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Transport Quartermaster Manual

Instructors Reading this Document

Name ____ Date ____

DIAGRAM of LSD
DOCK DECK

SYMBOLS FOR SURVEYING

ELEMENTS OF A TYPICAL AMPHIBIOUS FORCE

TASK FORCE
TASK GROUP
TASK GROUP
NAVAL FORCE
RECONNAISSANCE GROUP
LANDING FORCE
ATTACHED TROOPS
DIVISION
REGIMENTAL COMBAT TEAM

DIAGRAM of LSD
DOCK DECK

A TYPICAL DRAWING SHOWING MET

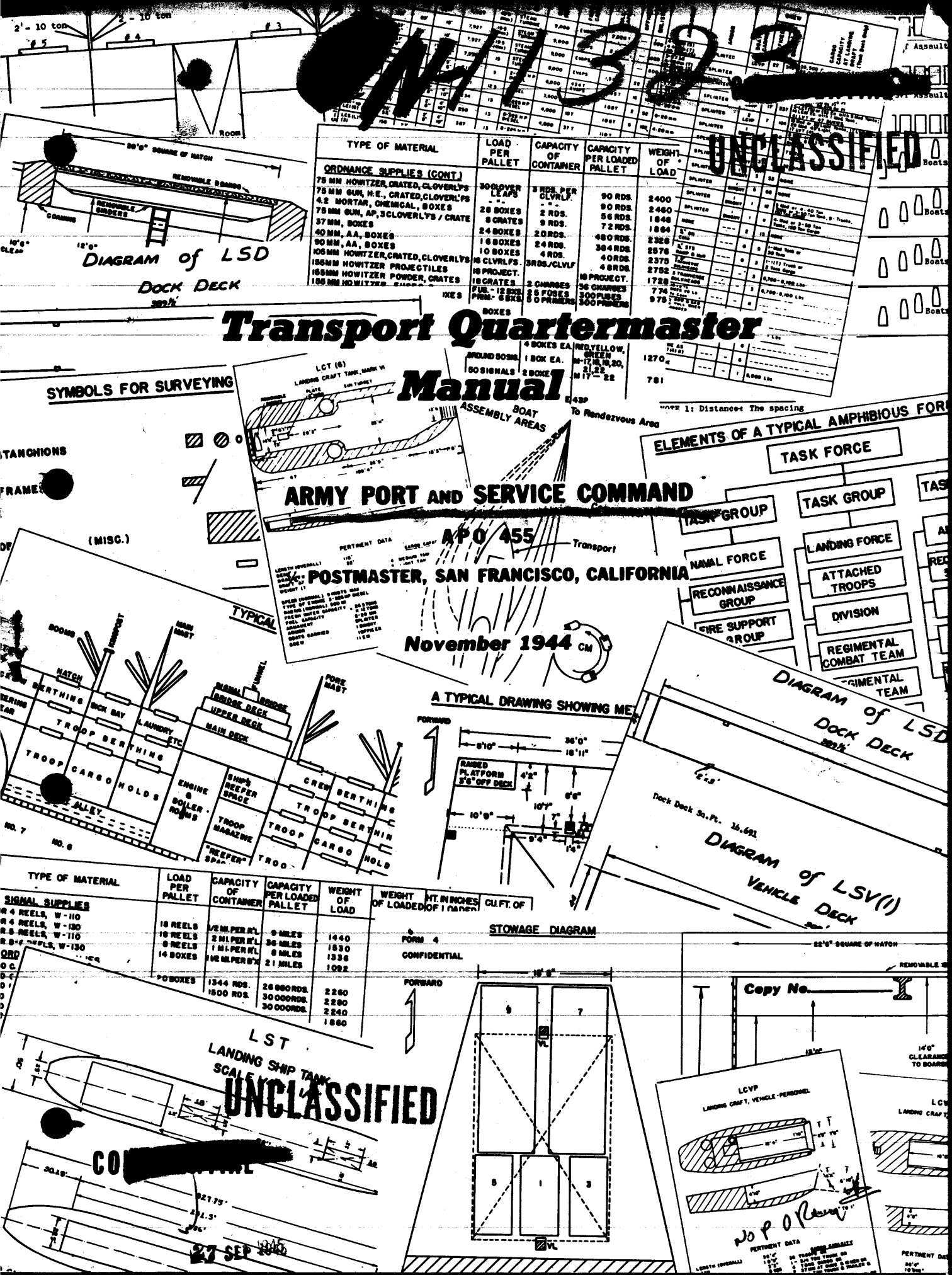
DIAGRAM of LSV(1)
VEHICLE DECK

STOWAGE DIAGRAM

FORM 4
CONFIDENTIAL

LST
LANDING SHIP TANK
SCALE 1/4" = 1' 1/4"

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Transport Quartermaster
Manual
ARMY PORT AND SERVICE COMMAND
APO 455
POSTMASTER, SAN FRANCISCO, CALIFORNIA
November 1944 CM
DIAGRAM of LSD
DOCK DECK
DIAGRAM of LSV(1)
VEHICLE DECK
ELEMENTS OF A TYPICAL AMPHIBIOUS FORCE
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LANDING CRAFT, VEHICLE - PERSONEL
27 SEP

FOREWORD

The Transport Quartermaster Manual is intended:

1. As a guide for the instruction of personnel.
2. To provide a ready reference to pertinent data contained in numerous publications.
3. To develop and prescribe uniform methods of procedure.
4. To make for mutual understanding, closer cooperation and increased efficiency.

This Manual is based upon the basic principles laid down in the Landing Operation Doctrine, U. S. Navy, (FTP 167), the Ship to Shore Movement (FTP 211), the Transport Doctrine, Amphibious Forces, U. S. Pacific Fleet, and the results of experiences and experimentations by Army and Marine Divisions, and the various Amphibious Training Centers in this area.

Recommendations for the revision of, or addition to, any portion of this publication are solicited.

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TABLE OF CONTENTS

INTRODUCTION

CHAPTER I ORGANIZATION OF AN AMPHIBIOUS TASK FORCE

CHAPTER II NAVAL DATA OF INTEREST TO A TQM

Section 1. Naval Customs and Terminology.
Section 2. Nomenclature and Symbols of Naval Ships.
Section 3. Organization of U. S. Naval Vessels.

CHAPTER III CHARACTERISTICS OF LANDING CRAFT

CHAPTER IV THE TRANSPORT QUARTERMASTER

Section 1. General.
Section 2. The Ship TQM.
Section 3. The Troop TQM.

CHAPTER V PREPARATION OF LOADING FORMS

CHAPTER VI COMBAT UNIT LOADING

Section 1. General.
Section 2. Arrangements Prior to Embarkation.
Section 3. Loading.
Section 4. Unloading.
Section 5. Reembarkation.
Section 6. Troop TQM Check List.
Section 7. The Shore Party.

CHAPTER VII GARRISON FORCE LOADING

Section 1. General.
Section 2. Loading.
Section 3. Unloading.

CHAPTER VIII PREPARATION AND MOVEMENT OF CARGO

Section 1. Palletizing Area.
Section 2. Palletizing.
Section 3. Packing and Crating.
Section 4. The Regulating Point.
Section 5. Pier Stowage.

CHAPTER IX LANDING SHIPS

Section 1. Landing Ship Dock (LSD).
Section 2. Landing Ship Tank (LST).
Section 3. Landing Ship Vehicle (LSV).
Section 4. Landing Ship Medium (LSM).

LIST OF ILLUSTRATIONS

SUBJECT	CHAPTER	SECTION	PAGE
Elements of a Typical Amphibious Force	I		2
Organization of a Transport Squadron	I		4
Composition—Battalion Landing Team	I		13
Wave Elements—Battalion Landing Team	I		13
The Landing Boat Assignment Table	I		15
LVT and DUKW Assignment Table	I		15
Landing Diagram	I		18
Typical APA	II	3	5
Typical AKA	II	3	6
Characteristics of Landing Craft	III		6
Landing Craft, Vehicle	III		7
Landing Craft, Vehicle-Personnel	III		7
Landing Craft, Mechanized	III		8
Landing Craft, Tank, Mark V	III		8
Landing Craft, Tank, Mark VI	III		9
Landing Vehicle, Track, Mark IV	III		9
Amphibious Truck, 2½ Ton	III		10
Boat Loading Table	III		10
Load Capacity of Landing Craft	III		10
TQM Organization	IV	3	4
Unit Personnel and Tonnage Table	V		8, 9
Cargo and Loading Analysis	V		10
Vehicle Debarkation Priority Table	V		11
Stowage Diagram	V		12
Consolidated Embarkation and Tonnage Table	V		13
Profile Loading Plan	V		14
Consolidated Vehicle Table	V		15
Landing Force Embarkation and Tonnage Table	V		16
Cargo Manifest	V		17
Symbols for Surveying	VI	2	3
Typical Drawing Showing Method of Surveying	VI	2	4
Cross Section of A Hold Section Compartment Looking Forward	VI	2	5
Cross Section of A Hold Section Compartment Looking Port Side	VI	2	5
Landing Boat Assembly Areas	VI	4	6
Landing Boats in the Transport Area	VI	4	7
Transfer Operations	VI	4	10
Movement of Landing Boat Waves From Line of Departure to Beach	VI	4	13
LVT and DUKW Waves at Line of Departure	VI	4	14
Movement of Assault Waves From Line of Departure to Beach	VI	4	15
Flo of Material and Control of Supplies—Transshipment Yard	VIII	1	5
Pallet Loads	VIII	2	6, 7, 8, 9
Landing Ship, Dock	IX	1	2
Landing Ship, Tank	IX	2	3
Landing Ship, Vehicle	IX	1	2

INTRODUCTION

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THE WAR of 1914-1918 was fought on a battle line approximately 600 miles long, extending through Belgium and France. After the entry of the United States in the war, the furnishing of troops and supplies to this battle line had as its most difficult problem the menace of submarines. It was possible to bring ships to the various ports and unload them with no danger of air attacks and it was also possible to transport troops and equipment from the debarkation areas to the battle positions with relative safety from any form of attack.

In the present war the problem is entirely different. Our battle lines cover a very substantial part of the globe from the standpoint of area. The greater part of enemy territory against which an attack may be launched is surrounded either by neutral countries or water. Our enemy in the Pacific Theater is spread out over thousands of islands reasonably secure on all sides because we must approach him by water. We cannot expect to unload our ships carrying men and their equipment and supplies in any port in enemy held territory, rather we must unload on the relatively insecure beaches. At such time as we do approach his positions for the purpose of engaging in combat, it is necessary that we have all the men in one force so that we may close with him and carry through the operation successfully. This problem of bringing the armed forces of this country and allied countries into contact with the enemy has necessitated the formation of an Amphibious Force.

The requirements in the assembling of troops and materiel, and shipping which must carry them for even a simple operation, should convince anyone of the intricate nature of the problem. The ships which carry the troops to the point of operation must be organized in their manner of loading to such an extent that when the troops debark, they will have with them all the equipment needed to execute the assault.

Troops engaged in amphibious operations are carried to the general vicinity of the point of attack in large transports which have been designed or remodeled to suit the particular purpose of carrying combat troops and their equipment. A portion of the supplies needed for the operation is loaded on the transport with the troops, and the balance is brought on cargo vessels which are equipped with high speed cargo handling gear and as many landing craft as can be carried. All of these ships, both the transports and the cargo vessels, are assembled in groups and moved to an area close to the point at which the troops are to be debarked. As this point is usually eight to twelve miles off-shore, it is necessary that the troops and their initial supplies be moved to the beach by means of landing craft and amphibious vehicles. The necessity for debarking the troops in a definite order, and for giving them a continuous flow of ammunition, water, rations, and gasoline requires a great deal of prior planning. For this purpose a Troop Transport Quartermaster (TQM) is assigned to each cargo or transport vessel. It is his

function to properly load the ship so that personnel and materiel can be unloaded according to established priorities. His task is not a simple one. He must be familiar with the tactical plan and must know the organization and equipment of the units which he is to load aboard the ship.

Any well ordered course in military tactics invariably includes instruction in a subject termed "terrain appreciation." This subject pertains to the art of recognizing aids and avoiding pitfalls in the medium in which combat takes place. It applies equally to the infantryman, the artilleryman, and to the TQM. Transport loading is not a course in military tactics, but rather an application of the principle of "terrain appreciation" to the medium in which the TQM works; namely, transport ships. The facility with which all of the favorable characteristics of the ship are utilized is a direct measure of the TQM's ability. Each ship differs from every other ship, just as each bit of terrain differs from adjacent sections, and each vessel requires individual study and examination.

The objective of an amphibious operation is the successful transportation of troops and their equipment over water to a position on the beach from which they may most advantageously overcome the enemy, and the continuing support of those troops, by reinforcements and supplies. The amphibious operation can be won only by the execution of a successful landing and the continued support of the landing forces. However, it can be jeopardized before the expedition sails. It can be lost by ineffective or improper loading. Each operation differs from every other operation. Likewise, task forces will never be identical. It is also true that equipment and supplies will never be alike. The priority in which materiel is required on the beach will vary with the mission. All of these factors operate to make the transport loading task one which involves individual study for proper execution, rather than adherence to a doctrine.

CHAPTER I

ORGANIZATION OF AN AMPHIBIOUS FORCE

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Composition of Amphibious Forces

The Amphibious Forces, U. S. Pacific Fleet, consist of:

1. Transports—Assault (APA)
2. Cargo Vessels—Assault (AKA)
3. Transports (AP)
4. Cargo Vessels (AK)
5. Civilian manned Transports (XAP) and Cargo Vessels (XAK)
6. Landing Ship Dock (LSD)
7. Landing Ship Vehicle (LSV)
8. Landing Ship Tank (LST)
9. Patrol and Special Craft (PCS, SC, LCC)
10. Landing Craft (LSM, LCI(L), LCI(G), LCT(5), LCT(6))
11. Landing Boats
12. Training Commands
13. Amphibious operating, repair, and training bases.

Functions of The Amphibious Forces

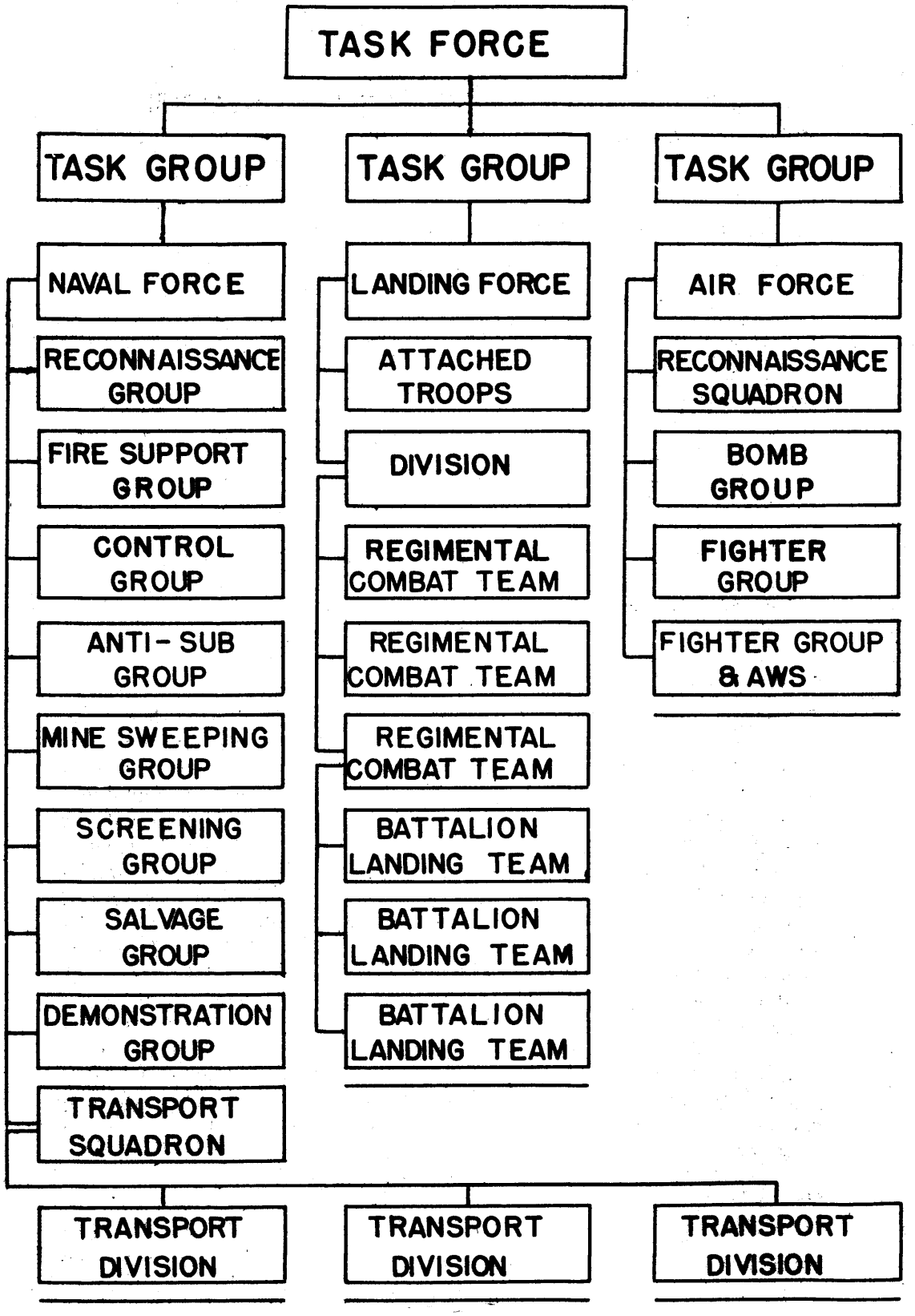
The Amphibious Forces are designed to undertake simultaneously several coordinated amphibious operations. They provide a single superior troop command which is charged with the responsibility for the continuity of planning and training, improvement of technique, and operations of amphibious troops employed in the sweep across the Pacific. They also provide an Amphibious Air Commander for Planning and control of the employment of air units and air liaison parties involved in the direct support of an amphibious operation, and for coordinating the organization of aviation ground elements to be assigned to captured bases. The Amphibious Force provides for continuous planning for amphibious operations of Naval Forces in harmony with the intentions of the high command, and in collaboration with similar planning agencies attached to the command of amphibious troops.

Although the transports and other classes of vessels of the Amphibious Forces are auxiliary types, their operations take them into the Navy's front lines and into action with the enemy, at least as often as other classes of vessels. Therefore, in the truest sense of the word, vessels of the Amphibious Forces are COMBAT SHIPS. TROOPS, instead of guns and torpedoes, are their PRINCIPAL WEAPONS.

