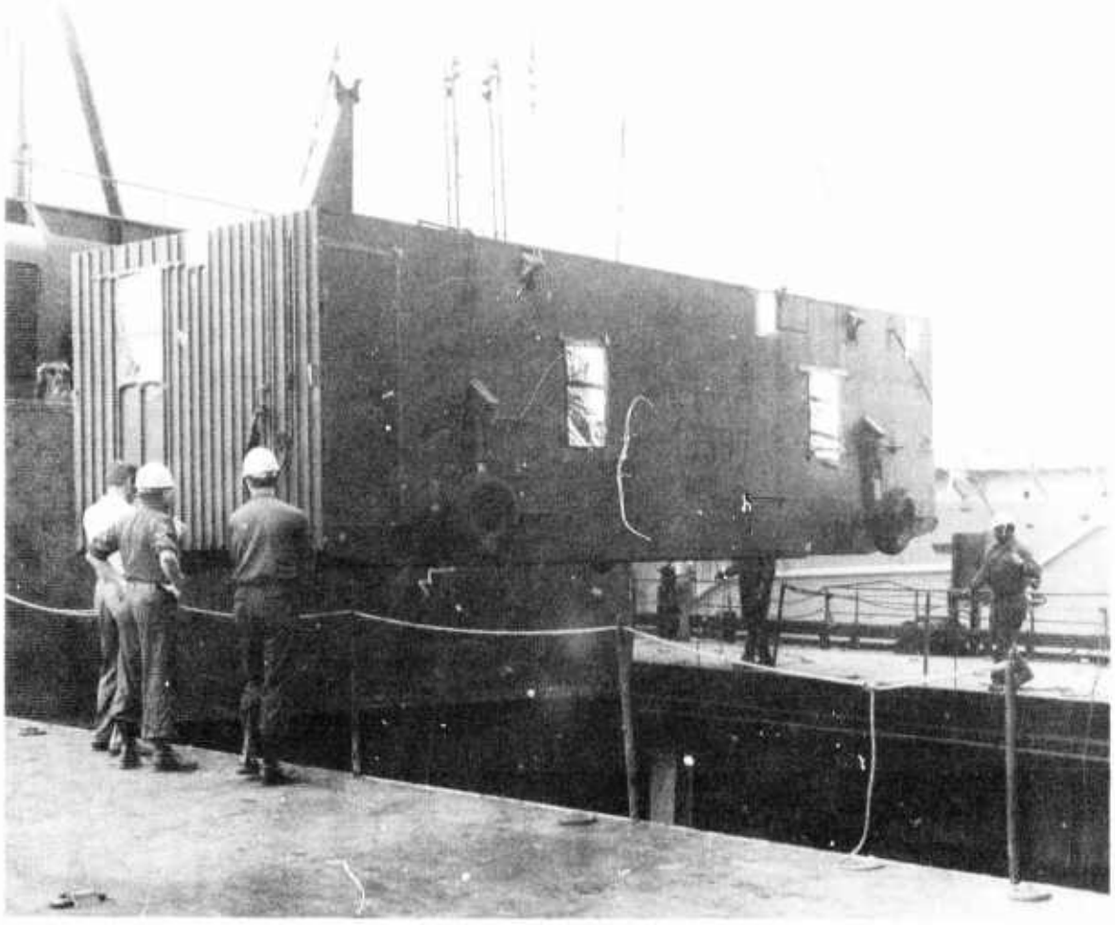

Figure 8-85. CH-54 Pods Discharge from GTS Callaghan.

reassembled for vehicle discharge when it was found that, by moving a few helicopters, vehicles could be selectively discharged. On 20 October at 1030 hours, the discharge of the American Ranger was suspended when the stevedores exercised their option not to work in the rain. Discharge operations resumed on 21 October at 0800 hours.

(5) The discharge of vehicles was adversely affected by vehicle maintenance problems. Maintenance assistance requirements at Norfolk during redeployment were greater than at any other time during the exercise. Many vehicles had dead batteries and missing or defective parts. Fortunately, the maintenance teams provided by the COSCOM were properly equipped, manned, and supervised to provide the necessary support (Figure 8-86).

Figure 8-86. Vehicle Maintenance Team During Discharge Operations.

(6) MILVAN unloading operations from the American Ranger were slow the first day because of insufficient tractors and trailers to clear the pier area (Figure 8-87). The following day, additional tractors and trailers were obtained, and the operation was successfully concluded (Figure 8-88).

(7) Vessel discharge times were as follows:

Vessel	Starter	Completed	Elapsed Hours
Callaghan	071015 Oct	110800 Oct	93-3/4 hrs
Meteor	110700 Oct	121725 Oct	34-1/2 hrs
Comet	140800 Oct	151125 Oct	27-1/2 hrs
Ranger	180800 Oct	211445 Oct	76-3/4 hrs

Figure 8-87. MILVAN Discharge Operations.