Organization

Elements from all branches of service—Army, Navy, and Air Force (Army & Navy)—constitute an Amphibious Task Force. These homogeneous elements, organized initially as tactical units with similar missions, are

ELEMENTS OF A TYPICAL AMPHIBIOUS FORCE



called Task Groups and are directly under the control of the Task Force Commander. Examples of Task Groups forming an Amphibious Task Force are: Army Corps or Army, Navy Covering Group, Navy Transport Squadron, Navy Carrier Group and Army Tactical Air Force.

Naval Attack Force

Prior to the assault, these Task Groups are reorganized into several Naval Attack Forces. The time of this reorganization will depend upon the tactical situation and the dispersion of landing points. Direct control over the Forces is released to the Naval Attack Force Commanders, who in turn will be responsible to the Amphibious Task Force Commander. A Naval Attack Force can be sub-divided into its component parts—Army, or Landing Force, Naval Force and Air Force.

Naval Force

The Naval Force component is sub-divided into various groups, depending upon their specific missions. In normal operations these groups are the Reconnaissance group, a Fire Support group, the Control group, the Demonstration group, the Anti-Submarine group and the Transport Squadron. The Transport Squadron is normally broken down into three Transport Divisions. Each of the three Transport Divisions consists of five APAs and two AKAs and is capable of transporting a reinforced regiment. An AP and an AK may be substituted for an APA and an AKA respectively.

Landing Force

The Army component, or Landing Force, consists of one reinforced Infantry Division which has been specially trained for amphibious operation. This division is sub-divided into three Regimental Combat Teams and a Division Headquarters, each of which is loaded on a Transport Division. A Regimental Combat Team consists of three reinforced Battalion Landing Teams, a Regimental Headquarters, and attached troops all loaded aboard five APAs with miscellaneous heavy equipment aboard two AKAs.

Air Force

The Air component contains the number and type of aircraft necessary for protection and support of the operation. Basically these aircraft are used for reconnaissance, fire protection and bombing missions.

Responsibilities of Landing And Naval Forces

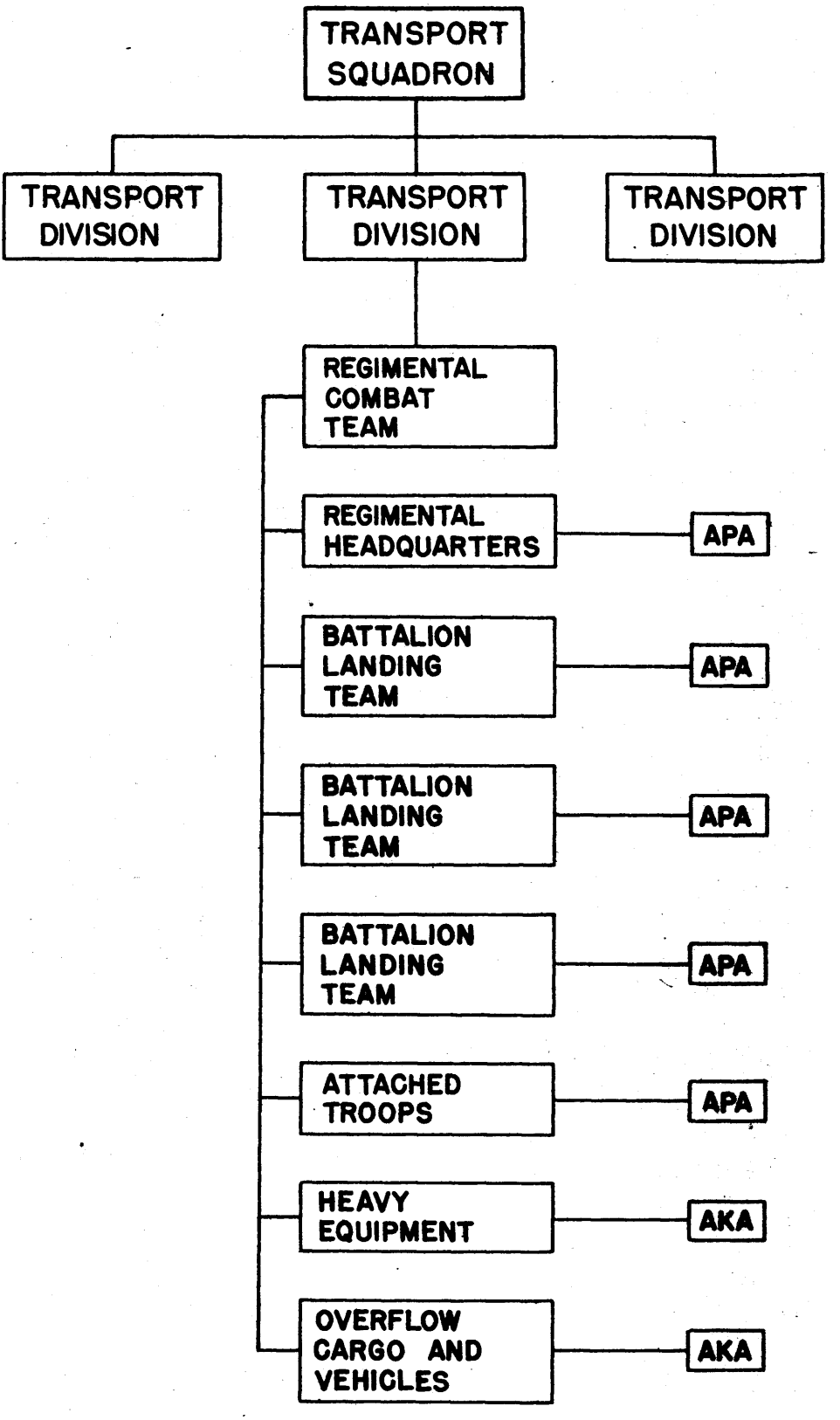
The responsibilities of the Landing Force are as follows:

1. Provide troops and equipment for reconnaissance of the beaches.
2. Provide troops for firing the guns of the boats.
3. Provide troops for all operations ashore.

The responsibilities of the Naval Force are as follows:

1. Reconnaissance (Air, Submarine, Rubber Boats).
2. Provide transports.
3. Provide close protection from sea and air attack.
4. Transport the Landing Forces to the beaches (remove under water obstacles).
5. Communications—ship-to-shore.

ORGANIZATION OF A TRANSPORT SQUADRON



Control Group

The functions of the Control group are as follows:

1. Establish the Traffic Control Station.
2. Dispatch and regulate the movement of loaded landing boats and amphibian vehicles to the beach.
3. Carry out salvage operations to clear the approaches to the landing beach areas and expedite unloading.
4. Mark the control point and line of departure.
5. Maintain constant communications with the Commander of the Transport Squadron, the Beachmaster, and the Shore Party.

The transport area initially is normally 18,000 yards off shore. The distance from the ship to the Control Point is normally 500 to 1500 yards depending upon visibility. The line of departure is usually 3000 to 5000 yards from the beach.

On the Control Boat is a representative of the embarked troops who is empowered to make tactical decisions for the CO of Troops. This representative should have a copy of the loading plans of all the ships under his control. A destroyer makes the best control vessel as it can maintain direction and provide close-in fire support for the landing craft. The LCI is often used as a substitute for a destroyer as a control vessel. The LCI can provide close-in fire support, but cannot maintain a fixed position in the water.

Covering Force

The covering forces, consisting of battleships and cruisers, provide a screen around the fleet of destroyers and would possibly be 200 miles out.

Salvage Group And Demonstration Group

The Salvage Group is charged with the responsibility of making minor repairs to small boats and ships. The Demonstration Group, operating from D minus 12 hours to D minus 3 hours, is a feint only to divert attention from the main attack. However, if it looks like a successful landing could be made, the Demonstration Group might continue on and make a landing. They are not equipped for sustained activity ashore.

PARALLEL COMMANDS

NAVAL	ARMY
Transport Squadron Commander	Landing Force Commander
Transport Division Commander	RCT Commander
Transport Commander	CO of Troops
Boat Group Commander	Landing Team Commander
Wave Commander	Senior Troop Officer
Boat Division Commander	Senior Troop Officer
Boat Officer or Coxswain	Boat Team Commander
Beachmaster	Shore Party Commander

Transports

Transports are the heart of an amphibious expedition. By the term transports is meant all types of sea going vessels which are used to carry assault troops, garrison troops and base construction and maintenance personnel with their equipment, from the port of embarkation to the objective and to land the personnel and equipment at the objective. To perform these functions, transports

receive the protection and support of aircraft and all classes of combatant vessels enroute to the objective and during landing operations. Thus the planning of transport operations is closely interwoven with all planning, naval and military, required in an amphibious expedition.

Planning For Transport Operations

Planning for transport operations requires information as to the target date and a knowledge of the troops and transports that will be employed. This information should be made available as soon as practicable, as the transports must be used in a carefully planned schedule as well as the final dress rehearsal. The target date is extremely important as it forms the basis of all transport planning. The above information, whenever possible, should be made known to the planners by D—100 days.

Phases For Planning

For planning purposes, the employment of transports in amphibious operations may be divided into five phases as follows:

1. Phase I—Preliminary Preparations and Training S—50 to S—15.
2. Phase II—Rehearsal. S—15 to S—4.
3. Phase III—Final Loading and Sailing. S—4 to S.
4. Phase IV—Enroute to Objective and Disembarkation of Troops. S to D —/— X Day.
5. Phase V—Re-embarkation and Return.

For purposes of advanced planning, the schedule for training, rehearsal, etc., will be figured for "S" Day, the date of sailing.

PHASE I — PRELIMINARY PREPARATIONS AND TRAINING S—50 TO S—15

Early Planning

This phase covers all the early planning, from the time of receipt of the first directive, through the preliminary planning and the training periods allotted to the ships and troops, to the time that loading is commenced for the final rehearsal. This phase is under the direction of the Amphibious Force Administrative Commander.

Basic considerations are: time available, shipping available, availability and location of troops to be trained, berthing and loading facilities at troop embarkation points and the available training beaches. Higher command will make the transports available for training, rehearsal and for the final assault phase. Ideally, the same transports should be used for all three phases, for the obvious improvement which such employment gives in cooperation between ship's crew and troops, and for the advantages of familiarizing the COs of Troops, TQMs and the troops themselves with the capabilities and capacities of the ships to be employed in the final operation.

Availability of Troops

Closely connected with the availability of shipping is the factor of the availability of the troops for amphibious training. This information is obtained from the troop commanders concerned.

Berthing And Loading Facilities

Berthing and loading facilities at troop embarkation points are important

factors for consideration. When berthing and loading facilities are ample at embarkation points, loading and unloading transports absorbs a minimum of time and presents no serious problem. However, when facilities at the embarkation points are meager, the most careful planning is necessary to prevent too much of the available training time from being absorbed in loading and unloading operations.

Training Beaches

The availability of several training beaches within reasonable distance from the troop embarkation points is highly desirable. According to the number of available training beaches a correspondingly greater latitude will be open to the planner in scheduling training exercises over a given period, since several troop units may then train simultaneously and bad weather periods are less likely to cut in on training time. Generally there is a shortage of landing beaches and the planning of training exercises becomes a matter of careful allotment of time and facilities to the troop units concerned.

Schedule of Employment

When all of the above factors have been ascertained it should be possible to draw up a schedule of employment of ships and troops over the period of availability, using the least flexible factor as the starting point. The schedule should include a definite time table for each transport division and for each troop unit to be lifted.

Unloading Practice

The Training Plan should require the complete unloading of as many of the participating ships or craft as available time permits. When available, obsolete and dummy cargo should be used during this phase. Completeness in unloading is necessary in order to give the shore parties, beach parties and boat crews a full scale familiarity with the critical phase of the landing when beaches tend to become heaped with supplies, some boats become disabled, and the supply system is in danger of breakdown. This will bring the beach organizations face to face with their real problems and will permit corrective measures to be taken before the actual assault.

Time Required For Training

Each troop unit should have a minimum of eight days made available for actual training, and more if possible, to allow for bad weather during the time allotted. The additional days to be allowed for loading will depend on the facilities at the embarkation point. Generally three days loading time is sufficient allowance at a major port. Two days should be allotted for disembarking troops and equipment.

Training of Ship's Crews

During this period transports should be required to utilize every available opportunity for training of their crews when not actually in use by troops. The schedule for such training will be variable, as transports will ordinarily fit their schedule to the availability of troops, whenever possible. It will also vary with individual cases, considering such factors as the experience of the crew, previous battle and loading experience, and all basic considerations such as the need for repairs and overhaul.

Supplying of Personnel and Equipment For Boat Pools

The Transport Squadron Commander will receive a directive regarding the personnel and equipment which he will have to supply from ships of his

Squadron for the Boat Pool. Plans must be made to replace such personnel and equipment that is left behind. All training should be completed and all units and ships should be available in time for the beginning of phase two, which starts with complete loading for the final rehearsal.

PHASE II — REHEARSAL S—15 TO S—4

Planning

The detailed planning for this phase is carried out by the Amphibious Force Commander. This planning covers the schedule of loading of transports, the schedule for sailing and detailed instructions for the conduct of the rehearsals and all operations which follow until the transports are released by the Force Commander.

Employment of Transports And Boats

Plans and directives for the tactical employment of transports and boats during the rehearsal will be prepared by the Commander responsible for preparing similar plans for the main operation. They will be as similar as possible, in form and content, to the plans which will be used in the main operation.

Loading of Transports For Final Rehearsal

Transports should be loaded for final rehearsal with the equipment which will be taken to the objective. It is therefore necessary that loading plans be completed prior to loading, for the final rehearsal. A period of five days should be allocated for complete loading with consideration to the loading capabilities of the ports at which troops and equipment are being embarked. Ship, Division and Squadron Commanders are consulted frequently so that their ideas for transport employment can be embodied in the plan.

PHASE III — FINAL LOADING AND SAILING S—4 TO S

This phase is for final inspection of transports and equipment, final loading of fuel and supplies for the assualt, minor repairs if necessary, re-waterproofing or other necessary repair of equipment used in the rehearsal, critique of rehearsal.

PHASE IV — ENROUTE TO OBJECTIVE AND DISEMBARKATION OF TROOPS. S to D —/— X DAY.

Plans Required

This phase requires careful detailed planning by the Commander of the Amphibious Force. In general the plans should provide for the following:

1. Movement from embarkation point to the objective area.
   a. Transport track.
   b. Cruising disposition (as laid down in FTP 167 or modified as required).
   c. Speed of force so as to arrive at objective at correct time.
   d. Re-fueling of smaller vessels.
   e. Rendezvous points.
   f. Communications enroute.

g. Battle dispositions.
h. Anti-submarine protection.
i. Anti-aircraft protection.
j. Smoke plans.
k. A map or chart showing routes and fixed points.

2. The approach.
   a. All of the above, some of which may not need modification.
   b. Track of transports as objective is neared, having in mind that transports should be kept out of radar and gun range and, as tracks converge in last phase, especially at night, that collisions are increasingly probable and must be avoided.
   c. Special last minute communications.
   d. A special large scale map or chart.

3. Operations at the objective.
   a. Location of transport areas.
   b. Location of tractor areas.
   c. Location of lines of departure.
   d. Location of alternate areas.
   e. Routes to the beach.
   f. Rendezvous areas for landing craft and tractors.
   g. Battle dispositions.
   h. Anti-submarine disposition.
   i. Anti-aircraft defenses.
   j. Screening plans.
   k. Smoke plans.
   l. Special maps or charts indicating all points and areas.
   m. Underwater demolition plan.

Most of the above considerations may be included in the plan for the phase with which it is included. Some, because of special complexity or length, may be the subject of special plans or annexes of their own.

Subsidiary planning by the Transport Squadron and Transport Division Commanders and Transport Commanding Officers should conform to the doctrine laid down in FTP 167 and FTP 211.

PHASE V — RE-EMBARKATION AND RETURN

Plans Required

Plans must be made by the Force Commander to re-embark and return assault troops. Consideration must be given to a number of possible situations, as follows:

1. Ships to be used for re-embarking designated troop units.
2. Ships designated for duty in other areas and leaving directly from captured islands or atolls.
3. Ships damaged or lost.
4. Formation of Task Group for return to base which should include screening or escorting forces.
5. Ships made available by higher command.

Time Schedule of Phases

The total time of the phases in detailed below:

1. Phase I—S—50 to S—15

Transports return from an operation or are attached to the Amphibious Force.
14 Days Transport overhaul and rehabilitation.
7 Days Transport Training (own personnel).
3 Days Troop Loading.
8 Days Troop Training.
2 Days Troop Unloading.

2. Phase II—S—15 to S—4
   5 Days Expeditionary Force Loading.
   6 Days Expeditionary Force Rehearsal.
3. Phase III—S—4 to S
   4 Days Rehabilitation, care and cleaning of equipment and final loading. Critique.
4. Phase IV—S to D —/— X Day
   Movement to objective, disembarkation of troops and assault.
5. Phase V—Re-embarkation and return to designated bases.

The above schedule assumes that the troops will be trained on the same transports on which they will be embarked for the final assault. However, due to lack of available transports, this may be impossible.

Determination of Number and Type of Transports Required

In planning for the use of transports in an amphibious operation, the type of terrain, landing beaches, reefs, etc., will determine the type of equipment which will have to be transported to the objective. The equipment to be transported will determine the type of transports required such as LSDs, LSTs, APDs as well as APAs and AKAs.

Allocation of Troop Units

For offensive operations, the Commander Amphibious Force allocates troop units to Transport Divisions in accordance with advice from the Commanding General Expeditionary Troops.

Transporting Troops

The Commander Amphibious Force is not only responsible for transporting the Landing Force, but is also responsible for transporting the first echelon of the Advance Base. Therefore, it is important that he maintain close liaison with the Advance Base planning sections of Commander in Chief Pacific Ocean Areas, Commander Air Force Pacific, and Commander Service Force U.S. Pacific Fleet, in order that sufficient ships are assigned to carry the personnel, equipment and material for the rapid initiation of construction of operational and defensive installations at the advance base.

For the purpose of determining the number and type of transports required to lift the first echelon of the Garrison Forces the following procedure may be carried out.

The unit commanders submit to the Island Commander (Garrison Force Commander) lists of personnel, equipment and material which they desire taken to the objective. The Island Commander screens these lists to insure that there is no duplication, or any unnecessary equipment. These screened lists are submitted to the Commanding General Expeditionary Troops who in turn further screens the lists as necessary. The Force is then requested to make ships available to transport the personnel, equipment and material to the

objective. If sufficient shipping is not available to lift the desired loads, a conference is held to adjust the loads to fit the available shipping.

Upkeep Planning For Transports

An important feature sometimes overlooked in planning for an amphibious expedition is the upkeep of the transports. Due to the fact that a single amphibious operation is usually a series of similar operations making up an entire campaign, each operation closely following the other in point of time, transports are in constant use and frequently needed overhaul periods are postponed. Several such postponements of overhaul periods for the same vessel soon places the vessel in a serious state of disrepair. Planners must therefore constantly be alert to maintain the material condition of all transports by taking advantage of every possible opportunity for upkeep and repairs.

Chronological Planning Schedule For RCT and BLT in an Amphibious Operation.

Steps to be followed:

1. Study Division order for mission, troops attached and quantities of supplies to be taken.
2. Study G-2 report on enemy dispositions, beaches, and terrain within assigned sector.
3. RCT Commander confers with Naval Transport Division Commander and determines the following:
   a. Number and names of assigned transports.
   b. Transports which are to be in initial assaults.
   c. Availability of landing craft on assault ships.
   d. Headquarters ship.
   e. Number and type of large landing craft to be available.
4. RCT Commander draws up tentative plan for employment of regiment.
5. Regimental Commander accomplishes the following:
   a. Composition of BLTs by units.
   b. Assignment of BLTs to ships.
   c. Designation of assault BLTs.
   d. Preparation of boat employment table for assault transports.
   e. Assignment of units to headquarters ship and AKAs.
   f. Assignment of units to large landing craft if such are used. (After completely loading transports).
   g. An allocation by type, weight, and cube of supplies to ships. This should be calculated by S-4 on the basis of information from Regimental TQM on capacity of ships.
   h. Direct Battalion COs to make embarkation plans.
   i. Prepare formal order for RCT complete with annexes. Before the formal order is published, the information to Battalion Commanders must necessarily be fragmentary. Fragmentary or not, the information must get to the Battalion Commanders as quickly as possible.
6. Battalion Commanders accomplish the following:
   a. Confer with all unit commanders in BLT to determine the items listed below in regard to their units:
      (1) Total number of officers and men.

(2) Total number and type of all vehicles.
(3) Type and quantity of equipment.
(4) Cube and weight of all supplies.

b. Confer with Troop TQM and determine how much of the personnel, vehicles, equipment, and bulk supplies can be loaded on the assigned transport. (Only about 50% of the vehicles can be taken).

c. Confer with unit commanders of the BLT and indicate what personnel, vehicles, and equipment will be taken and what must be left for later convoy. Order unit commanders (organic and attached) to submit UP&T Tables on the basis of personnel, vehicles, and equipment thus allocated; and C & LA forms.

d. Make boat assignment tables. These must necessarily be made before vehicles and equipment debarkation priorities can be determined.

e. Give Troop TQMs the following information at least two weeks before loading starts:
(1) UP&T Tables for all units on assigned ship.
(2) Vehicle Debarkation Priority Table.
(3) Supply Loading Plan (S-4) to include exact data on the number of containers, weight, and cube of supplies in the following groups:
(a) Individual reserve (issue to personnel and load on vehicles).
(b) Initial reserve.
(c) Beach reserve.
(d) Landing Force reserve.

f. Prepare formal battalion order.

g. Check Troop TQM's plans for feasibility.

The Boat Assignment Table

The Boat Assignment Table is issued as an annex to the battalion order and is made up together with the Landing Diagram. On the basis of this form, the Troop Billeting Officer berths the troops according to boat teams for efficient debarkation. Before analyzing the construction of this table, mention should be made of the form itself.

Column I indicates the Boat Team Number. Illustration: Boat Team No. 46 is the 6th boat in the 4th wave. The Boat Wave Commander and his military opposite will be embarked in the boat whose second digit is 1 (i.e. 11, 21, 31, etc.) and he is stationed at the apex of the Vee. There are rarely more than 9 boats in any wave, or more than 9 organized waves in the assault.

Column 2 designates the boats by type for each Boat Team. Naturally, care must be taken to assign a suitable type of boat for the troops and vehicles it is to embark.

The third column, which identifies the Debarkation Station, is not filled out until the ship is loaded and the troops are billeted. In this manner, the troops can be assigned to the Debarkation Station most convenient for traffic and debarkation. Rail-loading of boats permits light assault troops to remain on board until just before the boat group leaves for the Line of Departure. This will greatly improve the combat efficiency of the troops by preventing seasickness and undue exposure.

COMPOSITION–BATTALION LANDING TEAM

INFANTRY BATTALION

FIELD ARTILLERY BATTERY

COMBAT ENGINEER PLATOON
(From Division Combat Engineer Battalion)

ANTI-TANK CO. PLATOON
(From Infantry Regiment AT Co.)

CANNON PLATOON
(From Infantry Regiment Hq. Co.)

SHORE FIRE PARTY
(Navy Liaison Officer and Fire Control Personnel from FA. Bn.)

DETACHMENT ANTI-AIRCRAFT AUTOMATIC WEAPONS

ENGINEER BOAT CO.

ENGINEER SHORE CO.

WAVE ELEMENTS—BATTALION LANDING TEAM

NUMBER OF WAVE	NAME	COMPOSITION
I	Assault Wave	Assault Elements of 2 Rifle Companies
II	Support Wave	Support Elements of 2 Assault Companies
III	Fire Power Wave	Heavy Weapons Co.
IV	Reserve & Command Wave	Infantry Battalion Hq. Co., Battalion Hq. and Reserve Rifle Co.
V	Anti-Tank Wave	AT Platoon, Bn. Hq. Co.; AT Platoon, Reg. AT. Co.
VI	Field Artillery Wave	FA Battery
VII	Ammo. & Supply Wave	Essential Transport and Ammunition for Elements Already Landed.

Column four gives the expected time of calling the landing boat alongside. This will be expressed as H-(minus) or actual time if H-hour is known at the time the table is completed.

Personnel are listed in column 5 for each boat team according to unit function. In other words, this column tells the number of men in each boat, what unit they are from, and what each individual's job is. Also indicated is a statement of the equipment, supplies, ammunition, etc., to be carried in that boat. The listing of equipment must be exact because the Transport Loading Plan is based on this table.

Columns 6, 7, and 8 are for computation of the boat spaces used in each boat. A boat space is 224 pounds, or 13.5 cubic feet, whichever applies or whichever is arrived at first. For personnel, it is the space occupied by one man and his field equipment.

Personnel, arms, ammunition, and special equipment are listed according to the number of boat spaces each occupies, and the sum of all these is computed. Each boat can hold only a certain number of boat spaces with safety. LCVPs (36 boat spaces) are heavy by the head when overloaded and become less maneuverable, reducing the safety factor. Where the container of supplies adds up to a fractional number of boat spaces, the next higher boat space is allotted to it. Illustration: If a box of equipment weights 336 lbs., it is usually called 2 boat spaces.

The Boat Assignment Table must be made out for the first trip of the boats down to the smallest detail. This is an illustration of planning which begins at the point of projected assault and works back to the pre-embarkation point in order to plan and train appropriately. A copy of the Boat Assignment Table must be furnished the Troop TQM as soon as possible. The data on the employment of boats, troops, equipment, and supplies must necessarily be incorporated into the Master Debarkation Table.

In view of the fact that boating of units follows a fairly definite pattern, Division Headquarters may issue a memorandum as to boat procedure it desires followed. The following items are illustrative of some of the basic procedures the BLT may have to follow:

1. BLT Commander is assigned to the 3rd (or other) wave.
2. BLT Executive is assigned to the 4th (or other) wave.
3. Artillery Liaison Detail to be in the same wave as BLT Commander.
4. Specially trained demolition teams and engineers in initial wave.
5. Only light weapons to be carried in the 1st wave (exceptions listed).
6. Assignment of certain sections of the Heavy Weapons Company, Anti-tank Platoon, Anti-aircraft Platoon, Artillery, etc., to specific waves.
7. Assignment to waves of special equipment, such as bulldozers.
8. Assignment of Shore Fire Control Party, Air Liaison Party, and Shore Company Sections to specific waves.
9. Designation of time limits between waves.
10. Amount of combat ammunition to be carried with each weapon and in each vehicle.

The LVT and DUKW Assignment Table is prepared simultaneously with the Boat Assignment Table and with the Landing Diagram.

This form gives in detail the personnel and material to be embarked in each LVT and DUKW. It is the guide to the type of LVTs and DUKWs needed.

CONFIDENTIAL

LVT AND DUKW ASSIGNMENT TABLE

_____
Unit

Date:_____

TEAM No.	TYPE	TIME	PERSONNEL AND MATERIAL	SPACES			
				PERS.	ARMS	AMM.	SPEC.

CONFIDENTIAL

THE LANDING BOAT ASSIGNMENT TABLE

_____
Unit

Date:_____

TEAM No.	TYPE	DEBARKATION STATION	TIME	PERSONNEL AND MATERIAL	SPACES			
					PERS.	ARMS	AMM.	SPEC.

The BLT Commander should confer with attached units, such as the Shore Party, in order to discuss their preferences in regard to boat assigments. These should be given full consideration in boat priority even though some of them may not be primarily combat units. A balanced distribution in assault is important.

In assigning the units to boat teams, particular care must be taken to distribute the personnel, weapons, and equipment in a balanced manner. Where there exists only one of a kind, such as the Shore Fire Control Party, or a limited amount such as in the Joint Communication Team, the various members of these units may be divided in two or more boats for security. In this connection, it is important that emphasis be placed on the necessity for assigning drivers and similar personnel to the same ship that carries their vehicles. Likewise, boat teams should be debarked over the net, most convenient to the hatch, through which their vehicles, if any, are to come. Certain elements should be boated as a whole; viz. Artillery, Anti-aircraft, and Anti-tank weapons should be with their prime movers, crews, and initial ammunition.

Elements not boated in the initial trip usually consist of personnel and equipment which are not primarily combatant; viz. cooks, mess personnel, and certain clerical and supply personnel of headquarters sections.

The Landing Diagram

The Landing Diagram indicates the tactical disposition of the BLT in assault. It is issued as an annex to the field order of the BLT Commander. By means of this diagram, the BLT Commander informs the Captain of the Ship, Ship's officers, and his own unit subordinates of the projected battalion plan of attack. It is developed simultaneously with the Boat Assignment Table. The following points merit consideration:

1. Space is provided for "Formation Number", as there will be alternate formations.
2. Each wave is numbered consecutively beginning with number 1.
3. Waves are numbered from front to rear.
4. Each boat division is numbered. A wave may consist of one or more boat divisions. The reason for using the boat division is to provide more control over smaller units. This also permits a beach to be hit along its entire frontage simultaneously, whereas a single large Vee would hit at the apex much earlier than at the legs. It further increases the possibility of unit mobility, responsibility, reorganization, and the distribution of missions.
5. The function of each wave is sometimes indicated and, being fairly well standardized, may be laid down by Division order.
6. H-Hour is indicated so that the time may be calculated for each wave to hit the beach. Interval between waves is shown in units of time.
7. Each boat team has a number assigned to it. This is not the number printed on the boat. It is a number, usually 2 digits, which is assigned the boat team when it is made up, and is carried in the boat on a large placard mounted on a staff. The specifications are standard and are to be found in the Force SOP. The first digit indicates the wave; the second digit tells the order of the boat within the wave. Illustration: Boat Team No. 34 is the 4th boat in the third wave.

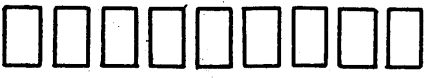
8. In addition to the circling maneuver, there are four common boat formations:
   a. Line Abreast.
   b. Column.
   c. Open Vee.
   d. Closed Vee.
   The visibility, beach approaches, frontage desired, and enemy installations will determine the choice, which will be shown on the Landing Diagram.
9. Distance between boats is given in yards, and is the distance between adjacent boats in the same formation. Interval (not like the Army term used with ranks of troops) is the distance between corresponding boats of two adjacent formations, i. e., between boat division commanders. Distance is usually larger in the first two waves, to permit greater dispersion. A 50-yard distance is a minimum to prevent the tendency that coxswains have to bunch up.
10. Each Boat Team number is prefixed by a designating letter indicating the type of boat. This is explained by a legend at the bottom of the Landing Diagram.
11. The name of the boat division commander and the name of troop officer in charge of that unit (these two officers are boated together) is shown. In addition, the names of any other boat officers may be indicated. Boat officers, coxswains, and troop officers, as necessary, will receive a copy of this diagram.

It is important to remember that maximum control is obtained by having a good Landing Diagram and Boat Assignment Table. Once boated over the side, the BLT Commander loses control of his unit. He does not regain control until reorganization takes place at the battalion objective or some similar phase line. It is imperative, therefore, that each Boat Team Commander be a leader, and that he understand fully the nature of his mission.

LANDING DIAGRAM

H-HOUR_____ BEACH_____

WAVE NO. 1 Distance_____yds
Interval_____yds



WAVE NO. 2 Distance_____yds
Interval_____yds

Interval_____minutes



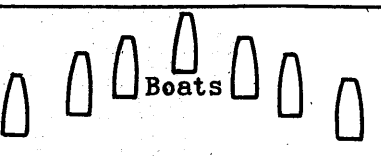
WAVE NO. 3 Distance_____yds
Interval_____yds

Interval_____minutes



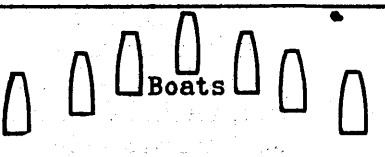
WAVE NO. 4 Distance_____yds
Interval_____yds

Interval_____minutes



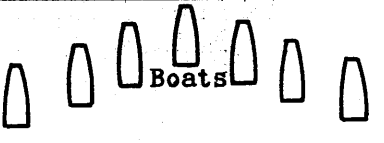
WAVE NO. 5 Distance_____yds
Interval_____yds

Interval_____minutes



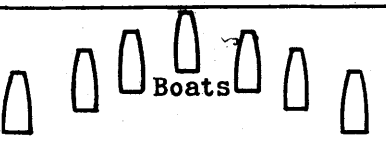
WAVE NO. 6 Distance_____yds
Interval_____yds

Interval_____minutes



WAVE NO. 7 Distance_____yds
Interval_____yds

Interval_____minutes



LEGEND:

2 - LVT(2) Type	L - LCP(L)
2A - LVT(2)A Type	R - LCP(R)
1A - LVT(1)A Type	P - LCV(P)
4 - LVT(4)	S - LCS(S)
	3 - LCM(3)

NOTE 1: Distance: The spacing between craft in the same wave.
Interval (yds): The spacing between waves.
Interval (time): The expected elapsed time between the landing of a wave and the landing of the preceding wave.

NOTE 2: The arrangement and number of LVTs, DUKWs and landing boats in each wave will depend on the tactical plan. The above is only an illustration.

CHAPTER II

NAVAL DATA OF INTEREST TO A TQM

SECTION 1 — NAVAL CUSTOMS AND TERMINOLOGY

Since the Troop TQM is the Liaison Officer between the Commanding Officer of Troops and the Captain of the Ship, the important task of dealing with all Naval Personnel falls on his shoulders. Consequently, the Troop TQM must be familiar enough with Navy terminology that he can talk intelligently with Naval personnel about matters pertaining to his job. The following information is supplied in a general form only. As the Troop TQM spends more time aboard naval and merchant vessels, he will become more proficient in the use of the correct naval language.

Naval Customs

Upon boarding a ship, first salute the colors at the stern of the ship. Next, salute the Officer of the Deck and request permission to come aboard. After stating your business to the Officer of the Deck, request permission to see the Executive Officer of the ship.

When leaving the ship, salute the Officer of the Deck and request permission to leave the ship. Before going down the gangway, salute the colors at the stern of the ship or the location of the colors if they are not visible. Naval Officers salute and are to be saluted only when covered. Officers of all ranks below Commander are addressed as Mr., while officers of and above the rank of Commander are addressed by their rank.

The following shows Naval Officers' rank and comparable Army Officers' rank:

Ensign	Second Lieutenant
Lieutenant (jg)	First Lieutenant
Lieutenant	Captain
Lieutenant Commander	Major
Commander	Lieutenant Colonel
Captain	Colonel
Commodore	Brigadier General
Rear Admiral	Major General
Vice Admiral	Lieutenant General
Admiral	General

NAVAL TERMINOLOGY

Abaft	Behind.
Aft	Toward the stern.
Amidships ('MIDSHIPS)	In the center of the vessel, either with reference to her length or to her breadth.
Athwartships ('THWARTSHIPS)	At right angles to the fore-and-aft lines of the vessel.
Belay	Stop.
Below decks	Anywhere in the ship below the main deck.
Bitts	Vertical wooden or metal projections on the deck used for securing lines or gear.
Block	Pulley—usually with rope tackle.

Boat Boom	The boom swung out from a ship's side when at anchor and to which boats in the water secure.
Boat Hook	A wooden staff with a metal hook at one end used for fending off or holding on.
Boatswain (BOS'N)	A warrant officer aboard ship who has charge of the rigging and who calls the crew to duty.
Booby-Hatch	A covered hatch on the weather deck.
Boom	The movable arm on a ship's crane or derrick.
Bow	The fore or front part of a ship or boat.
Bridge	The upper housing or platform, from which the ship is controlled.
Brig	Ship's jail or guardhouse.
Bulkhead	Transverse or longitudinal partitions separating portions of the ship.
Cable	Any wire rope on board ship.
Call	The Boatswain's pipe.
Captain	The ship's commander regardless of actual grade.
Cargo Hatch	A hatch over a cargo hold.
Carry Away	To break or tear loose.
Chief Bos'n's Mate	Petty Officer comparable, somewhat, to a Master Sergeant.
Colors	The national ensign.
Companionway	The steps leading below from an upper deck.
Compartment	Any walled-off space or room on a ship.
Compass Point	A unit measure of direction equal to about 11¼ degrees of a circle.
Davit	A curved metal spar fitting into a socket on the deck and projecting over the side for hanging a boat.
Dead Ahead	Directly ahead.
Decks	The floor levels of a ship—usually designated numerically or alphabetically down from the main deck. Up from the main deck the levels are designated consecutively: Boat Deck, Bridge Deck and Top Deck, all of which are in the ship's superstructure.
Deep Tank	A water-tight hold or compartment extending down to the ship's bottom, suitable for general cargo or liquids.
Dogs	Used to secure water-tight doors and hatches.
Draft	The depth of water to a vessel's keel. The depth to which a vessel sinks in the water.
Drum	A revolving spool for winding cables or hawsers.
Dunnage	Lumber used to make false decks over stowed cargo, to secure it and to facilitate further loading.
Ease Off	To slack up.
Ensign	The flag carried by a vessel as the insignia of her nationality.