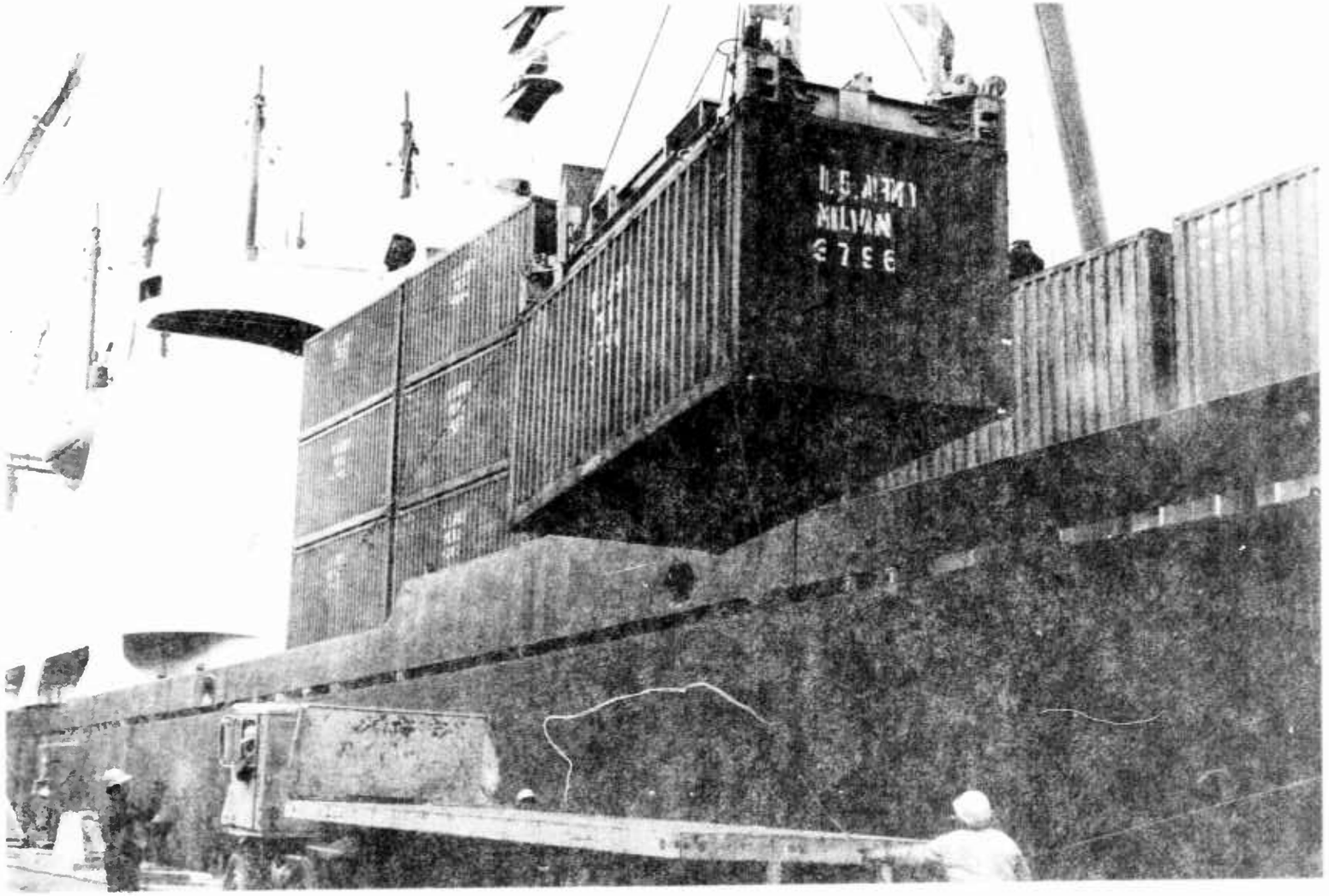

Figure 8-88. MILVAN Discharge Operations.

b. Beaumont.

(1) The USNS Meteor arrived at Beaumont 18 October 1976 and was discharged by commercial stevedores on the same day. The discharge was successfully completed with no complications.

(2) Commercial trucks were used to line haul equipment (less aircraft) to Fort Hood. Helicopters were flown to home station.

(3) The MTMCTEA representative observed that the quay at Beaumont possibly was too high to support roll-on/roll-off operations.

12. Summary.

a. The movement of the 101st Airborne Division (Air Assault) to and from Europe--REFORGER 76--was a success. The terminal operations at the various REFORGER ports incorporated innovative concepts for deploying an air assault division and provided transportation managers an opportunity to gain experience in deploying a large unit overseas. The utilization of commercial ports in three foreign countries exercised host nation support concepts and agreements. Though not an exercise objective, the use of a Navy port in CONUS did exercise an interservice support agreement.

b. The oversea deployment of an Army division is a major undertaking. The movement of an air assault division with 348 helicopters added an extra dimension to this already complex move. The helicopters were shipped in a near flyaway configuration permitting the rapid employment of the division in the theater of operations.

c. The high level of combat readiness of the division was sustained throughout the deployment and redeployment. Equipment and aircraft sustained minimal damage during transportation operations. The damage sustained was superficial; essentially, it consisted of dents and scrapes. At all ports of debarkation, 100-percent flyoff of helicopters was achieved.

d. The movement of large numbers of minimally disassembled helicopters on RORO ships is feasible and practical. The degree of helicopter disassembly will be determined by managing the tradeoff among combat readiness in the operational theater, the ocean ship system employed, and the number of vessels available for the move.

e. Army helicopters do not require the level of preservation and packing prescribed in the appropriate shipping manuals when deployed aboard modern ocean ship systems.

f. Anxiety about the handling of helicopters during port operations and movement by sea has been greatly reduced. Stevedores from three different countries loaded or unloaded the helicopters with minimal damage. Helicopters can be transported similarly to any other specialized piece of equipment. Technical advisors should be present during ship loading and unloading operations to preclude damage.

g. Onsite reconnaissance of outloading installations, SPOE, and SPOD must be done in the early planning stages to facilitate the planning effort and port selection. A physical inspection of the vessels to be used is necessary to determine the exact vessel configuration. Coordination of stow plans with all loading and discharge ports must be effected. Selective discharge of vehicles and helicopters and the use of side ramps should be considered in prestow plans.

h. Winds in excess of 30 miles per hour require discontinuance of helicopter loading operations. Rain may delay port operations at CONUS ports; however, overseas port operations can continue during rainy weather as long as the wind or fog does not create safety hazards.

i. The European phase of REFORGER 76 was conducted under the host nation support concept. The exercise tested the BENELUX Line of Communication in both the Netherlands and Belgium and demonstrated that the host nations have the capability to support an exercise of this type.

j. Staging of equipment and vehicles is critical to efficient loading of the vessels. The extra effort required to stage by stow location is not justified. Staging of equipment and vehicles by vessel and type is sufficient. Marking the vessel name on shipping labels is deemed sufficient for terminal control and staging.

k. Vehicle maintenance capability is essential to the efficient loading and unloading of RORO vessels and railcars. A minimum of one six-man maintenance team per vessel or train is required.

l. Lack of keys caused excessive delay during loading and unloading operations. Ignition keys for vehicles such as the M880 must be placed in a predesignated location on the vehicle and remain with the vehicle throughout the transportation cycle.

m. The adherence to MILSTAMP exception report procedures is required at each change of mode to identify damage, when and where it occurs.

n. The port organization for a large unit move should be reviewed and redesigned to place all port operating and support personnel under the operational control of the MTMC port commander.

o. AR 220-10 and FORSCOM Suppl 1 to AR 220-10 are in conflict concerning aircraft disassembly and assembly responsibilities at the port. The former states that the using unit is responsible for this function, while the latter assigns responsibility to the port.

p. Main deck-stowed helicopters need improved redi-covers as protection against salt spray damage. The CH-47 and CH-54 redi-covers utilized during REFORGER 76 were unsuitable for this purpose.

q. Cargo space in vehicles and trailers must be fully utilized for unit equipment, as prescribed in AR 220-10, to insure the economical use of transportation assets.

r. Use of normal MILSTAMP documentation procedures for large unit moves is not effective. Special documentation procedures for unit moves should be developed.

s. Helicopter positioning devices used aboard ship during the REFORGER 76 deployment were not satisfactory. The MTMC-designed device used for redeployment was effective but had certain operating limitations. Nonetheless, it is a model which could be further developed for future use.

t. The M750 van 24-volt electrical system is not compatible with a commercial tractor 12-volt electrical system. If possible, M750 electrical systems should be redesigned to attain compatibility.

u. Future NATO exercises of this nature should use appropriate STANAG documentation to insure thorough coordination of transportation requirements with the host nation, their military services, and commercial contractors.

v. The port of Beaumont, TX, should be surveyed prior to its selection as a SPOE for a large unit move to determine its capability to support roll-on/roll-off operations.

Responsible for controlling and coordinating the movement of REFORGER cargo .... out of CONUS water terminals.

SECTION IX

RETURN TO HOME STATION

1. Redeployment Rail Planning.

a. A redeployment planning conference was conducted by representatives of the Inland Traffic Directorate, MTMCEA on 7 August 1976. It was agreed that the concept of operations would be essentially the same as it was for deployment, except that NSC civil servants and international Longshoremen's Association (ILA) contract labor, instead of military personnel, would load railcars (Figures 9-1 through 9-4). A major goal in the redeployment was to minimize the number of railcars loaded at less than minimum weights.

Figure 9-1. Equipment Staged by Type for Redeployment Rail Load-out at Norfolk.

Figure 9-2. Mobile Ramp Used to Load the Bilevel Railcars.

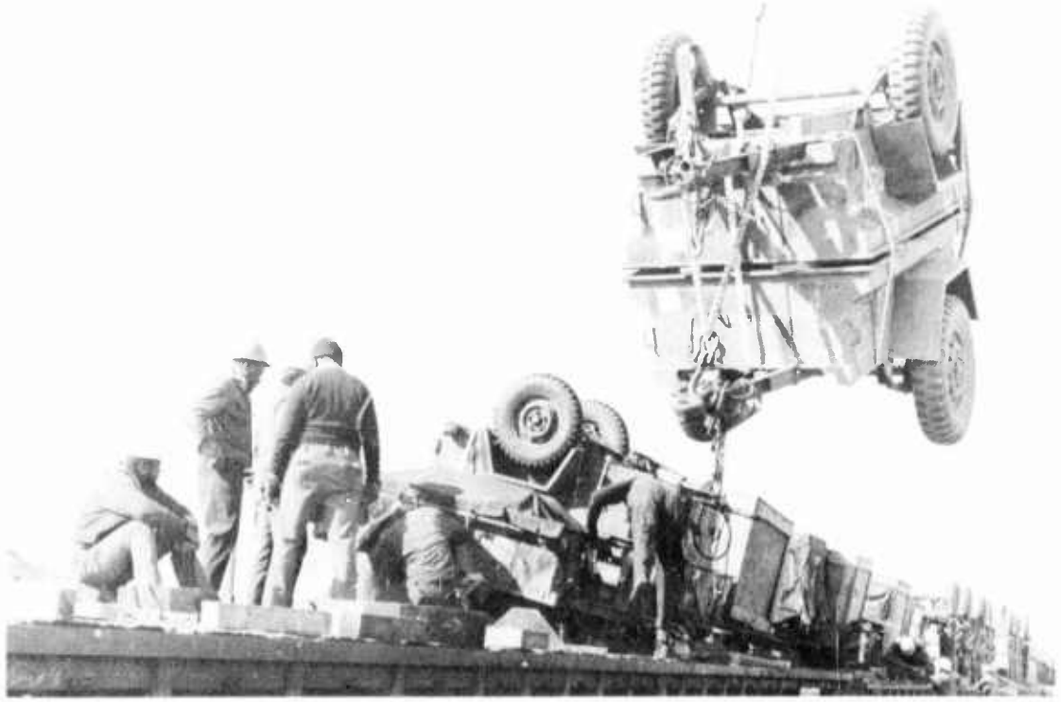

Figure 9-3. Equipment Loaded and Secured by ILA Contract Labor.

Figure 9-4. Vehicles Loaded and Secured by ILA Contract Labor.

b. Rail routings were submitted by the carriers and evaluated. Those routes that were equal in cost and service were given equitable distribution among the potential carriers.

(1) Trains 1, 3, 4 and 5 were routed for the redeployment on essentially the same route as for the deployment.

(2) Train 2 was routed as far south as Atlanta and north again to Fort Campbell (Figure 9-5).

c. Since the DODX guard cars were in poor condition for the deployment phase, they were thoroughly inspected prior to redeployment. Naval Base maintenance personnel repaired four of the five guard cars. The fifth guard car, scheduled for use in the move, could not be repaired, and two cabooses were substituted for it.

2. Rail Communication Net. Status charts were kept to control and monitor train progress as it was done during deployment. Each railroad provided one point of contact for all information relative to train status.

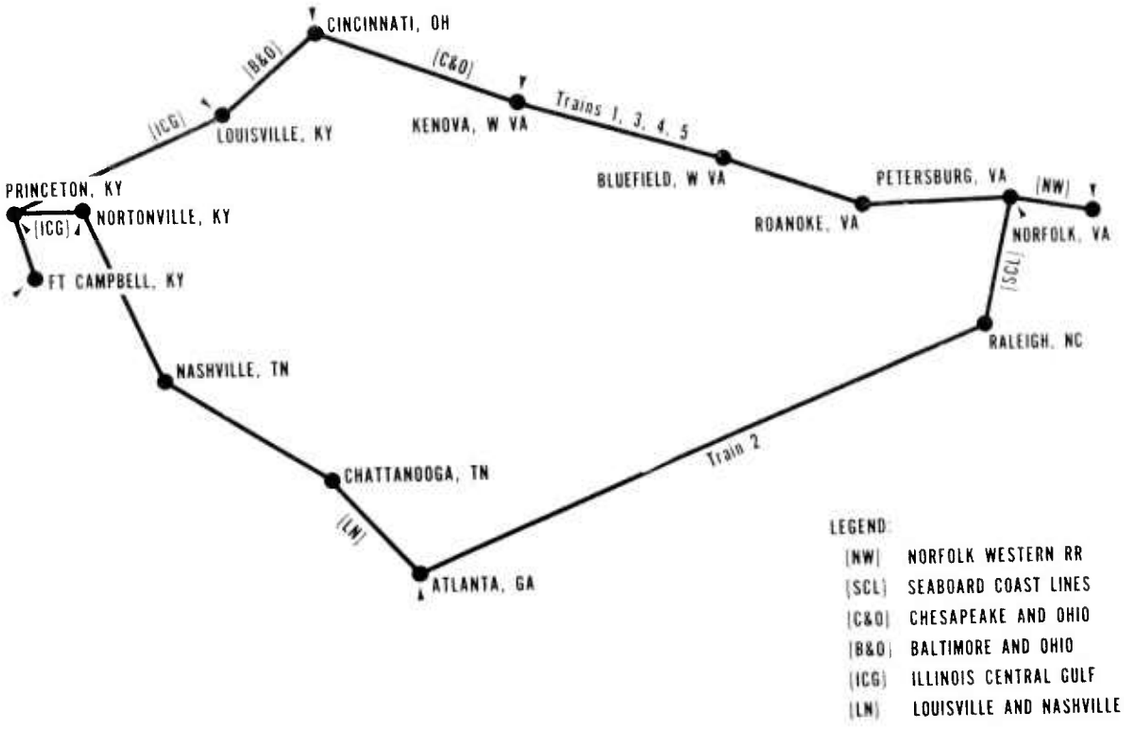

Figure 9-5. Redeployment Rail Routes.

3. Rail Operations.

a. Rail operations commenced 11 October and were completed 27 October 1976, when train number 5 was offloaded at Fort Campbell, KY. The five special trains used to move the 101st Airborne Division equipment from Norfolk, VA, to Fort Campbell, KY, arrived well within the scheduled transit times of 74:45 hours for trains 1, 3, 4, and 5, and 69:05 hours for train 2.