Fall	That part of tackle to which the power is applied in hoisting.
Fantail	The part of the stern of a vessel extending abaft the stern-post.
Fathom	Six feet.
Field Day	Time devoted to police of ship.
Flag Officer	Any naval officer above the grade of Captain.
Forecastle (Fo'c's'le)	Extreme forward portion of the main deck where the anchor gear is located.
Forward	Toward the bow.
Foul	Jammed; not clear.
Frame	Each rib of the ship numbered from the bow to the stern.
Galley	The ship's kitchen.
Gangway	Ladder or ramp used to go aboard ship.
Gear	The general name for ropes, blocks and tackles.
Gig	A Ship's boat designated for the use of the Commanding Officer.
Gunwale (GUNNEL)	The upper rail of a boat or vessel.
Hand-Rope	A line secured waist high above a boat-boom or gangplank; used for steadying oneself. (Also termed grab rope).
Hatch	An opening in a deck.
Hatch coaming	The sill or ledge surrounding hatch openings.
Hatch cover	The covering or "lid" on a deck opening into a hold.
Hawser	A large rope for towing or heavy work.
Head	Latrine on shipboard.
Heaving Line	A small line secured to a hawser and thrown to an approaching vessel or to a dock.
Heave to	To put a vessel in the position of lying-to.
Helm	The wheel by which a vessel is steered.
Hoist Away	An order to haul up.
Hold	The space below decks utilized for the stowage of ballast or cargo.
Honey Barge	Scow for removal of garbage or refuse.
Hull	The body of a vessel.
Inboard	Toward the center line of the ship.
Inshore	Toward shore.
Jack	A flag similar to the union of the national flag.
Jacob's Ladder	A ladder of rope with wooden steps used over the side and aloft.
Jumbo Boom	The main or largest lifting capacity derrick arm on the ship (30 tons or above).
Keel	The timber or bar forming the backbone of the vessel and running from the stem to the sternpost at the bottom of the ship.
Kingpost	The mast or stump used as upright for the boom.
Knock Off	To stop: especially to stop work.

Knot	One nautical mile per hour (a nautical mile is 2000 yards; a land mile is 1760 yards).
Ladder	Metal, wooden or rope stairway.
Lee	The side opposite to that from which the wind blows.
Leeward (LOOARD)	The direction away from the wind.
Leeway	The drift of a vessel to the leeward caused by the wind or tide.
Liberty	Permission to leave ship.
Life Line	Lines running about the weather decks of a ship to prevent personnel from falling overboard.
List	The inclination of a vessel not caused by wind or sea.
Lucky Bag	The place where found articles are kept.
Magazine	The space provided for the stowage of explosives.
Main Deck	The highest deck extending from stem or stern.
Make Colors	Hoisting the ensign.
Make Fast	Tie down; secure.
Master-at-arms	Petty Officer comparable to Provost Marshal.
Muster	To assemble the crew.
Net	Landing net (rope or chain) for use in debarking over side. Cargo net (rope) for use in handling cargo.
Officers' Country	The part of the ship devoted to officers' quarters.
Officer of the deck	Duty officer responsible for carrying out of ship's routine. Comparable to Officer of the Day.
Overhead	The ceiling of any deck level.
Painter	A rope attached to the bow of a small boat for making her fast.
Pay Out	To slack out on a line made fast on board.
Petty Officer	Equivalent to Army NCO.
Pipe Down	An order to keep quiet.
Platform	A partial deck; not extending from stem to stern.
Poop Deck	A partial deck above the main deck at the stern of the ship.
Port	The left side of a vessel looking forward. An opening in a ship's side such as an airport, gun-port, etc.
Prow	The part of the bow above the water.
Quarterdeck	That portion of the ship indicated by the Captain of the ship as the post of the Officer of the Deck.
Reefer	Ship's refrigerator space.
Ribs	The framework of a vessel.
Rigging	General term for all ropes of a vessel.
Screw	The propeller.
Scuppers	Holes cut in the waterways to drain water from the decks.

Second Deck (Upper Tween)	A complete deck directly below the main deck.
Secure	To make fast; safe.
Shaft Alley	The tunnel housing over the ship's propeller shaft.
Ship's skin	The outer hull of the ship.
Ship's store	The ship's canteen or PX.
Shore	To prop up or brace. A prop or stanchion placed under a beam.
Shove Off	To leave; an order to the bowman to shove the bow clear preparatory to leaving a dock or a vessel's sides.
Sick Bay	Ship's hospital.
Sling, wire	To set in ropes, so as to put in a tackle to hoist or lower it.
Smoking Lamp	No smoking is allowed on board ship when it is announced that "The Smoking Lamp is Out."
Square of the hatch	The surface of the hatch cover.
Stanchion	Any overhead supporting post, pillar or column.
Stand By	A preparatory order.
Starboard	The right side of a ship when facing the bow.
Stem	The bow of the ship.
Stern	The rear of the ship.
Stern Fast (Stern Line)	A rope led over the stern of a boat and used in securing her by the stern.
Stove	Broken in.
Stow	To put in place.
Take a Turn	To pass a turn around a belaying pin or cleat and hold on.
Tarpaulin	A piece of heavy canvas, used for covering hatches, boats.
Third Deck (Lower Tween)	A complete deck directly below the second deck.
Topside	On or above the main deck.
Turn	Passing a rope around a pin to keep it fast.
Underway	When ship is not anchored, tied up nor aground.
Union	The upper inner corner of an ensign.
Union Jack	Small flag, containing only the union without the fly. It is hoisted at the bow on the jackstaff.
Wardroom	Ship's Officers' mess and conference room.
Watch	A four-hour duty period.
Windward	Toward the wind.
Wing	That part of the hold or between-decks which is next to the skin.
Wire	Cargo lifting cable.

Naval Tonnage Terms

The TQM should be familiar with Navy tonnages so as to converse intelligently with the ship's officers. The following are some of the more common tonnage terms used:

Deadweight tonnage expresses the number of long tons (2240 pounds) of cargo, stores, and bunker fuel that a vessel can transport. It is the difference between the number of tons of water a vessel displaces "light" and when submerged to the load line. This term is used interchangeably with dead weight carrying capacity. A vessel's capacity for weight cargo is less than its total deadweight tonnage.

Cargo tonnage is determined by either "weight" or "measurement". The "weight" ton is the short ton, 2,000 pounds. A "measurement" ton is arbitrarily set as 40 cubic feet.

Gross registered tonnage is the total of the vessel's closed-in spaces divided by 100. A registered ton is 100 cubic feet.

Net registered tonnage is a vessel's gross tonnage minus deductions of space occupied by accommodations for crew, by the propelling power plant, fuel and space necessary for operating the vessel. This term expresses the space available for the accommodations of passengers and stowage of cargo. As a ton of cargo, in most instances, occupies less than 100 cubic feet, the vessel's cargo tonnage usually exceeds its net tonnage, and may, in some instances, exceed the gross tonnage.

Displacement of a vessel is the weight, in long tons, (2240 pounds), of the vessel and its contents. Displacement "light" is the weight of the vessel without stores, fuel or cargo. Displacement "loaded" is the weight of the vessel plus cargo, fuel and stores.

Actually, TQM personnel have little occasion to use this tonnage terminology, but it is an advantage to at least be familiar with it when talking to loading personnel.

The main figure in which TQMs are interested is the total cubic feet capacity of the ship available for cargo and this figure is always given on the characteristic sheets of transports and cargo ships.

CHAPTER II

NAVAL DATA OF INTEREST TO A TQM

SECTION 2 — NOMENCLATURE AND SYMBOLS OF NAVAL SHIPS

Type	*Symbol*
BATTLESHIP	BB
CRUISER	
Heavy	CA
Large	CB
Battle	CC
Light	CL
Flying Deck	CF
AIRCRAFT CARRIER	
Aircraft Carrier	CV
Seaplane	CVS
DESTROYER	
Destroyer	DD
Destroyer leader	DL
Escort vessel	DE
SUBMARINE	
Submarine	SS
Mine laying submarine	SM
MINE VESSEL	
Mine Layer	CM
Mine Layer, coastal	CMc
Light Mine Layer	DM
Mine sweeper, high speed	DMs
Mine sweeper	AM
Mine sweeper, coastal	AMs
Mine sweeper, harbor	AMb
PATROL VESSEL	
Eagle	PE
Submarine chaser	PC
Gun Boat	PG
River Gunboat	PR
Motor torpedo boat	PT
Motorboat, submarine chaser	PTC
Yacht	PY
Yacht coastal	PYc
AUXILIARY	
Crane ship	AB
Collier	AC
Aircraft carrier	ACV
Destroyer tender	AD

Type	*Symbol*
AUXILIARY—Continued	
Ammunition ship	AE
Provision storeship	AF
Miscellaneous auxiliary	AG
Combined operation—comm. hqs.	AGC
Seagoing dredge	AGD
Lighthouse tender	AGL
Motor torpedo boat tender	AGP
Surveying ship	AGS
Hospital ship	AH
Cargo ship	AK
Cargo, attack	AKA
Deep Hold cargo ship	AKD
Net cargo ship	AKN
General stores issue ship	AKS
Aircraft supply ship	AKV
Lightship	AL
Net-laying ship	AN
Oiler, or fuel-oil tanker	AO
Gasoline tanker	AOG
Transport	AP
Coastal transport (small)	APc
Transport, attack	APA
Artillery barge	APB
High-speed (destroyer) transport	APD
Cavalry transport	APC
Administration flagship	APF
Supporting gunnery ship	APG
Transport fitted for evacuation of wounded	APH
Labor transport, or barrack ship	APL
Mechanized-artillery transport	APM
Non-mechanized Artillery transp.	APN
Troop barge, Class A	APP
Troop barge, Class B	APT
Rescue transports	APR
Transport, submarine	APS
Aircraft transport	APV
Repair ship	AR
Base repair ship	ARb
Repair ship, battle damage	ARB
Cable repairing or laying ship	ARC

Type	*Symbol*
AUXILIARY—Continued	
Floating drydock	ARD
Advance base dock	ABD
Advance base sectional dock	ABSD
Mobile floating drydock	AFD
Heavy-hull repair ship	ARH
Repair ship, landing craft	ARL
Heavy-machinery-repair ship	ARM
Salvage vessel	ARS
Aircraft-repair ship	ARV
Submarine tender	AS
Submarine rescue vessel	ASR
Ocean-going tug	AT
Rescue tug	ATR
Seaplane tender	AV
Catapult lighter	AVC
Seaplane tender (destroyer)	AVD
Seaplane tender (small)	AVP
Aircraft-rescue vessel	AVR
Distilling ship	AW
Water tanker	AWK
Airship tender (lighter than air)	AZ
DISTRICT CRAFT	
Ambulance boat	YH
House boat	YHB
Fuel oil barge	YO
Gasoline barge	YOG
Oil storage barge	YOS
Pontoon stowage barge	YPK
Sludge removal barge	YSR
Stevedoring barge	YS
Torpedo testing barge	YTT
Water barge	YW
Chambers rescue	YRC
Degaussing vessel	YDG
Floating derrick	YD
Seaplane wrecking derrick	YSD
District auxiliary, miscellaneous	YAG

Type	*Symbol*
DISTRICT CRAFT—Continued	
Diving tender	YDT
Dredge	YM
Ferrbyboat and launch	YFB
Floating drydock	YFD
Floats, cars	YCF
Gate vessel	YNg
Lighter, aircraft transportation	YCV
Lighter, ammunition	YE
Lighter, ash	YA
Lighter, covered	YF
Lighter, garbage	YG
Lighter, open	YC
Lighter, open cargo	YCK
Lighter, open landing	YLA
Lighter, torpedo transportation	YFA
Motor mine sweeper	YMS
Net tender	YN
Net tender (tug class)	YNT
Patrol vessel	YP
Pile drivers floating	YPD
Scow, heating	YHT
Harbor tug	YT
Motor tug	YMT
Workshop	YR
LANDING CRAFT AND SHIPS	
Landing Craft, Vehicle	LCV
Landing Craft, Veh., Personnel	LCVP
Landing Craft, Mechanized	LCM
Landing Craft, Tank	LCT
Landing Craft, Inf. (large)	LCI(L)
Landing Craft, Inf. (Gunboat)	LCI(G)
Landing Vehicle, Tracked	LVT
2½-ton Amphibious Truck	DUKW
Landing Ship, Tank	LST
Landing Ship, Dock	LSD
Landing Ship, Vehicle	LSV
Landing Ship, Medium	LSM

CHAPTER II

NAVAL DATA OF INTEREST TO A TQM

SECTION 3 — ORGANIZATION OF U. S. NAVAL VESSELS

The CAPTAIN (no matter what his rank, he is known by this title) is in command and is charged with the full responsibility for the care and efficiency of the ship and the welfare of all aboard.

The EXECUTIVE OFFICER, next in rank to the Captain and under the latter's direction, has entire charge of all matters relating to personnel, routine and discipline. All orders issued by him are considered as coming directly from the Captain. On most general and important matters, the Troop TQM will deal directly with the Executive Officer; on specific and less important matters, he will deal directly with the various other ship's officers. For example, on minor matters relating to cargo where there is no point in bothering the Executive Officer, the Troop TQM should deal directly with the First Lieutenant.

The NAVIGATOR is head of the navigation department and is not only responsible for the safe navigation of the ship, but also for the supervision of the communication division.

The FIRST LIEUTENANT is responsible for the cleanliness of the ship, the water-tight integrity of the ship, repairs and upkeep of the landing boats, and general care and repairs of structural parts of the ship. Cargo stowage is also his responsibility. The men of the deck divisions of a transport have the added duties of running the cargo handling gear. Therefore, on a transport, the First Lieutenant also has authority over the deck divisions in work pertaining to his department. He is also the Damage Control Officer.

The GUNNERY OFFICER is head of the gunnery department and is responsible for the entire ordnance equipment aboard, and for the proper training of all gun crews.

The ENGINEER OFFICER is head of the engineering department and is responsible for all machinery for propelling the ship and its auxiliaries, and for the training of all men in the department. The Troop TQM will deal with him on matters such as the failure of blowers in troop compartments, the installation of lights where needed, and the connection of water hoses at a convenient point for filling the water cans.

The SUPPLY OFFICER has charge of the general mess, the ship's store and the issue of clothing and small stores. The Troop TQM should notify this officer of the expected time of arrival of troops and the total troop personnel to be messed. If the ship needs any particular gear for the handling of cargo, it is the Supply Officer who actually obtains it.

The duties of the MEDICDAL and DENTAL OFFICERS are apparent. The Troop TQM should see to it that the Troop Medical Officers meet the Ship's Medical Officers as soon as possible to make all necessary arrangements.

The CHAPLAIN (if any) is charged with the general religious interests of all hands, has charge of the library, assists in promoting the education of the men and is interested in their general welfare. He frequently has additional duties with reference to motion pictures and entertainment, and helps in promoting smokers, parties and various forms of athletics.

BOAT GROUP COMMANDER is in charge of all the ship's landing boats. He is responsible to the First Lieutenant for their hull maintenance and to the Engineering Officer for their mechanical maintenance. During an operation he has tactical control of the landing boats upon their departure from the ship. On ships that have a Boat Division, he may be the Division Officer.

WATCH and DIVISION OFFICERS have charge of the divisions aboard ship and stand watch as officer of the deck and engineer officer of the watch. The Troop TQM will generally deal with the heads of the First and Second Divisions when something pertaining to that Division is required. For example, if the ship is at a dock and it is desired to bring aboard some special equipment that might require the use of a winch and boom for a short time, the Troop TQM should go directly to the Division Officer concerned to get the job done.

For the purpose of administration, an APA or AKA is divided into departments, Divisions and Sections under Department Heads and Division Officers as shown in the following table:

Department	*Department Assignments*
Navigation	Navigation Maneuvering control Communications Tactics Intelligence Ship's Chief Censor "N" Division Navigation Lookouts Deck watch supervision Education Post Office
Construction & Repair	Damage Control & Gas warfare Hull Maintenance and upkeep Messing & Berthing—Crew and Troops "R" Division Deck Divisions
Gunnery	Operation & maintenance of battery Fire Control Magazines—ship & cargo Training of gun crews Lookouts—surface, horizon & sky Deck Divisions
Engineering	All machinery & electrical installations care, operation and maintenance. Engineer watch supervision. Training and instruction of engineer divisions. "A" "B" & "M"
Medical	Health of all personnel Sanitation of the ship First aid training "H" Division
Supply	Equipage, Supplies, Commissary Provisions, Clothing—maintenance & issue

Designation	*Duties*
1st Division	Forward Deck Division
2nd Division	Midship Deck Division
3rd Division	After Deck Division
"A" Division	Auxiliary Machinery
"B" Division	Boiler Division
"E" Division	Electrical Division
"H" Division	Medical Division
Boat Division	Landing Boats
"M" Division	Engine Room Division
"N" Division	Navigation & Communication
"R" Division	Construction & Repair
"S" Division	Supply, Food Preparation

OFFICER COMPLEMENT & ASSIGNMENT OF DUTIES

Typical APA Organization

Rank	*Administrative Duties*	*Collateral Duties*
Captain	Commanding	
Commander	Executive Officer	Educational Officer Morale Officer
Lt Commander	First Lieutenant	Gas Warfare
	Damage Control Officer	Hull Board
Lieutenant	Gunnery Officer	Asst Educational Off
Lieutenant	Engineer Officer	Hull Board
Lieutenant	Debarkation Officer	Asst First Lieutenant
Lieutenant	Communication Officer	"N" Division Officer
Lieutenant (jg)	Engineering Watch and Division Officer	
Lieutenant (jg)	Watch and Division Officer 1st Division	Ship's Store Officer
	Watch and Division	Ship's Service Officer
Ensign	Watch and Division Officer 3rd Division	
Ensign	Engineering Watch and Division Officer, "A" Division	
Ensign	Engineering Watch and Division Officer "E" Division	
Ensign	Radar Officer	CIC Officer
Ensign	Assistant Navigator	Signal Officer
1st Lt (USMC)	Ship TQM	Legal Officer
	Troop Liaison Officer	
Lt Comdr (MC)	Senior Medical Officer	Sanitation Officer
Lt (jg) (MC)	Junior Medical Officer	"H" Division Officer
Lieutenant (DC)	Dental Officer	
Lieut Comdr (SC)	Dental Officer	
Lieut (jg) (SC)	Disbursing Officer	"S" Division Officer
Lieut Comdr (Ch C)	Chaplain	Welfare Officer Asst Morale Officer
Boatswain	Ship's Boatswain	"R" Division Officer
Machinist	Jr "M" Division Officer	Engineering Watch Officer
Electrician	Jr "E" Division Officer	Engineering Watch Officer

TYPICAL APA ORGANIZATION—Continued

Rank	*Administrative Duties*	*Collateral Duties*
Carpenter	Ship's Carpenter	Repair Officer
Pay Clerk	Asst Supply Officer	Coding Board
Pay Clerk	Asst Supply Officer	Coding Board

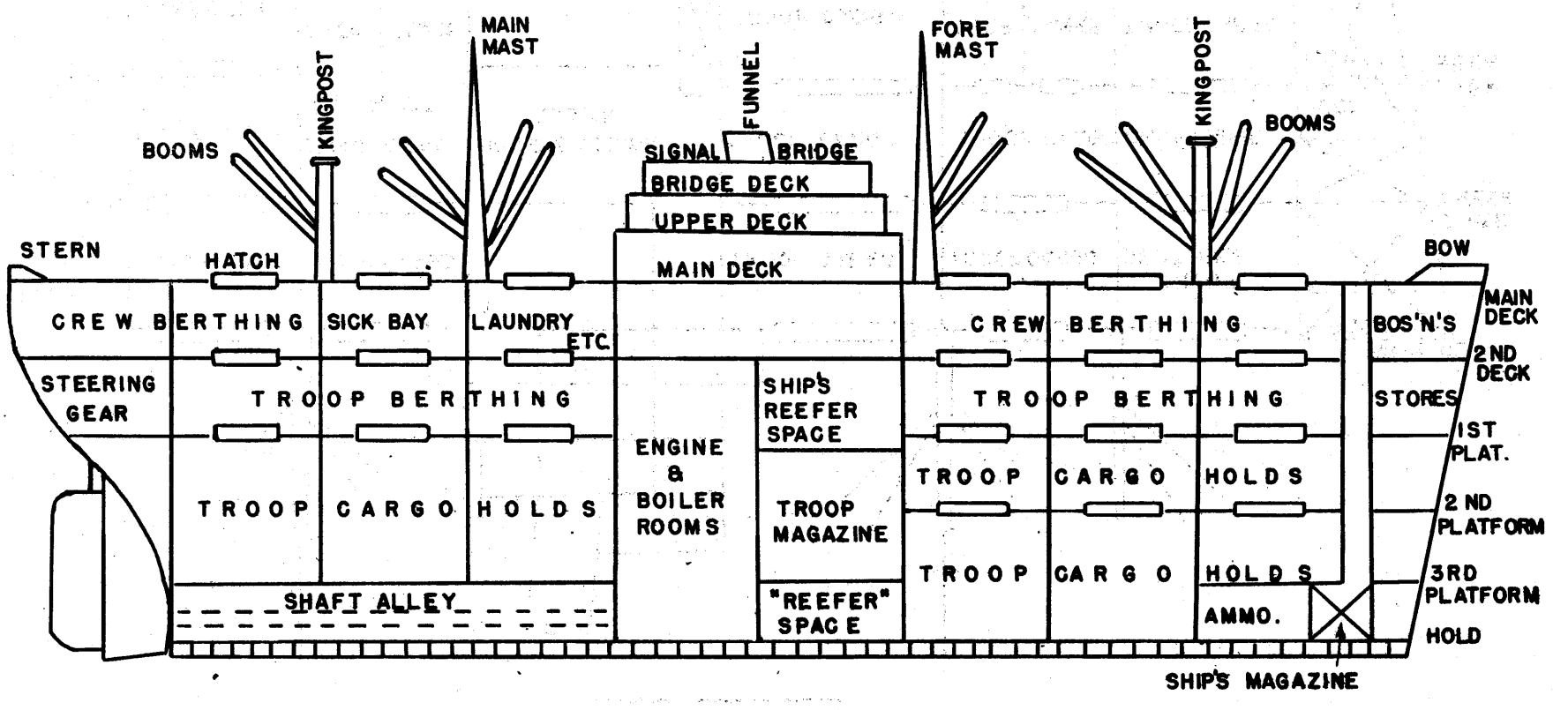
LANDING BOAT GROUP COMPLEMENT

Rank	*Administrative Duties*	*Collateral Duties*
Lieutenant	Boat Group Commander	Boat Division Officer
Lieutenant (jg)	Asst Boat Group Comdr	Asst Boat Division Officer
Ensign	Boat Officer	Boat Div Jr W & D Officer
Ensign	Boat Officer	Boat Div Jr W & D Officer
Ensign	Boat Officer	Boat Div Jr W & D Officer
Ensign	Boat Officer	Boat Div Jr W & D Officer
Ensign	Boat Officer	Boat Div Jr W & D Officer
Ensign	Boat Officer	Boat Div Jr W & D Officer
Ensign	Boat Officer	Boat Div Jr W & D Officer
Ensign	Boat Officer	Boat Div Jr W & D Officer
Ensign	Boat Officer	Boat Div Jr W & D Officer
Ensign	Boat Officer	Boat Div Jr W & D Officer

BEACH PARTY COMPLEMENT

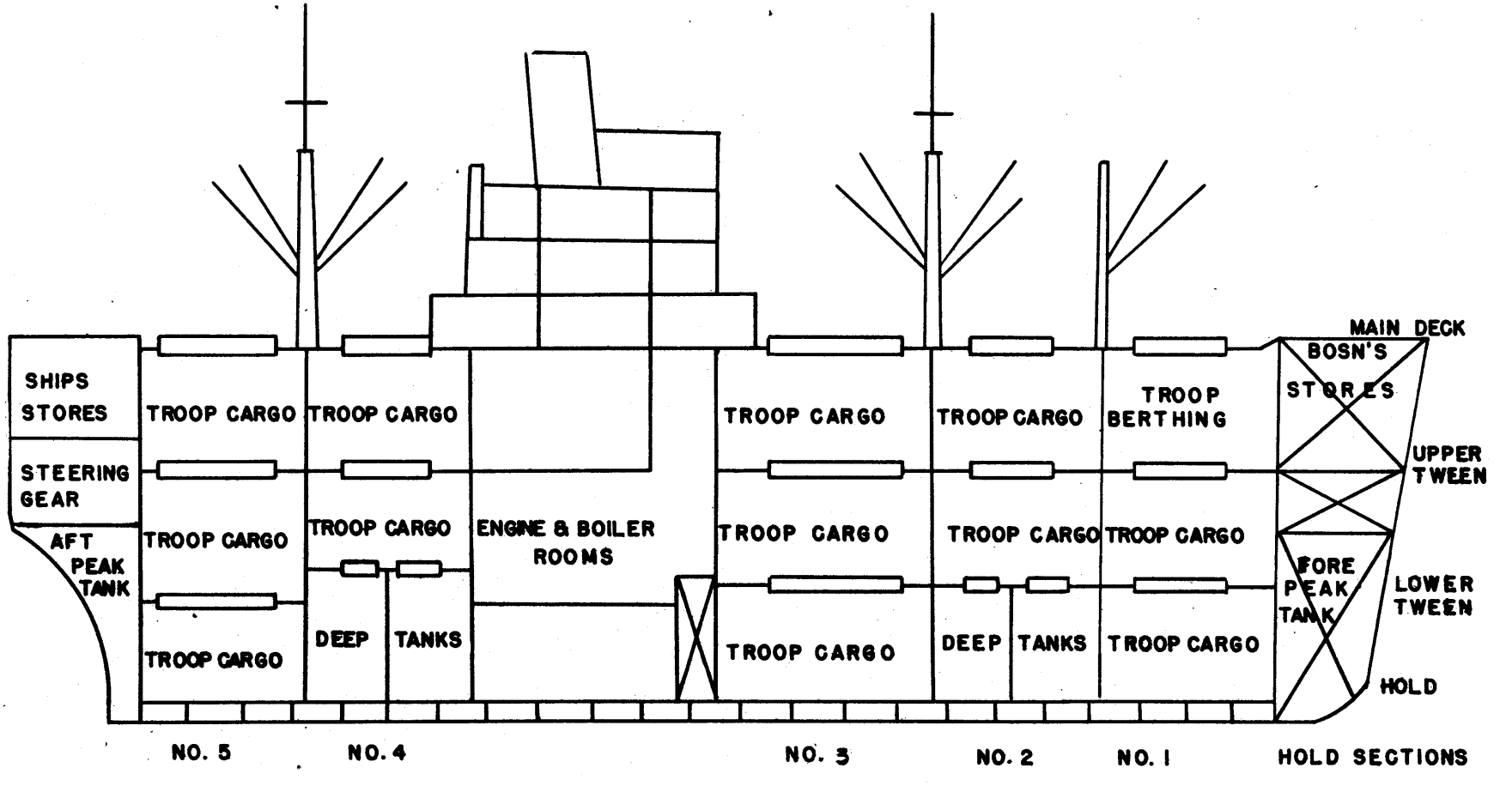
Rank	*Administrative Duties*	*Collateral Duties*
Lieut Comdr	Beachmaster	Asst First Lieutenant
Lieutenant	Beach Party Comm. Officer	Radio Officer Asst Comm Off
Lieutenant (MC)	Beach Party Medical Officer	Assistant Medical Officer

TYPICAL APA



SHIP'S PROFILE

TYPICAL AKA


SHIPS STORES
STEERING GEAR
AFT PEAK TANK
TROOP CARGO
TROOP CARGO
TROOP CARGO
TROOP CARGO
TROOP CARGO
TROOP CARGO
TROOP CARGO
TROOP CARGO
TROOP CARGO
TROOP CARGO
TROOP CARGO
TROOP CARGO
TROOP CARGO
TROOP CARGO
DEEP TANKS
DEEP TANKS
ENGINE & BOILER ROOMS
TROOP BERTHING
MAIN DECK
BOSN'S STORES
UPPER TWEEN
FORE PEAK TANK
LOWER TWEEN
HOLD
NO. 5
NO. 4
NO. 3
NO. 2
NO. 1
HOLD SECTIONS

CHAPTER III

CHARACTERISTICS OF LANDING CRAFT

Availability of Landing Craft

One of the most serious handicaps, which will complicate the TQM's problem in unloading a ship, is the limited number of landing boats and tank lighters available for ferrying vehicles and supplies ashore. Ordinarily, APAs carry two to four LCMs and twenty-five to thirty LCVPs. Obviously, no equipment which can be carried in LCVPs should be sent ashore in LCMs as long as heavy equipment remains aboard.

Boat Space

Capacity of landing boats is generally referred to in terms of boat spaces. It is assumed that one boat space is equal to the weight or volume of an average soldier fully equipped for combat. For the sake of a uniform figure, a boat space is assumed to equal 224 pounds, or 13.5 cubic feet. Either figure is used depending on which is reached first.

LCVP

APAs usually carry twenty-five to thirty LCVPs. They were designed to provide a boat which could serve the dual purpose of moving vehicles and personnel. The maximum capacity of an LCVP is one ¾ ton Weapons Carrier, or 4 tons of cargo, or 36 men.

LCM(3)

The LCM(3) is the largest landing boat normally carried aboard assault transports and cargo ships. Most APAs carry two to four LCM(3)s, while the AKAs usually carry two to eight. The cargo capacity of the LCM(3) is 30 tons or one medium tank. The LCM(3) is invaluable in the unloading phase as it is able to handle most of the army vehicles carried aboard the APAs and AKAs. With the addition of LSDs to the ships of the Amphibious Forces, the LCM(3) has become more important as 14 LCM(3) (each with a medium tank) can be loaded into an LSD and transported to the objective.

LCI(L)

The Landing Craft, Infantry, LCI(L), is the largest of the landing craft types. Its use as a troop carrier is definitely limited by its size and accommodations for troops. Generally speaking, forty-eight hours is the longest practical period to keep troops on board. It is ocean-going, however, and has good cruising range. Its speed is too slow to permit it to accompany Assault Transport Groups.

LCT

The Landing Craft, Tanks, LCTs, are of two general types; the LCT(5) and the LCT(6). Because the superstructure of the LCT(6) is not athwartships, as in the LCT(5), it is more difficult to handle alongside transports and larger ships. Neither type is ocean-going. As a cargo carrier with facilities for unloading on a beach, they have no equal. Both can be carried in an assault operation in LSDs or on the main decks of LSTs.

LVT

Landing Vehicles, Tracked, LVTs, are pontooned tanks of an all steel construction and are designed to be operated in water as well as on land. The tracks are equipped with grousers which provide traction on land and propel the vehicle in water.

The LVT(2) is an unarmored personnel and cargo carrier with a hull construction of ten, twelve and fourteen gauge steel. A glass windowed cab is provided for the operator.

The LVT(4) is similar in most respects to the LVT(2), except that the engine is located forward and a ramp has been installed aft to expedite unloading and permit the use of a palletized cargo.

The LVT(A)(1) is identical to the LVT(A)(2) in construction, hull and cab design except that a turret similar to that used on a light tank is mounted on top of the cargo compartment. A 37mm gun and a caliber .30 machine gun are installed in the turret. Directly behind the turret, in a flat plate between the engine compartment and turret, are two circular manholes equipped with scarf mounts for machine guns.

The LVT(A)(4) is the heaviest amphibious vehicle tracked, with a weight of 38,000 pounds. It is a turret type, similar to the LVT(A)(1) except that it carries greater armament (one 75mm and one 50 caliber machine gun).

It should be realized that the troop and cargo type LVT is a bulky, heavy, fuel consuming piece of equipment, requiring much cargo space for its delivery to the theater of operations. It has neither the speed nor the life of a boat or truck. The probable life of the tractor is 180 hours of operation. In an emergency, where overhauling is not possible, 200-300 hours can be obtained. A minimum of 72 hours is necessary for a general overhaul where completely equipped ship facilities exist. After 300 hours of operation, a major overhaul is necessary. Operators are trained to keep breakdowns to a minimum and will not allow the most minor repairs to go unattended when time permits. In view of these limitations the following are considered appropriate tasks:

1. Delivery of personnel, equipment, and supplies directly from the ship to the beach and to dumps.
2. Transporting personnel, equipment, and supplies from Landing Craft over a reef to the beach and to dumps.
3. Transporting personnel, equipment, and supplies from beached boats to inland positions and dumps.
4. Towing out stalled vehicles or boats.
5. Clearing the beach of vegetation or light wire obstacles for unloading boats. Tractors can crush light barbed wire and can also be used for ripping out sections of wire obstacles.
6. Delivering personnel, equipment, and supplies over terrain that cannot be traversed by other vehicles.
7. Acting as prime movers for light artillery weapons over suitable terrain.
8. Clearing fields of fire through heavy growth and expediting the work of the engineers.
9. Evacuating wounded from inland positions on return trip to beach or directly to ship.
10. Transporting light artillery pieces from ships to firing position. The 75mm pack howitzer must be broken down to a size suitable for manhandling from tractor to ground, and for distribution of component parts within cargo compartment according to weight.

The LVT is not a tank and must not be employed as such. Commanders who attempt to do so will not have such vessels available for the vital troop carrying and cargo handling jobs for which they are designed.

The characteristics of the LVT prohibits stacking. The decision as to the type of ship used to transport LVTs must be given careful consideration based on the speed of the ship, quantity of LVTs to be carried, unloading facilities, and methods of launching and loading. The following ships and Landing Craft are capable of transporting LVTs.

1. APs and APAs
2. AKs and AKAs
3. LSTs
4. LSDs
5. LSVs
6. LSMs
7. LCTs

Loads for initial trips to the beach should be planned according to the need of the operation insofar as they can be foreseen. Experience shows that the demands for small caliber ammunition, demolitions, and water during the initial phases of operations are greater than demands for other items.

The initial phase for tractors will be considered concluded when demands are for supplies rather than personnel. Loading for this phase should consist of boxes of uniform size, weight, and shape where possible. Only enough personnel should be provided to stow and unload cargo under the guidance of the tractor crew. Extreme care must be exercised in lowering cargo into tractors in order to prevent damage to the propeller shaft and bilge pump power take off. There is not sufficient room within the tractor compartment to unload large size nets. Nets should be lowered to the engine compartment and supported by ship boom until partially unloaded. All embarked supplies should be consigned to one destination, thus avoiding split loads.

In many cases it will be necessary to transfer cargo from boats to tractors off shore or at the edge of a reef. If this is necessary, adequate working parties afloat must be provided.

Prior to loading the LVTs on LSTs or LSDs, all heavy equipment should be loaded in the LVTs. This will eliminate the necessity for transporting such equipment from APs or AKs by means of small boats. LVT loads should be planned by assault troop commanders.

Pertinent Data on LVTs:

	LVT(2)	LVT(4)	LVT(A)(1)	LVT(A)(4)
Overall length	26'1"	26'1"	26'1"	26'1"
Overall width	10'8"	10'10"	10'0"	10'8"
Overall height	8'1"	8'1"	10'1"	10'1"
Weight, unloaded with crew, unarmored	25,200	25,300	.....	.....
Weight, unloaded with crew, armored	28,500	28,600	32,800	38,000
Cargo capacity (pound)	6,500	8,000	.....	.....
Cargo capacity (men)	20-24	30	.....	.....
Cargo space,				
Length	129"	150"	.....	.....
Width	94"	84"-94"	.....	.....
Depth	52"	64"	.....	.....

The ramp of the LVT(4) is capable of supporting 5000 pounds.

DUKW

The Amphibious Truck is a vehicle designed for service operation on land or water. It has automotive characteristics of a conventional truck but is, in addition, equipped with a water tight hull designed in such a manner that the truck chassis and drive units are attached to and in the body of the hull. For land operation, the vehicle utilizes six driving wheels, driven by a conventional six cylinder, valve-in-head engine through the transmission, transfer case and propeller shaft. For water operation, the vehicle is propelled by a water propeller powered from the engine through the transmission and a water propeller case. As a truck, the front wheels are steered with conventional steering assembly. When operating in water, the vehicle is steered with combined use of the front wheels and a rudder which is connected to, and operated by the steering gear column.

Pertinent Characteristics of SNL G-501 Amphibian Truck 2½-ton 6x6 (DUKW-353), typical of all DUKW models, are listed as follows:

Maximum overall length	31'0"
Maximum overall width	8'0"
Maximum overall height (top up)	8'10"
Maximum overall height (top down)	8'2"
Maximum overall height (windshield down)	7'5"
Weight (light)	13,000
(loaded)	18,600
Cargo capacity (pound)	5,000
Cargo capacity (men)	25
Cargo space	6'9¾" x 12'5"

The volume of cargo handled by DUKWs is affected by the following factors:

1. Distance from ship to shore.
2. Distance from beach to dump.
3. Necessity for stops to inflate or deflate tires.
4. Efficiency of cargo handling personnel.
5. Number of ship's hatches being worked.
6. Number of DUKWs available.