Train No.	Transit Time (Hours)
1	56:55
2	65:25
3	51:30
4	54:30
5	53:05

b. The CONUS rail redeployment required 219 DODX and 213 commercial cars. The DODX cars consisted of 43 chain tiedown, 172 heavy-duty flatcars, and 4 guard cars.

c. The lack of sufficient MILVAN chassis in good condition increased the requirement for COFC cars. Missing or broken MILVAN locking devices, lack of lights or brakes, broken landing gears, and numerous flat tires are examples of the maintenance problems associated with the MILVAN chassis. COSCOM maintenance teams, supplemented by a commercial contractor, attempted to complete repairs prior to the departure of trains, but were unable to do so.

d. MILVANs were drayed to the Portlock area, using both military and civilian tractors and drivers. M750 and M373 vans were drayed by military tractors.

e. The goal to load all railcars heavier than minimum weights was not achieved despite the attempts to mixload heavy and light equipment on the same railcar. This principle of mixloading was constrained primarily by the unavailability of a compatible equipment mix and by the necessity to homogeneously load relatively light equipment (105-mm howitzers) on DODX flatcars.

4. Summary.

a. The final phase of REFORGER 76 was well executed and reflected a high degree of professional competence on the part of all concerned.

b. Transportation planners should try to minimize the number of railcars loaded at less than minimum weights. However, the extra time and effort required to mixload rather than typeload railcars may counteract the potential benefits to be gained. This area requires further study.

SECTION X

PROBLEM AREAS

1. General. The preceding sections of this analysis present detailed discussions of the various phases of MTMC participation in REFORGER 76. Although the overall mission was accomplished satisfactorily, problems were encountered. Some of these problems were minor, and some were resolved on the spot. They are addressed in previous sections and are highlighted in each section's summary. There are, however, four major problem areas that warrant special attention. Each is identified and discussed separately in the remaining paragraphs of this section.

2. Cargo Documentation Procedures for Unit Moves. DOD Reg 4500.32R, MILSTAMP, requires certain special documentation for unit moves. These special procedures were not followed during REFORGER 76. Even if they had been followed, the requirement to attach a TCMD to each shipment unit (vehicle, MILVAN, etc.) would still exist. As each shipment unit moves through a port (staging areas and lifting aboard ship) TCMD copies are pulled and submitted to the documentation sections for the purpose of accounting, controlling, and billing. Use of the current documentation system for unit moves requires an excessive expenditure of time and manpower not only in TCMD preparation but in the distribution of TCMD copies each time cargo status changes. The myriad opportunities for documentation error under the current system during a large volume unit move reduces significantly the benefits derived. During REFORGER 76, mistakes made in documentation during deployment were perpetuated in the redeployment operation. When all equipment moves through the same SPOE, is transported on dedicated ships, and moves in isolation, there is no need for individual control and accountability for each shipment unit.

3. Untimely and Inaccurate Equipment DATA for Shiploading Planning. The principal problem in obtaining cargo movement data was the need to balance the 101st Airborne Division equipment requirements against the imposed space constraints (four vessels). COMPASS was used as the means to obtain equipment data. The initial data received was inaccurate, and valuable time was lost obtaining corrected data. Units made various changes in equipment lists and several different iterations of COMPASS data were required to obtain the final data for ship loading planning. Delays were encountered during each of the data processing stages since information was transmitted from the moving unit, through FORSCOM, to the transportation planner by courier rather than by electronic means.

4. Inadequate Terminal Organization for Large Unit Moves. The terminal organization at Norfolk during the deployment of the 101st Airborne Division was complicated, and the port responsibilities were not clearly defined. There were several Army units performing port support functions in addition to Navy port elements, but no single commander was officially designated to be in charge of the REFORGER terminal operation. This caused considerable difficulty in the planning, coordination, and execution of port operations. The terminal operators (NSC and MTMC) were dependent upon the 1st COSCOM and 101st Airborne Division elements for port support, with no operational control over their activities.

5. Inadequate Equipment for Loading and Deploying Aircraft. The requirements for adequate protective redi-covers for deck-loaded CH-47 and UH-1 helicopters and for skid-mounted helicopter positioning and loading devices were identified during the conceptual planning stages. One of the two recommendations in MTMC Report 75-6, An Analysis of Deployment of the 101st Airborne Division (Air Assault) to Europe, was to make this equipment available for the deployment. In the absence of a suitable positioning device for the deployment, the 101st Airborne Division developed one. It was inadequate; one was then developed by MTMC and used during redeployment. It was a significant improvement over the other devices but does have operating limitations. Suitable redi-covers for the UH-1 were provided by AVSCOM. However, the modified CH-47 redi-covers provided were not able to withstand the ocean voyage winds, and 31 of them were ripped and torn during the two ocean crossings.

SECTION XI

CONCLUSIONS AND RECOMMENDATIONS

1. Conclusions.

a. General. This report relates the mission of the Military Traffic Management Command to the discharge of its mission responsibilities in support of REFORGER 76 and evaluates the adequacy of its performance. At first glance it may appear that there were myriad planning and operational deficiencies in the deployment phase of the exercise. However, in the final analysis, the success or failure of a unit deployment must be measured in terms of delivery time in the operational theater and combat effectiveness upon arrival. The 101st Airborne Division (Air Assault) with supporting elements deployed from CONUS to Europe and redeployed from Europe to CONUS with 12,000 personnel and 85,000 MTON of equipment and supplies, including 348 helicopters, over 2,200 vehicles, and 263 MILVANs. It left home station on schedule, and met its theater-required delivery date with a minimum of equipment damage and with its aircraft operational within 24 hours of ship discharge. Its redeployment to CONUS was also effected on schedule with minimal equipment damage. By these standards the REFORGER 76 deployment/redeployment was a highly successful operation, and the plans and procedures on which it was based were proved to be effective. REFORGER 76 clearly demonstrated that the movement of large numbers of minimally disassembled helicopters on RORO ships is both feasible and practical.

b. Specific.

(1) Preliminary planning for unit oversea deployments should include onsite surveys of both the rail facilities of the outloading installation(s) and the SPOE and SPOD under consideration, as well as vessels to be employed (Section III).

(2) Efficient ship utilization in unit deployments is dependent on accurate and timely unit equipment movement data. The data base (COMPASS) from which this information is obtained must receive timely, updated unit equipment data inputs from the deploying units (Section IV).

(3) The complexities of a large unit oversea deployment require that the SPOE and SPOD perform many support functions not normally associated with terminal operations. These include the provision of billeting, messing, vehicle maintenance, air traffic control, administrative transportation, additional security, fire-fighting equipment, and general

troop support. The terminal organization and associated command relationships necessary to meet these port responsibilities are not clearly defined in existing publications (Section VIII).

(4) MILSTAMP documentation procedures prescribed by DOD Reg 4500.32R are too complicated for use with large unit moves and require an excessive and unnecessary expenditure of time and effort. Individual document control and accountability for each shipment unit is not necessary when a unit's equipment moves as a package, separated from commercial cargo, through single SPOE/SPOD and is transported on dedicated shipping (Sections VI and VIII).

(5) Deck-loaded aircraft require protective covers to guard against the corrosive effects of salt water. The redi-covers used for CH-54 and CH-47 helicopters were inadequate and suffered extensive damage from high winds on both the east and west Atlantic crossings (Section VIII).

(6) The various shipboard aircraft positioning devices, used during the REFORGER 76 pretest and the exercise deployment itself, were not entirely satisfactory. The requirement exists for an improved omnidirectional helicopter positioning device that can be easily installed and can negotiate deck obstructions such as D-rings, raised cloverleaves, and deck seams (Section VIII).

(7) The cargo vehicles of a unit deploying overseas should be used to the maximum to transport miscellaneous organizational equipment and accompanying supplies, in accordance with AR 220-10 and FORSCOM Reg 55-1. The use of vehicle cargo space will reduce the number of MILVANs and/or CONEX required, with a consequent saving in line-haul and port-handling costs. It will also permit maximum utilization of shipping space (Section VIII).

(8) Unit deployments are major military operations requiring careful planning, detailed coordination, and precise execution. The deploying unit required MTMC technical assistance both in preparing the necessary documentation for the movement and in the rail outloading of its equipment. Outloading operations would have been improved had the rail assistance teams been made available at least 30 days prior to the rail loadout. This would have permitted more detailed operational planning as well as more comprehensive classroom instruction with preliminary phases, followed by onsite "hands on" demonstrations (Section VI).

(9) Various planning, operational, and procedural problems have been identified throughout this report (Sections III through IX); the most

significant of these are discussed in Section X. Although not highlighted, the remainder deserve careful consideration to insure that insofar as possible these deficiencies are not repeated in future deployment exercises or operations.

2. Recommendations. It is recommended that:

a. Preliminary planning for unit oversea deployments include onsite surveys of the outloading installation(s), the SPOE and SPOD under consideration, and the vessels to be employed, time permitting.

b. The deploying unit provide accurate and timely unit cargo movement data during the planning phases and that cutoff dates be established beyond which equipment list changes will not be permitted.

c. A flexible, tailored port organization under a MTMC port commander be established to handle water terminal operations during unit surface deployments. Such an organization will be responsible for cargo receipt, segregation, staging, loading aboard ship, and all port support functions and will include MTMC terminal/outport personnel as well as TRADOC/FORSCOM/host nation port support units. The organization must be responsible to the MTMC port commander and discharge its functions under his operational control.

d. A manual TCMD listing or card deck be prepared for the moving unit's equipment as prescribed by DOD Reg 4500.32R and as outlined in FM 55-61 and FM 55-65. These documents should be aggregately controlled and processed as the unit's equipment moves through the transportation system instead of attaching an individual TCMD on each shipment unit (vehicle, MILVAN, etc.). REFORGER 77 documentation activities should be closely observed to identify those procedures that could be omitted or modified to streamline the current MILSTAMP requirements.

e. The redi-cover used for CH-54 and CH-47 aircraft be redesigned to eliminate the deficiencies noted in REFORGER 76.

f. An improved helicopter positioning device be developed for use on shipboard and possibly on cargo aircraft. Improvement of the MTMC device employed in the REFORGER redeployment should be pursued as a means to this end.

g. All units deploying by surface means utilize cargo-carrying vehicles for military impedimenta and accompanying supplies to the maximum extent (AR 220-10, FORSCOM Reg 55-1).

h. MTMC make rail outloading and documentation technical assistance teams available to the outloading installation(s) for initial operational planning, classroom instruction, and practice loading at least 90 days prior to the loadout, with the final 30 days devoted to final detailed planning.

i. The various planning, operational, and procedural problems identified in this report (Sections III through IX) be noted and corrective action taken in future deployment exercises and operations.

APPENDIX A

SUMMARY OF MTMC REPORT 75-6

1. Conduct of the Analysis. The analysis was conducted by the MTMC Transportation Engineering Agency (MTMCTEA) under the monitorship of the Directorate of Plans and Operations, HQ, MTMC. The final study report was completed and issued as MTMC Report 75-6, An Analysis of Deployment of the 101st Airborne Division (Air Assault) to Europe, dated February 1975.

2. Assumptions. Certain key assumptions were required for the analysis. These were as follows:

a. The exercise would be conducted in a peacetime environment.

b. The outloading capabilities of Fort Campbell, KY, and the selected APOE/SPOE were considered adequate.

c. The oversea port, Bremerhaven, was also considered to possess adequate cargo-handling capability.

d. The movement requirements were those of the division as it was configured in January 1975 and reported in FORSCOM COMPASS unit movement data file.

e. Aircraft assets and planning factors used were contained in Annex J of the Joint Strategic Capabilities Plan, Fiscal Year 1975 (JSCP FY75). Neither the Civil Reserve Air Fleet (CRAF) nor C-130 aircraft were used.

f. Sealift assets were those US flag ships contained in the then current MSC Ship Register. Availability of these ships was determined by MSC.

3. Options. As mentioned previously, an all-airlift option and combinations of air and sealift options were examined. They are identified and highlighted below.

a. All-airlift Option 1. The division could be airlifted using C-141 and C-5 aircraft and be operational in 21 days at an estimated cost of $71.4 million based on peacetime planning factors and FY 75 dollars.

b. Combination of Airlift (troops only) and Sealift. With helicopter transportability of primary concern, several combinations of vessels for the movement of the division equipment were considered.

(1) Option 2:

C9 Lighter aboard ship (LASH)	- 220 helicopters plus vehicles
C8 LASH	- 188 helicopters plus vehicles
RORO (Callaghan)	- vehicles
C6 Containership	- vehicles plus equipment
135 C-141A (or equivalent)	- troops

(2) Option 2A: Substituted two C4 break-bulk ships for the containership.

(3) Option 3:

C9 LASH	- 390 helicopters
Seatrain	- 18 CH-47 helicopters plus vehicles
RORO (Callaghan)	- vehicles
SL-18 Containership	- vehicles plus equipment
135 C-141A (or equivalent)	- troops

(4) Option 3A: Substituted two C4 break-bulk ships for the containership.

(5) Option 4:

C9 LASH	- 390 helicopters
RORO (Callaghan)	- 18 CH-47 helicopters plus vehicles
2 C4 Break-bulk ships	- vehicles plus equipment
135 C-141 (or equivalent)	- troops

(6) Option 4A: Substituted a SL-7 containership for the two break-bulk ships.

(7) Option 5:

C9 LASH	- 390 helicopters
RORO (Callaghan)	- vehicles
2 C4 Break-bulk ships	- vehicles plus equipment
6 C-5A	- 18 CH-47 helicopters plus troops
131 C-141A (or equivalent)	- troops

(8) Option 5A: Substituted an SL-18 containership for the two break-bulk ships.