When the ship is one mile, or less, offshore and the dump not over five miles inland, an average of one ton of cargo per truck per hour can be handled from one hatch. This assumes that inflation and deflation of tires is necessary (without automatic equipment) on each trip.

DUKWs can be transported to the scene of operations by any cargo ship with hatch openings large enough to accommodate the length and width of a DUKW (31' x 8'2"). A cargo boom of ten ton capacity will lift the vehicle out of the hold.

LSTs and LSDs make excellent carriers for DUKWs as their characteristics simplify the problems of loading and launching.

The rated capacity of a DUKW is 2½ tons of cargo. This load may be exceeded slightly in emergencies.

The general method of handling small cargo is with a 20x20 foot (3½ ton) cargo net. With this in mind, each DUKW should be equipped with one net of this size so that on each trip from the shore to the ship, an empty net can be exchanged for a full one.

The howitzer sling is used for loading howitzers aboard DUKWs. This sling consists of three cables and chain assemblies attached to a lighting ring. Two of the cables are 45½ iches long and the third cable, used as a stabilizer, is 113 inches long. The two cables are attached to the wheels of the howitzer. It is important that the chain be passed through the wheels from the outside—then under the wheels. It is necessary to change the center bilge auxiliary pump outlet in order to allow the wheels of the 105mm gun to fit into the hold.

All heavy cargo should be centered approximately two feet forward of the center of the cargo space.

One in every five DUKWs should be fitted with an "A" frame to be used in unloading the DUKW at the dump. Every DUKW is equipped with fixtures for attaching "A" frames. The "A" frame, used in conjunction with the winch, makes an excellent crane.

If necessary to handle heavier cargo, such as trucks, etc., two DUKWs can be lashed side by side and a platform placed over the top to accommodate the load. This should not be practiced except in smooth water.

PERSONNEL LANDING CRAFT

LCI(L)	Landing Craft, Infantry (large)
LCP(L)	Landing Craft, Personnel (large)
LCP(R)	Landing Craft, Personnel (ramped)
LCR(S)	Landing Craft, Rubber (small)
LCR(L)	Landing Craft, Rubber (large)

VEHICLE AND TANK LANDING CRAFT

LCM(3)	Landing Craft, Mechanized
LCT(5)	Landing Craft, Tank
LCT(6)	Landing Craft, Tank
LCV	Landing Craft, Vehicle
LCVP	Landing Craft, Vehicle, Personnel

SUPPORT AND COMMAND CRAFT

LCC(1)	Landing Craft, Control
LCC(2)	Landing Craft, Control
LCI(G)	Landing Craft, Infantry, Gunboat
LCS(S) (1)	Landing Craft, Support, (small)
LCS(L) (3)	Landing Craft, Support, (large)

AMPHIBIOUS VEHICLES

LVT(2)	Landing Vehicle, Tracked
LVT(3)	Landing Vehicle, Tracked
LVT(4)	Landing Vehicle, Tracked
LVT(A) (1)	Landing Vehicle, Tracked, Armored
LVT(A) (2)	Landing Vehicle, Tracked, Armored
LVT(A) (4)	Landing Vehicle, Tracked, Armored
DUKW	2½ ton, 6x6, Amphibian Truck

LANDING SHIPS

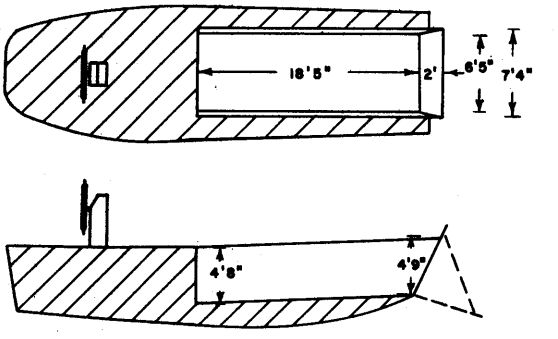
LSD	Landing Ship, Dock
LSM	Landing Ship, Medium
LST	Landing Ship, Tank
LSV	Landing Ship, Vehicle
AGC	Amphibious Force Flagship
APD	High Speed Transport (Destroyer)

SYMBOL	LENGTH OVERALL	BEAM	DRAFT		LANDING DISPLACEMENT (TONS)	SPEED (NORMAL)	TYPE OF ENGINE	RADIUS (NORMAL)	FRESH WATER CAPACITY	FULL CAPACITY	TROOPS		ARMAMENT	ARMOR	BOATS CARRIED	CREW		CARGO CAPACITY AT LANDING DRAFT (Tank Deck Only)
			FORWARD	AFT							OFFICERS	ENLISTED				OFFICERS	ENLISTED	
L.S.V. (1) (2)	453' 10½"	60' 2½"	(1) 18' (2) 17'		7,927	19.5 (Max.)	STEAM TURBINE	9,000	EVAPS	2,020 T	—	800	4-5"/38 (S) 4-40mm (T) 20-20mm (S)	SPLINTER	16 LCVP	22	345	35,500 Cu. Ft. 27 DUKWS
L.S.V. (3) (4)	451'	60'	18'		7,927	19.5 (Max.)	STEAM TURBINE	9,000	EVAPS	2,020T	—	800	3-5"/38 4-40mm (T) 18-20mm (S)	SPLINTER	14 LCVP	20	362	19 L.V.T. or 29 DUKWS
L.S.V. (5) (6)	457' 11"	60'	18'		7,927	19.5 (Max.)	STEAM TURBINE	9,000	EVAPS	2,020T	—	800	4-5"/38 (S) 4-40 mm (T) 20-20mm (S)	SPLINTER	10 LCVP	20	362	19 LVTs or 31 DUKWS GASOLINE 17,500 Cu. Ft. AMMO. 3,600 Cu. Ft. GENERAL 30,475 Cu. Ft.
L.S.D.	457' 9"	72'	15' 5"	16' 2"	7,930	15	STEAM TURBINE	8,000	EVAPS	1,500T	22	218	1-5"/38 (S) 2-40mm (T) 2-40 mm QUAD. 16-20mm (S)	SPLINTER	2 LCVP	17	237	3-LCT(5) or (6) Eq. with 5 Med. Tanks; 14 LCM Eq. with 1 Med. Tank; 41 LVT or 47 DUKWS.
L.S.T.	328'	50'	3' 1"	9' 6"	2,160	9	2-900 H.P. DIESEL	6,000	434 T EVAPS	595T	16	168	7- 40 mm 12-20 mm	SPLINTER	2 LCVP	7	104	19 Med. or 39 Light Tanks; 17 LVT (Max.) 29 Med. 45 Light, 17 LVT (4)
L.S.M.	203' 6"	34'	3' 5"	6' 11¼"	741	12.5	DIESEL	3,600	18 T	168T	2	52	6-20 mm	SPLINTER	1 DINGHY	4	48	5 Med. or 3 Heavy Tanks; 6 LVT or 9 DUKWS
LCI (L) 0-350	158' 5½"	23' 3"	2' 8"	4' 10"	234	13	8-225 H.P. DIESEL	4,000	10T	106T	6	182	4-20 mm	SPLINTER	1 DINGHY	3	25	75 Tons
LCI (L) 351- up	158' 5½"	23' 3"	2' 8"	4' 10"	250	13	8-225 H.P. DIESEL	4,000	37 T	110T	9	196	5-20 mm	SPLINTER	1 DINGHY	3	25	32 Tons
351- up LCI (G)	158' 5½"	23' 3"	2' 8"	4' 10"	387	13	8-225 H.P. DIESEL	4,000	37T	110T	0	0	3-40 mm (a) 4-20 mm And 10 Mk 7 ROCKET PROJECTOR	SPLINTER	1 DINGHY	3	53	NONE
LCS (L) (3)	158' 5½"	23' 3"	5'	9"	395	13	8-225 H.P. DIESEL	4,000	39.3 T	86.9T	0	0	1-3"/50 2-40mm (T) 4-20 mm (S)	SPLINTER	1 DINGHY	5	68	NONE
LCT (5)	117' 6"	32'	2' 10"	4' 2"	286	8 (Max.)	3-225 H.P. DIESEL	700	2.5 T	11.12T	0	0	2-20 mm	SPLINTER	1 DINGHY	1	12	5 Med. or 4-40 Ton Tanks or 3-50 Ton Tank; 9- Trucks; 150 Ton Cargo.
LCT(6)	120'- 4"	32'	3' 4"	4'	284	8 (Max.)	3-225 H.P. DIESEL	700	2.5T	11.12T	0	8	2-20 mm	SPLINTER	1 DINGHY	1	11	4- Med. or 3-50 Ton Tanks; 150 Ton Cargo
L.C.C.	56'	13' 7"	3'-11½"		30	13.5 (Max.)	2-225 H.P. DIESEL	240@ Max.	---	550 (Gal)	0	0	3- 50 Cal (T) M.G.	NONE	---	2	13	NONE
L.C.M.	50'	14'	3'-6"		28	10	2-225 H.P. DIESEL	125	---	400 (Gal.)	0	60	2-50 Cal (S) M.G.	¼" ON Conn	---	0	5	1- Med. Tank or 30 Tons
LCVP	36'	10' 5¼"	3'-2"		9	9	1-225 H.P. DIESEL	100	---	200 (Gal.)	0	36	2-30 Cal (S) M.G.	¼" STS RAMP & Hull	---	0	3	1-1(T) Truck or 2 Tons Cargo
LCP (R)	35' 10"	10' 9"	3'-6"		13,000	11	DIESEL	200	---	150 (Gal.)	0	30 to 36	2-30 Cal M.G.	¾" TRANVERSE BULKHEADS	---	—	3	6,700-8,100 Lbs.
LCP (L)	36' 8"	10' 10"	3-6"		18,000	8	DIESEL	130	---	150 (Gal.)	0	30 to 36	2-30 Cal M.G.	3 TRANVERSE BULKHEADS	---	—	3	6,700-8,100 Lbs.
LCS(S)	41' 2"	10' 0"	3'-6"		12.5	9	DIESEL	60	---	150 (Gal.)	0	0	2-50 Cal. M.G., 2-303 LEWIS SMOKE POTS	10 Lb To SIDES, 20 Lb. To Conn	---	—	11	----------
LVT (2)	26' 1"	10' 8"	4'		12.5 14.5	5.5W* 2.5L*	GASO LINE	50W 150L	---	110 (Gal.)	0	30	2-50 Cal. M.G. 2-30 Cal. M.G.	½" BOW & CAB ¼" HULL WHEN ARMORED.	---	—	3	6,600 Lbs.
LVT (4)	26' 1"	10' 8"	4'		12.5 14.5	5.5W 25L	GASO LINE	65W 200L	---	150 (Gal.)	0	30	2-50 Cal. M.G. 2-30 Cal. M.G.	SAME AS MARK (2) WHEN ARMORED	---	—	3	8,000 Lbs.
LVT (A) (1)	26' 1"	10' 8"	4'-3"		16.2	5.5W 25L	GASO LINE	50W 150L	---	104 (Gal.)	0	0	1-37mm 3-30 Cal. M.G.	½" TURRET ¼" HULL	---	—	6	----------
LVT (A)(4)	26' 1"	10' 8"	4'-3"		19	5.5W 25L	GASO LINE	50W 150L	---	104 (Gal.)	0	0	1-75 mm 1-50 Cal. M.G.	SAME AS LVT(A) (1)	---	—	6	----------
2½T 6x6 DUKW	31'	8'	3' 8"	4' 4"	9.2	5.5W 50L	GASO LINE	400 MILES @35 M.P.H	---	40 (Gal.)	0	25	VARIES	NONE	---	—	1	5,000 Lbs.

*L-LAND W-WATER (SPEEDS IN M.P.H.)

LCV

LANDING CRAFT, VEHICLE



SCALE 1/8" TO 1'

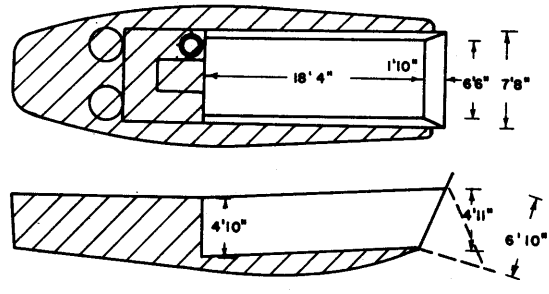
PERTINENT DATA

LENGTH (OVERALL)	36'4"
BEAM	10'9½"
DRAFT	3'
WEIGHT (TONS)	6.8
SPEED (NORMAL)	10 MPH
TYPE OF ENGINE	225 HP GAS OR DIESEL
RADIUS (NORMAL)	200 MI.
FUEL CAPACITY	150 GAL.
ARMAMENT	2 CAL. 30 MG
CREW	4

CARGO CAPACITY
36 TROOPS OR
1/2 TON TRUCK OR
4 TONS CARGO

LCVP

LANDING CRAFT, VEHICLE-PERSONNEL



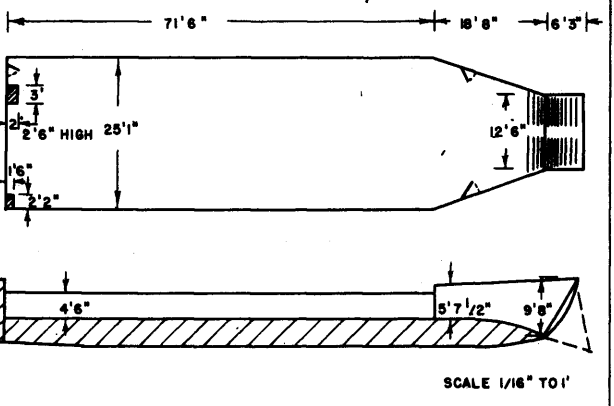
SCALE 1/8" TO 1'

PERTINENT DATA

LENGTH (OVERALL)	36'4"	CARGO CAPACITY
BEAM	10'9"	36 TROOPS OR
DRAFT	3'2"	1 – 3/4 TON TRUCK OR
WEIGHT (TONS)	8.925	4 TONS CARGO OR
SPEED (NORMAL)	10 MPH	2 37 MM AT GUNS & 18 MEN OR
TYPE OF ENGINE	225 HP DIESEL	1 – 1/4 TON TRUCK & TRAILER & 17 MEN OR
RADIUS (NORMAL)	100 MI	1 105 MM HOWITZER & 15 MEN OR
FUEL CAPACITY	200 GAL	2 1 TON TRAILERS & 5 MEN OR
ARMAMENT	2 CAL. 30 MG	1 37 MM AT GUN, 1/4 TON TRUCK & 15 MEN
ARMOR	1/4" RAMP & SIDES	
CREW	4	

LCT (5)

LANDING CRAFT TANK, MARK V



SCALE 1/16" TO 1'

PERTINENT DATA

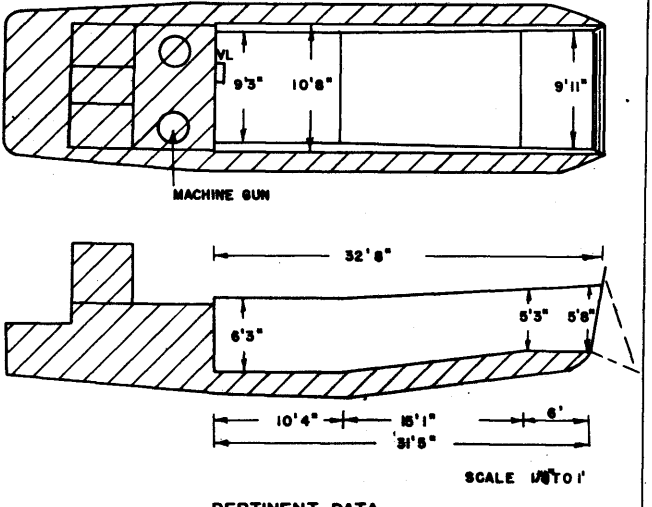
LENGTH (OVERALL)	108'
BEAM	32'
DRAFT FWD	3'4"
DRAFT AFT	4'1"
WEIGHT (TONS)	286
SPEED (NORMAL)	9 KNOTS MAX.
TYPE OF ENGINE	3-225 HP DIESEL
RADIUS (NORMAL)	500 MI.
FRESH WATER	25 TONS
FUEL CAPACITY	11.12 TONS
ARMAMENT	2-20 MM
ARMOR	SPLINTER
BOATS CARRIED	1 DINGHY
CREW	1 OFFICER 11 E M

CARGO CAPACITY

5 MEDIUM TANKS OR
5 LIGHT TANKS OR
3 HEAVY TANKS OR
400-500 TROOPS (SHORT TRIP ONLY) OR
70 TROOPS (SLEEPING OVERNIGHT) OR
150 TONS CARGO

LCM

LANDING CRAFT MECHANIZED



SCALE 1/16" TO 1'

PERTINENT DATA

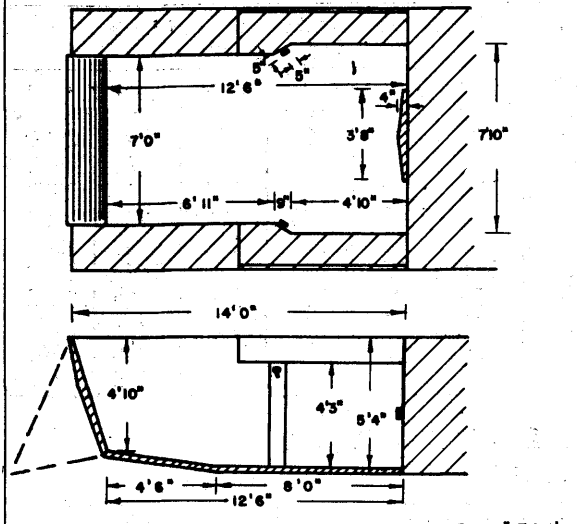
LENGTH (OVERALL)	50'
BEAM	14'
DRAFT	3'6"
WEIGHT (TONS)	22
SPEED (NORMAL)	10 MPH
TYPE OF ENGINE	2-225 HP DIESEL
FUEL CAPACITY	400 GAL.
RADIUS (NORMAL)	125 MI.
ARMAMENT	2 CAL. 50 MG
ARMOR	1/4" ON CONTROL STATION
CREW	5 EM

CARGO CAPACITY

1 MED. TANK OR
30 TONS CARGO OR
120 TROOPS OR
2 1/2 TON TRUCKS OR
3 1/4 TON TRUCKS OR
1 LIGHT TANK OR
4 1TON TRAILERS OR
2 105 MM HOWITZERS & 20 MEN OR
1 HALFTRACK OR
1 BULLDOZER OR
1 CRANE TRACTOR OR
1 CRANE TRUCK MOTORIZED OR
1 D-7 TRACTOR W/O BLADE OR
1 D-8 TRACTOR W/O BLADE

LVT (4)

LANDING VEHICLE TRACK, MARK IV



SCALE 1/4" TO 1'

PERTINENT DATA

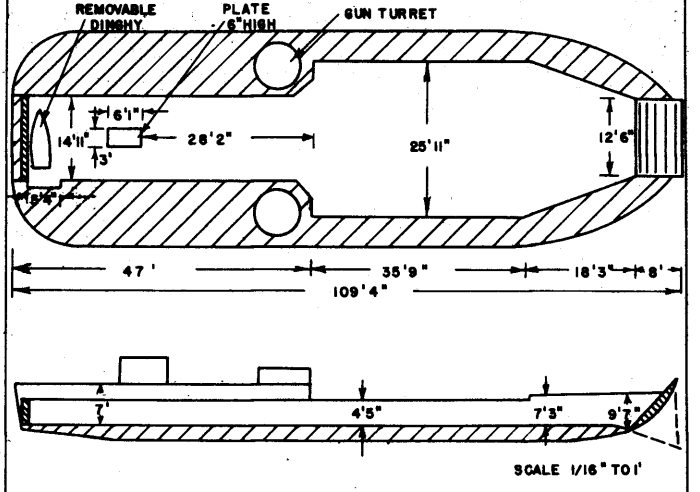
LENGTH (OVERALL)	26'1"
BEAM	10'8"
DRAFT	4'0"
WEIGHT (TONS)	12'2"
SPEED (NORMAL) LAND	14-23 MPH
WATER	4- 5 MPH
TYPE OF ENGINE	250 HP GAS
RADIUS (NORMAL)	200 MI.
FUEL CAPACITY	150 GAL.
ARMAMENT	4 BRACKET MOUNTS FOR 30 & 50 CAL.
ARMOR	NONE
CREW	4 EM

CARGO CAPACITY

4 TONS CARGO OR
1 1/4 TON TRUCK

LCT (6)

LANDING CRAFT TANK, MARK VI



SCALE 1/16" TO 1'

PERTINENT DATA

LENGTH (OVERALL)	118'
BEAM	32'
DRAFT FWD	3'4"
DRAFT AFT	4'
WEIGHT (TONS) LIGHT	132
LOADED	282
SPEED (NORMAL)	9 KNOTS MAX.
TYPE OF ENGINE	3-225 HP DIESEL
RADIUS (NORMAL)	500 MI.
FRESH WATER CAPACITY	26.5 TONS
FUEL CAPACITY	11.12 TONS
ARMAMENT	2-20 MM
ARMOR	SPLINTER
BOATS CARRIED	1 DINGHY
CREW	1 OFFICER
	11 EM

CARGO CAPACITY

4 MEDIUM TANKS OR
5 LIGHT TANKS OR
3 HEAVY TANKS OR
400-500 TROOPS (SHORT TRIP ONLY)
OR
70 TROOPS OR
150 TONS CARGO

BOAT LOADING TABLE

Item	Rounds Per Container	Sq. Ft. Per Container	Wt. In Lbs. Per Container	Rounds Per Unit of Fire	No. of Containers to Load Each Type of Craft					
					LCP(R)	DUKW	LCVP	LCV	LCM	LCT
30 cal. amm.	1250	1.21	101	2000	100	50	80	100	594	2970
50 cal.	350	1.21	115	2000	87	44	70	87	521	2608
37mm	20	1.56	101	100	100	50	80	100	594	2970
60mm	18	2.28	82	100	122	61	98	122	731	3658
75mm	3	1.66	70.3	300	142	71	114	142	853	4267
81mm light	6	1.74	58	70	171	85	137	171	1034	5170
81mm hvy.	3	1.46	57	30	176	88	140	176	1052	5263
90mm	4	3.94	236	125	42	21	33	42	258	1271
105mm	3	2.50	153.9	200	64	32	51	64	389	1948
155mm	2	2.34	218	150	45	23	36	45	275	1376

LOAD CAPACITY OF LANDING CRAFT IN POUNDS & SQ. FT.

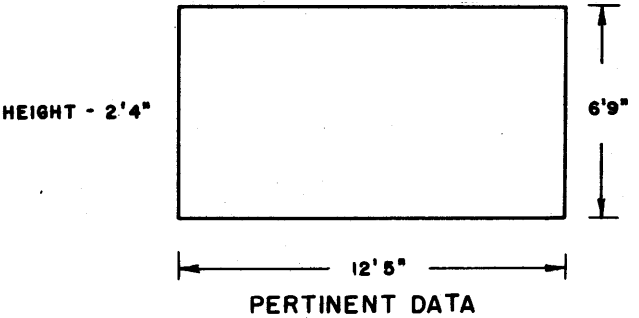
Type of Craft	Capacity in Pounds	Capacity in Sq. Ft.	Ramp Width
LCP(L)	6000	74.2	NONE
LCP(R)	6000	130	3'5⅛"
LCV	6000	117	6'1¼"
LCVP	6000	114	6'4½"
DUKW	5000	84.84	NONE
LCM	60000	304	10'4"
LCT	300000	2382	12'6"

The figures given for capacity of craft in square feet have been determined after careful consideration of loading problems. Adequate space has been allowed to permit crews to carry out their duties and to assure the shortest possible time in loading and unloading.

The DUKW will carry 5000 pounds on land or 10000 pounds on water.

DUKW

AMPHIBIOUS TRUCK, 2-1/2 TON, 6 x 6



PERTINENT DATA

BEAM	8'2"
LENGTH (OVERALL)	31'0"
HEIGHT	8'10"
DRAFT FWD	3'6"
AFT	4'3"
WEIGHT (TONS)	7.2
SPEED (NORMAL) LAND	3-50 MPH
WATER	4-6 MPH
TYPE OF ENGINE	GAS
ARMAMENT	NONE
ARMOR	NONE
CREW	1

CARGO CAPACITY

25 TROOPS OR
2-1/2 TONS CARGO

CHAPTER IV

THE TRANSPORT QUARTERMASTER

SECTION 1 — GENERAL

Methods of Transport Loading

Transport loading is usually accomplished in one of four definite and distinct methods. The first is COMMERCIAL LOADING . . . Materiel is packed into ships without thought for facility in debarkation. Every effort is made to utilize every cubic foot of cargo space. Economy in the use of ship's space is the guiding keynote. In a military sense, this type of loading is good only for resupplying occupational or garrison forces.

The next method is designated as CONVOY UNIT LOADING. In this type of loading, entire units with all their equipment and assigned supplies are embarked in one convoy. Supplies and equipment are loaded without consideration for rapid tactical debarkation. Units will probably be separated, at least in part, from their equipment and supplies. This method of loading is economical in ship's space and is applicable for the transportation of occupational troops which will be debarked at a single port. However, it would be ineffective if troops were to be debarked at widely separated points since their equipment would probably be on another ship.

ORGANIZATIONAL UNIT LOADING is a method which merits considerable study and consideration. Units so loaded have all their equipment and supplies stowed on the vessel with the unit. Readiness for assault tactical debarkation is not essential and for this reason ships which do not have assault transport characteristics may be used. This method of loading is usually designated for the embarkation of reserve troops in a large amphibious assault force. Since it is possible that equipment and supplies so loaded may have to be debarked over the side into boats and lighters, some thought must be given to accessibility. This provides a somewhat less economical method of loading than those described in the two previous types of loading.

The last and most important method of loading is COMBAT UNIT LOADING. This method is most frequently mentioned and, unfortunately, is not often completely understood. It is the backbone of the entire amphibious operation. The best tactical plan ever devised will come to grief if the transports are not loaded correctly. By definition, combat unit loading is the loading of personnel and materiel aboard ship in such a manner that when the personnel are debarked, each man will have his fighting gear or weapons with him. Therefore, each machine gun section will have its guns and ammunition, and each artillery section will have its gun and prime mover with it when it hits the beach. The loading of a transport so that every vehicle, round of ammunition, and box of rations is in its proper place aboard ship for an assault on an enemy beach, is the responsibility of the Troop TQM for that ship. The tactical plan is made by the CO of Troops, and the Troop TQM then makes loading plans to conform to that plan. The following command echelons have Troop TQMs:

Army Task Force or Field Army
Corps
Divisions
Regimental Combat Teams or other Embarkation Groups
Landing Teams, Separate Organizations or Detachments aboard any of the following type ships: APA, AP, AKA, AK, XAP, XAK, and LSTs.

SHIP TQMs

All APAs and AKAs will have Marine Officers permanently assigned on board as Transport Quartermasters. Those ships of the Amphibious Force to which TQMs have not as yet reported will have Naval Officers designated as "acting" TQMs. In order to eliminate confusion, the TQM permanently assigned to a ship is known as the "Ship TQM", as distinguished from the "Troop TQM".

DIVISION TQM

Force, Field Army, Corps and Division TQMs operate as Special Staff Officers on the staffs of their respective commanders. They make suitable recommendations on matters pertaining to staff planning, employment of transports, loading, and embarkation of the troops of their commander. The Division TQM is responsible to the Division Commander for the complete coordination of all loading activities of that Division.

RCT TQM

The Regimental Combat Team or other Embarkation Group TQM coordinates Troop TQM activities within the embarkation group. He does not load any one ship, but has the function of insuring the proper and complete loading of all ships within his group. During loading, the RCT TQM will establish an office on the docks at a centrally located position.

TROOP TQM

A Troop TQM and suitable assistants are designated by all Divisions as far in advance of amphibious operations as is practicable. These officers will be trained either by established schools or by the Divisions when facilities and capable instructors are available.

It is recommended that one officer and at least 10 noncommissioned officers be assigned from each infantry battalion, artillery battalion, from Division Troops, and from other major attached units in order that every major unit in the Division will have personnel thoroughly familiar with the problems of loading and embarkation. Sufficient numbers of officers must be designated so that each ship, including LSTs, has a Troop TQM.

When performing duty as Troop TQM for a particular ship, officers so assigned will follow the general directives expressed in paragraph 926, FTP 167, functioning as the direct representative of the CO of Troops in all matters relating to loading, unloading, billeting, messing, and contact with ships' personnel. The Troop TQM contacts ships' personnel and, in general, deals with the ship through the Ship TQM.

Troop TQMs and details, under command of the Division TQM (or TQM of the highest embarkation echelon if less than a Division) should proceed to the Port of Embarkation and establish a Command Post at the earliest practicable time, in advance of troops and materiel, for coordination of plans with ship and port loading personnel. The Commander of the Ship Loading-Unloading Detail (Ship's Platoon) and the Billeting Officer act under the direction of, and as assistants to, the Troop TQM.

CHAPTER IV

THE TRANSPORT QUARTERMASTER

SECTION 2 — THE SHIP TQM

The Ship TQM is assigned to permanent duty on an APA or AKA as a Ship's Officer by the Commandant, U. S. Marine Corps, and is the expert advisor to the Captain of the Ship on combat loading problems. He may, in addition to his Ship TQM duties, be assigned usual ship's duties appropriate to Heads of Ship Departments, but will not be assigned duty as Ship's Service Officer or given regular watches of any character. In case a Marine Officer is not available, the Captain of the Ship will appoint a Naval Officer of the rank of Lieutenant or above to act in the capacity of a Ship TQM.

The Ship TQM's duties will be to:

1. Act as the direct representative of the Captain of the Ship in matters relating to the loading and unloading of troop cargo, and the embarkation, billeting and messing of troops.
2. Advise the Captain of the Ship on, and submit for his approval, detailed plans for loading and unloading cargo, and for billeting and messing troops.
3. Assist the Troop TQM in the preparation of loading, unloading, billeting and messing plans.
4. Perform liaison with the CO of Troops through the Troop TQM during both the planning and operational phases of a joint expedition.
5. Command the Ship's Marine Detachment if one is attached to the ship.

The Ship TQM must have a sound knowledge of:

1. Naval customs and terminology.
2. The Amphibious Force organization.
3. The command and administrative organization of a U. S. Naval Ship.
4. Tables of Basic Allowance, Tables of Organization, and Tables of Logistics, for both the Marine Corps and Army.
5. The equipment and normal arms of Marine and Army Divisions and the classification of supplies.
6. The Standard Operating Procedure (SOP) for Supply Administration, including shore parties and supply ashore.
7. The general characteristics of transports and the characteristics and limitations of landing craft and landing boats.
8. Ship and dock cargo handling equipment.
9. How to prepare ship's loading characteristics pamphlets.
10. How to prepare embarkation and debarkation forms, including loading and stowage plans.
11. Cargo problems at advanced bases.

The Ship TQM must make a continuing study of his ship's characteristics and of cargo. Such study should include:

1. The exact dimensions of each hold section and changes due to alterations.

2. The dimensions and characteristics of types of cargo.
3. The number of landing craft carried and their most efficient employment.
4. The variations of the rigging of his ship.
5. The proper slings for hoisting the various types of cargo.
6. The methods of slinging and hoisting different types of cargo.
7. The rate of discharge of various types of cargo from each hold.
8. The overall arrangement and use of cargo spaces within the ship.
9. Billeting, messing and sanitary facilities for troops.

The above study will enable the Ship TQM to make recommendations to the Captain of the Ship for alterations which will facilitate the rapid discharge of cargo and will also provide the Ship TQM with the basic knowledge necessary for proper embarkation—debarkation planning.

The Ship TQM will maintain an up-to-date record of all ship's data affecting troops, their equipment and supplies, during amphibious operations. This data will include the following:

1. Scale drawings of the following (Scale $\frac{1}{8}'' = 1'$):
   a. Profile diagram of ship.
   b. All cargo holds, showing square feet of deck space, cubic capacity, overall dimension, size of hatch openings, and clearances to boards, to coaming and to girders.
2. Boom locations and capacities.
3. Officer and troop berthing and messing facilities, to include plans showing the locations of bunks in compartments.
4. Number and type of landing craft.

It is not the present policy of the Navy Department to assign Marine enlisted personnel to APAs and AKAs for permanent duty. Ship TQMs will therefore request their Commanding Officers to assign officer and enlisted assistants as may be required to carry out their duties.

During loading, embarkation, debarkation and unloading, the Ship TQM and the Debarkation Officer will receive the assistance of Deck Division Officers. These Division Officers and other Officer and Petty Officer assistants will take care of the hatches in their parts of the ships.

Plans for billeting and messing of troops should be worked out to the satisfaction of the CO of Troops. The importance of good living conditions for troops on board ship cannot be exaggerated. The Ship TQM will provide the Troop TQM or Billeting Officer with ship's plans showing the location of bunks in compartments. He will also advise him of Ship's Regulations which affect billeting and messing, so that a proper plan may be made for the best comfort of troops in accordance with debarkation plans. Troops will ordinarily be billeted by debarkation teams with each team having the most convenient route to its debarkation station.

CHAPTER IV

THE TRANSPORT QUARTERMASTER

SECTION 3 — THE TROOP TQM

The Troop TQM is in complete charge of the planning, the loading, and the unloading of all troop supplies and materiel for the ship to which he is assigned. The Troop TQM functions as the direct representative of the CO of Troops on all matters relating to the loading, unloading, billeting of troops, messing and liaison with the ship's personnel.

The Troop TQM should be of the rank of Captain. He will have a detail of at least ten NCO assistants for clerical and other duties as assigned. The Billeting Officer and the Ship's Platoon Commander will act under the direction of, and assistant to, the Troop TQM.

Under operating conditions, the Troop TQM will be attached to the staff of the CO of Troops embarked on a particular ship. In this capacity, he follows the general directive expressed in paragraph 926, FTP 167, functioning as a direct representative of the CO of Troops in all matters relating to loading, unloading, billeting, messing and contact with ship's personnel. He should be assisted in billeting and messing arrangements by officers especially detailed for that purpose. When embarked upon a ship to which is assigned a permanent Ship TQM, the Troop TQM will deal with this officer in the same manner as he would with other Ship's Officers. In all cases the provisions of paragraph 926, FTP 167, will be carried out by the Troop TQM.

When a combat loading of ships is scheduled, the Troop TQM must be given sufficient data to formulate his initial loading plans. This necessary data is a list of the units being embarked, Unit Personnel and Tonnage Tables (UP&T) showing personnel and materiel being brought by each unit, Cargo and Loading Analysis Forms (C&LA) from all units being embarked, a debarkation priority list of the vehicles and cargo and a list of G-4 supplies. The responsibility for the furnishing of this data lies with the CO of Troops. Therefore, if a reinforced battalion is being embarked aboard a transport, the battalion commander will be the CO of Troops for that ship and must formulate a plan which will govern the loading by the Troop TQM.

The plan made by the CO of Troops of a unit, even as small as a battalion, must be made with the mission to be accomplished at the landing point or beach head in mind. This necessitates long range planning and decisions which must be made and held to for a period of possibly two months or more. It is absolutely imperative that the plans for the operation be made on the basis of the proposed action at the beach head and carried back to the Port of Embarkation. The end is planned and the means to accomplish that end are arranged accordingly. The importance of starting to plan the entire movement at the proposed beach head and then working back, cannot be over emphasized, because that is the only way personnel and materiel can be intelligently loaded aboard ships.

Troop TQMs and details, under command of the Division TQM, (or the TQM of the highest embarking echelon, if less than a Division) should proceed to the Port of Embarkation at the earliest practicable time. The Troop Billeting Officer should accompany the Troop TQM when he proceeds to the Port of Embarkation. The Troop Billeting Officer should have with him such information regarding the priority of debarkation of troop units as will permit the proper billeting of troops with respect to debarkation stations.

The Ship TQM will advise the Troop TQM and the Troop Billeting Officer of the ship's regulations which effect billeting and messing, and provide plans showing the location of bunks in compartments. The Ship TQM with the Troop TQM and the Troop Billeting and Mess Officer will prepare plans for the billeting and messing of troops with due regard for debarkation priorities, messing facilities, Ship's Regulations and the best comfort of troops.

In the loading of the ship, the TQM is the liaison officer operating between the CO of Troops and the Captain of the Ship. Tact and diplomacy will go far in attaining coordination and cooperation between the ship's personnel and the troops being embarked. One of the most important tasks a Troop TQM has is to furnish the CO of Troops with an accurate picture of the ship's capabilities.

In order to have an effective and expeditious loading, the Troop TQM must be equipped by study and practice to recognize basic characteristics of ships and to translate these characteristics into concrete and sensible recommendations to the CO of Troops.