(9) Option 6:

RORO (Callaghan)	- 317 helicopters plus vehicles
RORO (Comet)	- 91 helicopters plus vehicles
RORO (Meteor)	- vehicles plus equipment
2 C4 Break-bulk ships	- vehicles plus equipment
135 C-141A (or equivalent)	- troops

4. Seaports of Embarkation (SPOE) Selection:

a. The SPOE of Baltimore, Hampton Roads, Charleston, Jacksonville, Mobile, and Beaumont were selected for costing. Baltimore was dropped from consideration because it lacked a suitable open area to stage helicopters. Options 3 and 5A were eliminated because of SL-18 containership nonavailability, and Option 5 was not costed because its ship requirements were identical with Option 4.

b. The results of the basic cost analysis that was conducted are shown in Table A-1.

TABLE A-1
TOTAL DIVISION DEPLOYMENT COST BY OPTION AND PORT
(MILLIONS OF DOLLARS)

Option	Hampton Rds, VA	Charleston, SC	Jacksonville, FL	Mobile, AL	Beaumont, TX
2	19.34(3)*	19.10(1)	19.21(2)	19.55(4)	20.09(5)
2A	19.52(1)	19.55(2)	19.65(3)	19.88(4)	20.56(5)
3A	19.46(2)	19.45(1)	19.54(3)	19.57(4)	20.31(5)
4	18.77(2)	18.75(1)	18.85(3)	19.00(4)	19.63(5)
4A	20.24(4)	19.60(1)	19.88(2)	20.13(3)	20.62(5)
6	17.50(2)	17.43(1)	17.53(3)	17.57(4)	18.23(5)

*Ports ranked by option.

c. Option 6 was determined to be the least-cost option using given cost estimates, and Hampton Roads was found to be optimal from a combination cost and facility standpoint. Charleston was the least-cost port, but was eliminated by the study analysts because it lacked a RORO berth, had limited helicopter staging areas, and had a limited daily railcar unloading capability.

5. Final Sealift Options: A more detailed cost analysis was conducted on redesignated options based on MSC-projected ship availability. Mobile was considered as a secondary port for the break-bulk vessels, with the other ships sailing from Hampton Roads. Table A-2 shows the final sealift options and their respective deployment times and costs.

TABLE A-2
FINAL DIVISION OPTIONS

OPTION	SHIPS	SPOE	DAYS TO DEPLOY	COST (MILLIONS OF DOLLARS)
D-1	3 RORO 2 C4 Break-bulk	Hampton Roads, VA	19.0	18.1
D-1A	3 RORO 2 C4 Break-bulk	Hampton Roads & Mobile, AL	21.5	18.2
D-2	C9 LASH, 3 RORO	Hampton Roads	17.75	18.2
D-3	C9 LASH, 3 RORO C4 Break-bulk	Hampton Roads	19.0	19.1
D-3A	C9 LASH, 3 RORO C4 Break-bulk	Hampton Roads & Mobile, AL	21.5	19.2

Note: Troops are airlifted.

6. Option Comparisons. The all-airlift option, estimated to cost $71.4 million with a deployment time of 21 days, was eliminated when compared with the cost of combination air and sealift options. Option D-2 provides the least-time sea deployment, while Option D-1 is the least costly. The options using LASH vessels were eliminated because of the nonavailability of LASH ships for an exercise deployment. This process of elimination caused Option D-1 to be selected as the best option relative to dollar cost, deployment time, and ship availability.

7. Brigade Deployment. One objective of the 101st Airborne Division deployment analysis was to analyze separately the deployment of a brigade from that division. An analysis similar to the one for the entire division was conducted. The optimal brigade deployment, from a least-cost, least-time, and ship-availability standpoint, was to use the RORO Callaghan sailing from Hampton Roads, VA, for equipment and C-141 aircraft for personnel.

8. Conclusions of the Basic Study. Airlift/Sealift deployment is competitive with airlift deployment of either the entire 101st Airborne Division (Air Assault) or only a brigade of that division. Specific conclusions using peace-time planning factors were:

a. Airlift deployment could be accomplished in 21 days at a cost of approximately $71.5 million.

b. An optimal airlift/sealift deployment could be accomplished in 19 days at a cost of $18.1 million.

c. Use of the following US Army Aviation Systems Command (AVSCOM) equipment would reduce significantly the man-hours and cost of helicopter preparation and loading for deployment:

(1) Protective redi-covers for CH-47 and UH-1H helicopters.

(2) Hoisting eyes for a minimum of 50 percent of the CH-47 helicopters to be loaded.

(3) A minimum of 15 positioning and loading devices for skid-mounted helicopters.

9. Recommendations of the Basic Study. If an exercise deploying the 101st Airborne Division (Air Assault) or a brigade were chosen, it should be accomplished by the optimal airlift/sealift options identified, and the AVSCOM equipment listed in paragraph 8c above should be used to prepare and load deploying helicopters.

APPENDIX B

HELICOPTER TRANSPORTABILITY TESTS (HELTOT)

1. General. HELTOT was divided into two phases. Phase I was designed to evaluate the conceptual loadings of the OH-58, UH-1, AH-1, and CH-47 helicopters in a LASH lighter and was completed at Paducah, KY, in October 1975. Phase II verified the conceptual loadings of the CH-47 and UH-1 helicopters in the lower deck of a Sea Barge (SEABEE) ship and was successfully completed in February 1976 at Galveston, Texas. The LASH lighter was selected for barge-load testing because it is smaller and more restrictive than the larger SEABEE barge.

2. Phase I, HELTOT (LASH).

a. The LASH system has two components: a mother ship and a family of barges. LASH lighters are loaded aboard the mother ship at the stern by a 500-ton traveling gantry crane and are stacked vertically in cells similar to those of a containership.

b. Phase I HELTOT demonstrated that all the helicopters in an air-mobile division can be loaded and unloaded at an unprepared river bank, using a mobile crane. All helicopters were loaded in a minimum disassembly configuration. Minimum disassembly was as follows:

(1) AH-1, removal of main rotor blade assembly, wings, and synchronized elevators.

(2) UH-1, removal of main rotor blade assembly, synchronized elevators, and FM antenna.

(3) OH-58, removal of the main rotor blade assembly on one helicopter and the horizontal stabilizer on another helicopter. No disassembly on the remaining six helicopters.

(4) CH-47, removal or folding of the main rotor blades.

c. Eight OH-58, eight AH-1, six UH-1, and two CH-47 helicopters were sequentially loaded in the LASH lighter (Figures B-1 through B-4).

d. An 8-foot section from one end of the lighter was removed to accommodate the CH-47 helicopters. The cut-out section can be easily stored and secured under the nose of the two CH-47 helicopters. The removal of the 8-foot section does not weaken the structural integrity of the lighter, and is easily welded back into place at any time. Lighters

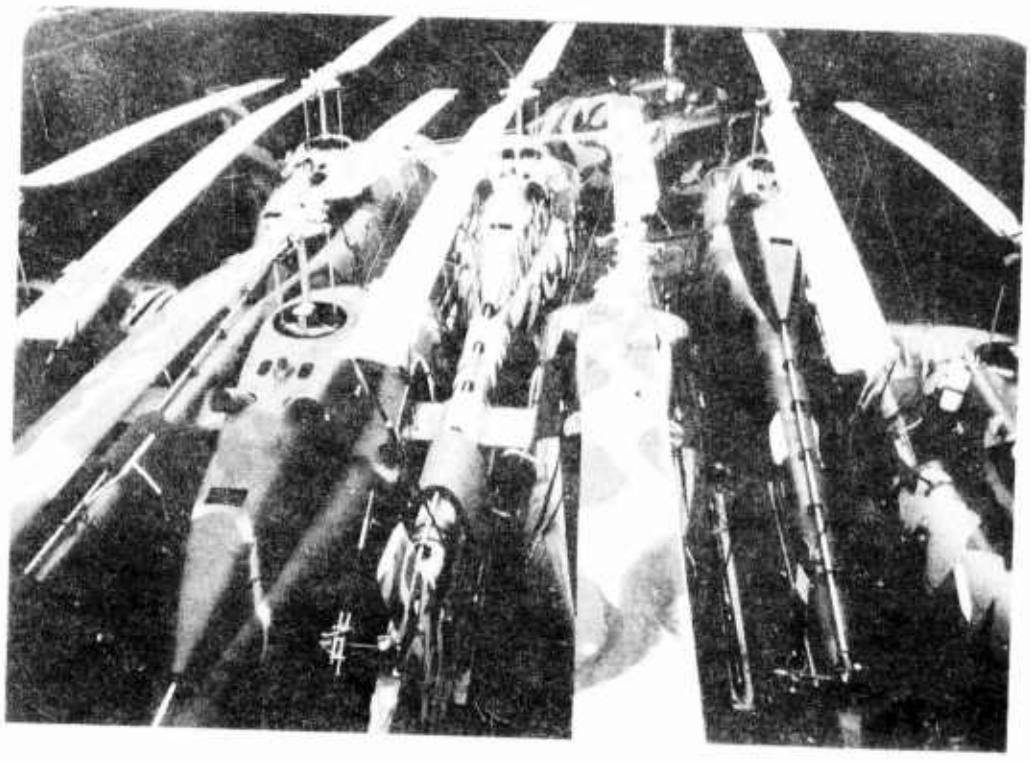

Figure B-1. OH-58 Helicopters in a LASH Lighter.

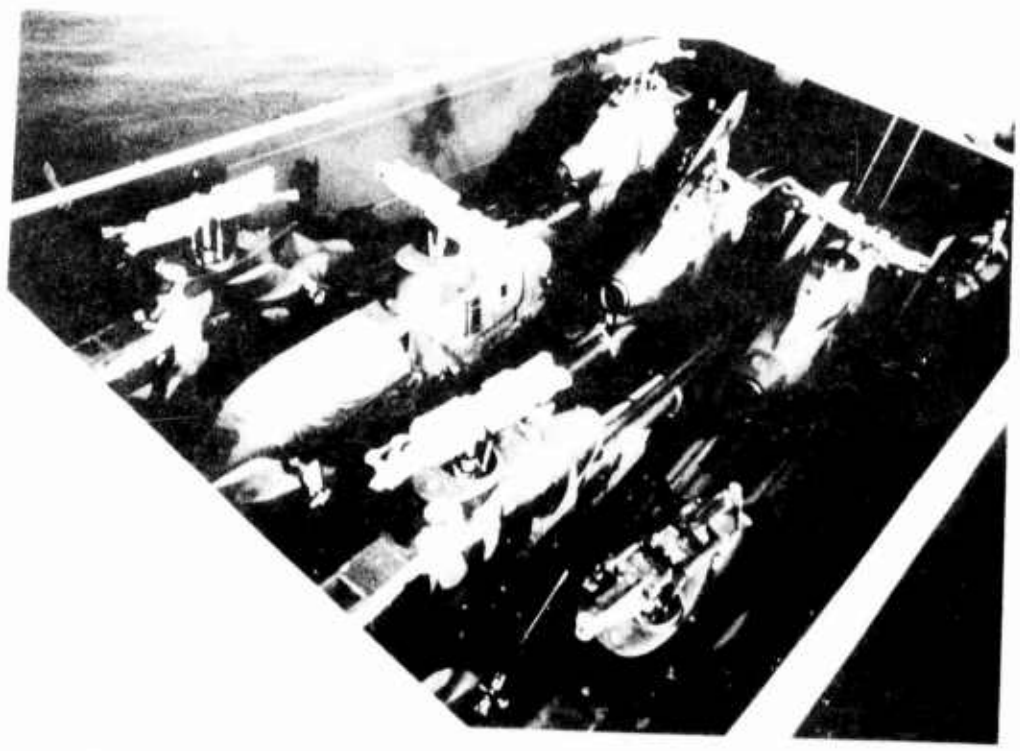

Figure B-2. AH-1 Helicopters in a LASH Lighter.

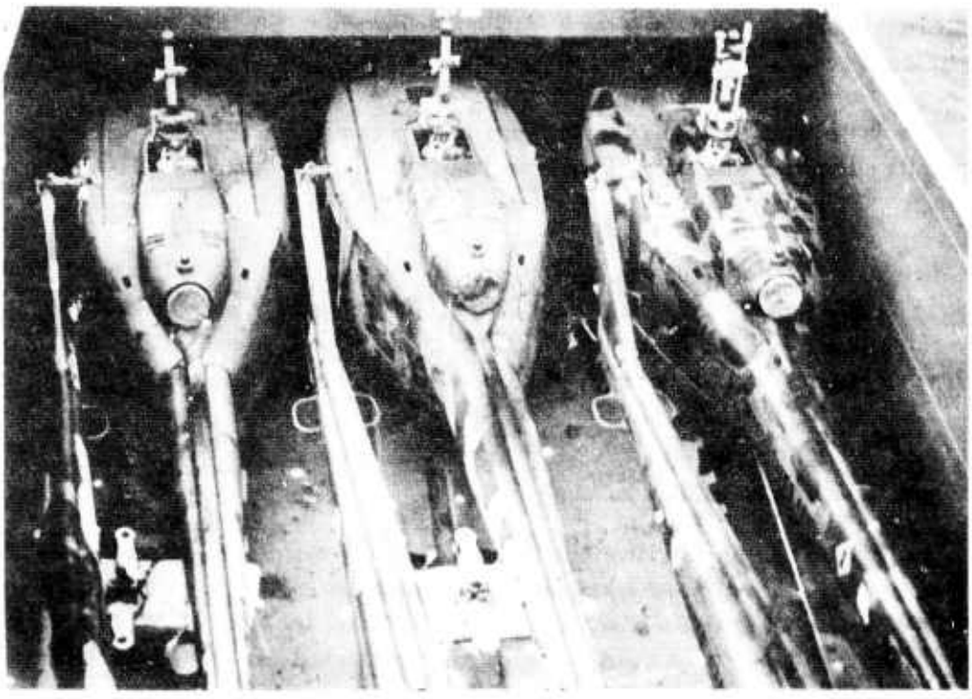

Figure B-3. UH-1 Helicopters in a LASH Lighter.

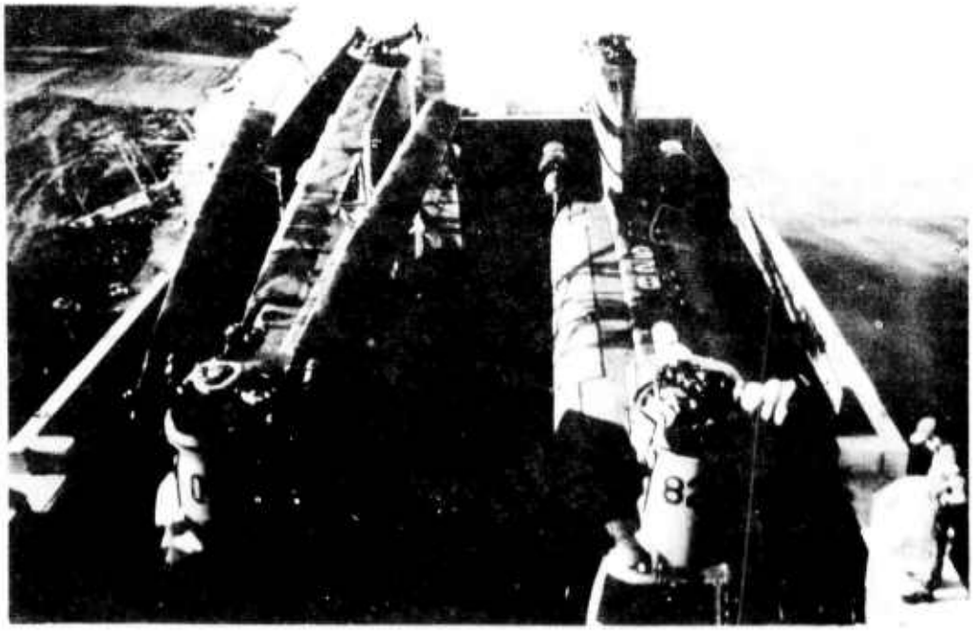

Figure B-4. CH-47 Helicopters in a LASH Lighter.

loaded with CH-47s cannot be stacked. This causes the loss of at least one lighter for every lighter loaded with two CH-47 helicopters.

e. The fabrication and installation of spacers for the lifting posts will be required when stacking lighters loaded with AH-1 and UH-1 helicopters.

f. The use of the techniques proven in Phase I HELTOT would require 2 LASH ships to transport the 422 helicopters of the airmobile division. Helicopters would require 103 lighters and, depending on ship configuration, 43 to 75 lighters would be available for other equipment and supplies.

3. Phase II, HELTOT (SEABEE).

a. The SEABEE ship, like the LASH, has two major components, a mother ship and a family of barges. A maximum of 38 barges are stowed horizontally on 3 decks after they are lifted aboard by a 2,000-ton stern elevator. Up to 160 40-foot containers can be loaded on top of 10 barges on the upper deck.

b. Phase II involved testing the feasibility of transporting minimally disassembled CH-47 and flyable UH-1 helicopters on the lower deck of the SEABEE ship. Minimum CH-47 disassembly consisted of folding the main rotor blade assembly.

c. The entire Assault Support Helicopter Battalion, consisting of 48 CH-47 helicopters, can be stowed in the lower deck in lieu of 12 barges. Additionally, 48 flyable UH-1 or AH-1 helicopters can be stowed between the columns of CH-47's (Figure B-5).

d. Three methods of loading were successfully tested.

(1) Roll-on/Roll-off

(2) Lift-on/Lift-off

(3) Fly-on/Fly-off

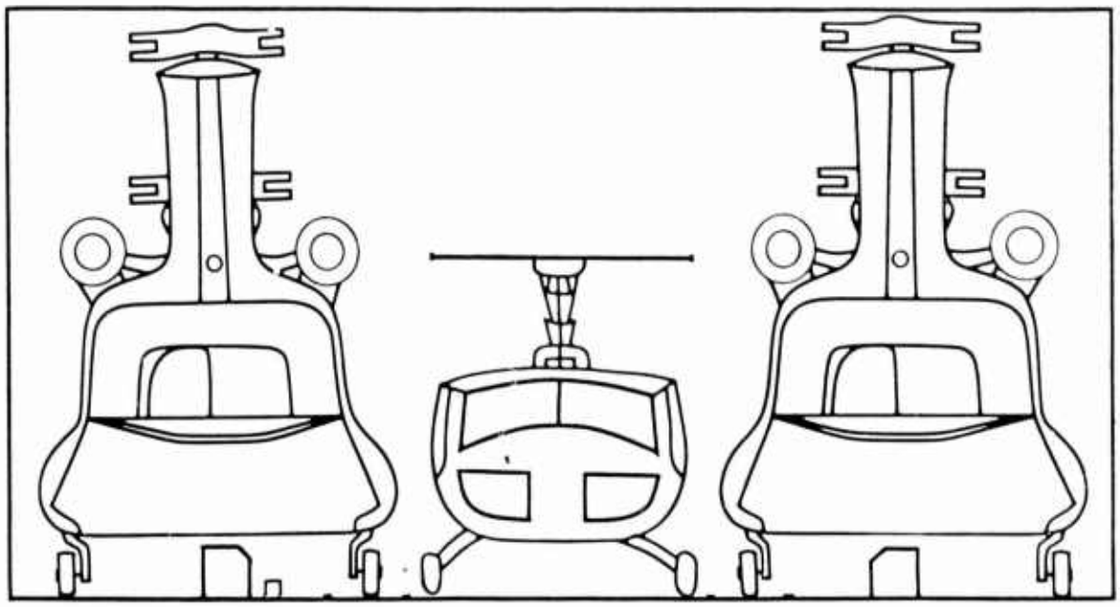

Figure B-5. Conceptual Loading Configuration in Lower Deck of Seabee Ship.

4. Tiedowns: LASH, SEABEE. Aircraft can be secured to the deck of both the LASH lighter and SEABEE barge by installing tiedown fittings or using a floating block and brace system. The installation of tiedowns would be required on the lower deck of the SEABEE ship and when transporting the CH-47 in the LASH lighter. Transporting the CH-47 in the SEABEE barge is not considered feasible, since a SEABEE barge loaded with the CH-47 helicopter must be top deck loaded with covers removed.

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This study is an analysis of the Military Traffic Management Command (MTMC) participation in the Return of Forces to Germany (REFORGER) 76 Exercise. It is designed to provide a documentary narrative of the exercise deployment and redeployment phases and an evaluation of the MTMC performance in the discharge of its REFORGER mission. Although problem areas in planning and execution are identified and corrective actions recommended, the deployment and redeployment of the 101st Airborne Division (Air Assault) was a highly successful
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