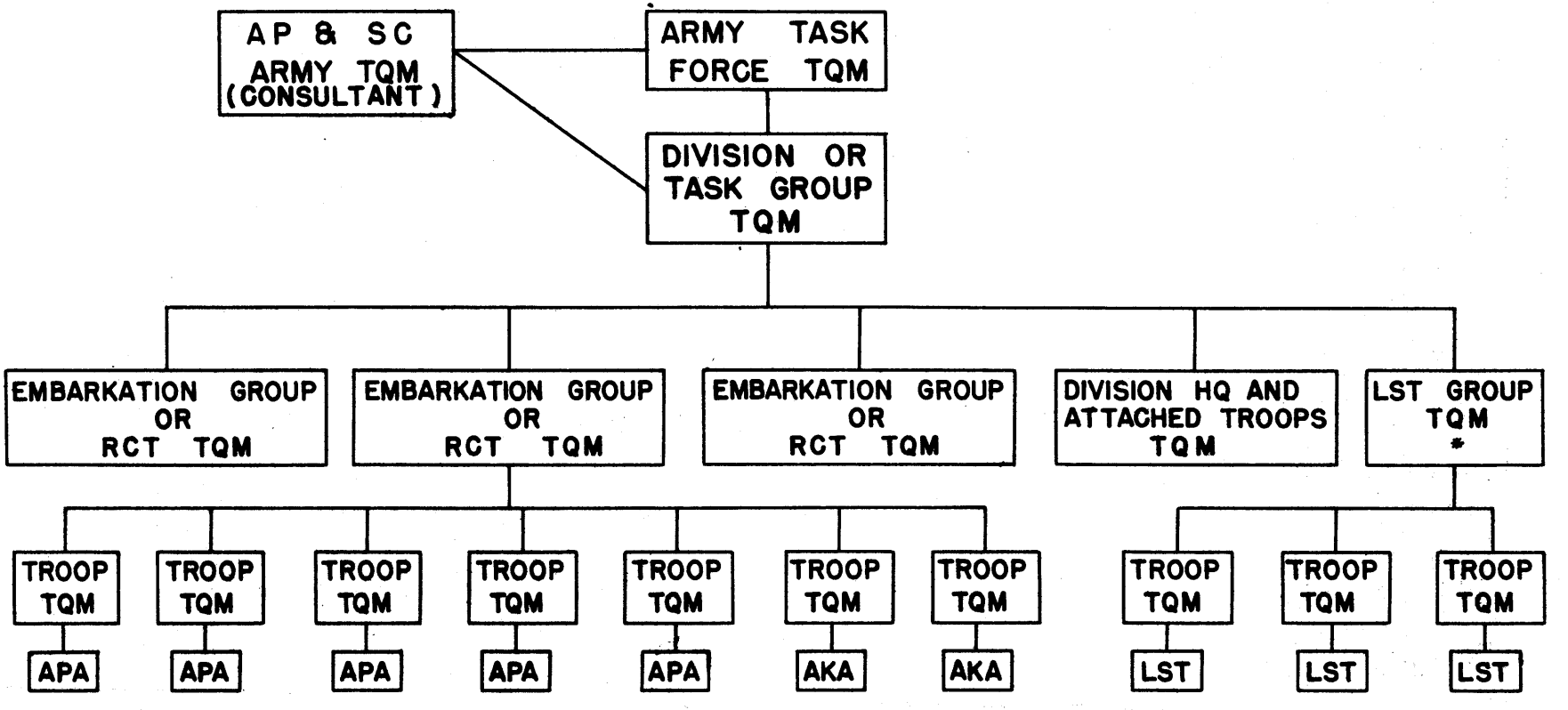
The Troop TQM must be familiar with, and have a sound knowledge of:

1. Naval customs and terminology.
2. The Amphibious Force organization.
3. The command and administrative organization of a U. S. Naval Ship.
4. Tables of Basic Allowances, Tables of Organization, Tables of Equipment and Tables of Logistics.
5. The equipment and normal arms of army divisions and classification of supplies.
6. SOP for supply administration, including shore parties and supply ashore.
7. The general characteristics of transports, and the characteristics and limitations of landing craft and landing boats.
8. Ship and pier cargo handling equipment.
9. How to prepare ship's characteristics plans.
10. How to prepare embarkation and debarkation forms, including loading and stowage diagrams.

Troop TQMs have a myriad of other duties in addition to planning and supervising the loading and unloading of a ship. Contacts with Naval personnel on board ships, with civilian loading and port authorities, with railroad personnel, and many others, are all part of a day's work for a Troop TQM. The accomplishment of this most important job takes an officer who can plan and organize; a diplomat; a two-fisted disciplinarian; an officer who won't take "NO" for an answer when something almost impossible must be done; and above all, one who can keep a level head.

The foregoing may well be considered the qualifications for a good Troop TQM and is the basis upon which the selection of Troop TQMs should be made. History has cited several examples of poorly executed amphibious operations. One of the contributing causes to the difficulties encountered was the lack of planning and foresight exhibited in loading the ships. It is the responsibility of future Troop TQMs to prevent the old mistakes from being repeated, and to insure that every man landed on a hostile beach will be able to hit the beach fighting.

TQM ORGANIZATION



* NUMBER OF LST'S TO BE USED WILL DEPEND UPON THEIR AVAILABILITY AND THE REQUIREMENTS OF THE MISSION.

CHAPTER V

PREPARATION OF LOADING FORMS

Introduction

In order to standardize the preparation of loading plans, certain forms have been devised and approved by all the services. The proper use of these forms will simplify and standardize the preparation of the loading plan and consequently ease the task of loading the ship.

Instructions for Preparation

General: Loading Forms are divided into specific classifications:

1. Those used for assembling information concerning the types and quantities of cargo to be loaded, and those used in the actual loading, i.e.:
   a. The Unit Personnel and Tonnage Table (UP&T), (Form 1).
   b. The Cargo and Loading Analysis (C&LA), (Form 2).
   c. The Cargo Manifest. (For use by units but not required for submission with loading plan), (Form 9).
2. Those pertaining to the actual loading of a ship only, i.e.:
   a. Debarkation Priority Table (Form 3).
   b. Stowage Diagram (Form 4).
   c. Consolidated Embarkation and Tonnage Table (Form 5).
   d. Profile Loading Plan (Form 6).
   e. Consolidated Vehicle Table (Form 7).
   f. Landing Force Embarkation and Tonnage Table (Form 8), (to be submitted by Combat Teams, Groups, Divisions or smilar groups to Landing Force Commander).

Forms used to gather cargo data:

1. *The Unit Personnel and Tonnage Table—(UP&T) (Form 1).*
   a. This form, for purpose of clarification, is subdivided into two sections:
      (1) *The upper portion,* used for assembling information covering T/O&E, TBA, TA and Special Equipment of individual units of a Combat or Landing Team such as companies, batteries, and special detachments. (lines 1 to 12).
      (2) *The lower portion,* used for assembling information pertaining to cargo common to the entire combat or landing team and directed by the "4" Section to be issued in quantity, (lines 13 to 30 inclusive).
   b. In the column to the extreme left, for purpose of planning, all cargo is divided into stowage classifications:
      (1) *Troop Space Cargo*—Cargo for stowage on the square of the troop space hatch or other accessible places where it is available during the voyage.
      (2) *Unit General Cargo*—Hold stowage cargo belonging to individual units.
      (3) *Bulk General Cargo*—Hold stowage cargo issued by direction of the "4" section for all units of the Combat Landing Team.

This cargo is further subdivided for stowage purposes into:
(a) *Ammunition*
(b) *Other*

c. *Types of Cargo:*

Line #1—Baggage—includes the cubic feet and weight of all Class II—T/O&E, TBA, and TA baggage; including barracks bags, sea bags, trunk lockers, cruise boxes, bedding rolls, etc. All baggage is considered to average 3.5 cubic feet and 80 pounds per person. Therefore, multiply the total personnel by these figures to obtain the cubic feet and weight.

Line #2—Office Equipment—includes the cubic feet and weight of all Class II—T/O&E, TBA, TA equipment necessary for administrative purposes during the voyage, such as field desks, typewriter chests, mimeograph machines, etc. This line does not include crated office equipment for hold stowage which is entered in line #4 below.

Line #3—Total Troop Space Cargo—includes the total cubic feet and weight of lines 1 and 2.

Line #4—Organizational Equipment—includes the cubic feet and weight of all items of Classes II and IV equipment authorized by T/O&E, TBA, and TA. Items of equipment which are specifically listed in lines 1, 2, 5, 6, 10 and 11, will not be included herein. The items on this line include tool chests, cleaning and preserving materials, extra water cans, etc.

Line #5—Mess Equipment—includes the cubic feet and weight of all Class II, T/O&E, TBA and TA equipment necessary to operate a galley or mess in the field, such as ranges, screens, etc., (excluding fuel and rations).

Line #6—Camp Equipment—includes the cubic feet and weight of all Class II, T/O&E, TBA and TA equipment required to establish a temporary camp in the field, such as tentage, tent poles, tent stakes, cots, portable latrines, tent flies, etc.

Line #7—Special Equipment—includes the cubic feet and weight of items of Classes II and IV equipment in excess of organization T/O&E, TBA and TA allowances, and issued for a specific operation. Such items include fortification materials, building materials, cement, nails, wire, tarpaulins, lumber, pipe, steel hut parts, construction equipment, etc., necessary to build semi-permanent or permanent installations.

Line #8—Aviation Materiel—includes the cubic feet and weight of all aviation general cargo, (Class IV-E) other than heavy lifts and not provided for elsewhere on the UP&T. Such items include engine and structural spares, Section "A", aircraft tools, beaching gear, and other aeronautical spares specifically ordered for the support of aircraft.

Line #9—Total Unit General Cargo—includes the total cubic feet and weight of lines 4 to 8 inclusive.

Line #10—Vehicles—includes the cubic feet and actual net weight of all wheeled or tracked carriers either self-propelled or requiring a prime mover, uncrated equipment with or without skids, (such as certain types of distillation units). Such items include trucks, tanks, guns, (towed or self-propelled), hand carts, trailers, airplanes, generators, distillation units, boring mills, heavy lathes, etc. All items

included in this line are listed with specific measurements on the reverse side of the UP&T.

Line #11—Heavy Lifts (Crated)—includes the cubic feet and weight of all bulky and heavy crated or boxed equipment of all classes of supply weighting over 800 pounds and/or occupying over 275 cubic feet. Crated material of this nature will require handling similar to a vehicle.

Line #12—Total Heavy Lifts—includes the total cubic feet and weight of lines 10 and 11.

Line #13—Ammunition (Small Arms)—includes the cubic feet and weight of all small arms ammunition, including .30 caliber, .50 caliber, etc.

Line #14—High Explosives—includes the cubic feet and weight of all high explosives, such as artillery and mortar ammunition including white phosphorous, projectiles, grenades, powder, bombs, primer cord, dynamite, and Composition "C".

Line #15—Pyrotechnics and Fuzes—includes the cubic feet and weight of all sensitive high explosives (pyrotechnics, fuzes, blasting caps etc.) which require special stowage in a pyrotechnic locker or on the weather deck in a specially constructed crib.

Line #16—Total Ammunition—includes the total cubic feet and weight of lines 13, 14 and 15.

Line #17—Gasoline—includes the cubic feet and weight of all gasoline, in cans or drums.

Line #18—Other Petroleum Products—includes the cubic feet and weight of diesel fuel, lubricating oils, grease, etc., in cans or drums.

Line #19—Water—includes the cubic feet and weight of all water, in cans or drums.

Line #20—Other Liquids—includes the cubic feet and weight of all other liquids, including acids, paint, alcohol, chemical warfare liquids, etc.

Line #21—Rations—includes the cubic feet and weight of *all* types of rations, including rations for initial issue to troops prior to debarkation.

Line #22—PX Supplies—includes the cubic feet and weight of all commissary, Post Exchange, Fleet Canteen stocks, ships' stores, officers' club stocks, beer, liquor, etc.

Line #23—Signal—includes all signal classes II & IV equipment. Such items include telephones, radios, searchlights, blinkers, sound systems, spare parts, etc.

Line #24—Engineer Equipment—includes all engineer classes II & IV maintenance supply and equipment. Such items include compasses, drafting and duplicating equipment, camouflage nets, garnishing rolls, sketching equipment, etc.

Line #25—Ordnance—includes the cubic feet and weight of all ordnance classes II & IV maintenance supply and equipment, such as spare parts for all weapons.

Line #26—Motor Parts—includes the cubic feet and weight of all motor parts classes II and IV maintenance supply and equipment, such as spare parts for all motors, trucks, boats, etc.

Line #27—Medical—includes the cubic feet and weight of all

medical classes II and IV maintenance supply and equipment, such as additional Thomas splints, bandages, tapes, stretchers, portable operating tables, etc., (excluding liquid chemicals which are listed under line #20 and require special stowage). This line is for maintenance or resupply medical equipment supplied by higher echelons, (medical supplies for the landing team medical section will be shown on line #4).

Line #28—Chemical—includes the cubic feet and weight of all dry chemical warfare classes II and IV maintenance supply and equipment, such as decontamination materials, gas proof curtains, dust respirators, gas alarms, gas masks, etc.

Line #29—QM Supplies—(General)—includes the cubic feet and weight of all quartermaster maintenance supply and equipment, (general), such as additional individual and organizational equipment, (clothing, buckets, individual entrenching tools, etc.). For Naval organizations, it includes such items as GSK, small stores, household consumables.

Line #30—Total Other Cargo—includes the total cubic feet and weight of lines 17 to 29 inclusive.

Line #31—Total Cargo—includes the total cubic feet and weight of all cargo, (lines 3, 9, 12, 16, and 30).

Grand Total—includes the square feet of line 10, and the grand total in cubic feet, weight, short tons, (2000 lbs.), measurement tons, (40 cubic feet equals one measurement ton), of standard and specially prepared cargo.

Vehicle Summary

The Vehicle Summary is on the reverse side of the UP&T and is designed to list vehicles according to their priority, giving actual dimensions. When filling out this summary, the unit commander determines the priority in which he desires his vehicles to hit the beach.

Each vehicle is listed separately in order of priority. Dimensions should be listed in feet and inches (2½ ton truck wo/w is 22'3" in length). The weight of the vehicle should be the actual net weight (unloaded).

After all vehicles are listed, the lift column on the top of the summary should be filled in, showing the number of lifts falling into each category. Particular care should be taken in cases where vehicles are exactly "on" the tonnage denominations to place them in the correct category—a vehicle weighing exactly 10,000 pounds should be listed in the second column "5 to 10 ton".

Consolidated UP&T

After all units and the Combat or Landing Team "4" Section UP&Ts are completed, a consolidation of all figures on the individual UP&Ts is accomplished and termed "Consolidated UP&T".

2. *The Cargo and Loading Analysis—(C&LA) (Form 2).*
   a. *General:*—This form is a breakdown of all cargo listed by cubic feet and weight on the UP&T. It is comparable to a voucher, receipt, or manifest, and supports the figures entered on the UP&T. It is designed to divide effort placed on different types of cargo, by entering in detail only those items of prime importance to an operation (ammunition, water, rations, petroleum products, etc., lines 13 to 29), and by listing in general (number of containers)

the remaining or less vital items (camp equipment, mess equipment, lines 1 to 8). This form provides space for the Troop TQM to indicate "where stowed". In structure, the C&LA is recapitulation and elaboration of the UP&T, providing space for more detailed information.

b. *Columns*:

(1) *Line Number*—The entry under this heading corresponds to the UP&T.

(2) *Organization*—Name of unit to which cargo belongs.

(3) Corresponds to description on UP&T with a further breakdown, using T/O&E, TBA and TA nomenclature, i.e.:

High Explosives

Shell, HE, M49A2, w/fuze PD

M62, 60mm Mortar, M1&M2.

Gasoline

80 Octane (5 Gallon Cans)

72 Octane (55 Gallon Drums)

(4) Includes the number of containers in which the cargo is packaged, (boxes, drums, cans, etc.).

(5) *Rounds or Gallons*—includes the total number of rounds or gallons in the containers.

(6) *Square Feet, Cubic Feet, Weight (pounds)*—includes the square feet, cubic feet and weight in pounds of each particular item (square feet column used for vehicles and heavy lifts only).

(7) *Standard Cargo—Specially Prepared Cargo*:—

(a) *Standard Cargo*—includes all items in their normal loose packaging, such as boxes, drums, cans, etc.

(b) *Specially Prepared Cargo*—includes cargo on pallets, in cargo drums, etc.

Consolidated C&LA

After all unit and Combat or Landing Team "4" section C&LAs are completed, all figures are consolidated and the form termed "Consolidated C&LA".

3. *Cargo Manifest (Form 9)*

This form is a convenient one for individual units to use for the proper listing of all equipment. It is an aid in the proper preparation of the UP&T Table. It is *not* however, a required embarkation form that must be submitted as part of the "Loading Plan" for a ship.

It is prepared by each unit which is to be embarked on the ship and is passed on to the Troop TQM by the CO of Troops along with the UP&T Table and the C&LA. The column titled line number refers to the line numbers on the UP&T Table. Boxes to be loaded are numbered consecutively within each unit and listed under the column box number. A description of the cargo to be embarked is entered in the appropriate column with the cubic feet and weight indicated in the spaces for it. A total by line number is shown, this figure being the entry that is made on the UP&T Table. Care should be exercised in the preparation of this form and sufficient information as to the contents of each box should be included so that if it is necessary to have a particular item on short notice, it can be easily found by referring to the form to obtain the box number.

Forms pertaining to the actual loading of a Ship:

1. *The Vehicle Debarkation Priority Table, (Form 3).*
The CO of Troops fills out the Vehicle Debarkation Priority Table from data submitted by individual units of the command. It is a consolidated list of all vehicles of the command by priority in accordance with the tactical scheme. It shows in addition, the type, cubic feet, and number of containers of cargo loaded in each vehicle. The "Where Stowed" column is completed by the Troop TQM after the vehicles have been loaded. The data concerning cargo loaded in vehicles is for the information of the loading officer. These figures will not affect individual lines and totals on the UP&T Table, which will include all cargo carried on vehicles under each line designation.
2. *The Stowage Diagram (Form 4).*
The Stowage Diagram is a scale drawing of each deck and platform available for the stowage of vehicles and/or cargo. The drawing is made to the scale of $\frac{1}{8}''$ equals 1'. The drawing accurately locates all obstructions, stanchions and vertical ladders. It also contains such necessary information as:
   a. Clearance height to coaming, girders and boards.
   b. Square feet and cubic feet of cargo space available.
   c. Boom capacities.

   The Stowage Diagram is completed by indicating the vehicles and type of cargo loaded on each deck or platform, giving the amount of cubic space occupied. In completing this diagram, the Troop TQM will prepare templates to represent equipment and all rolling stock. Each vehicle template should be drawn to the scale of $\frac{1}{8}''$ equals 1', using the actual dimensions of the vehicles. The vehicle template should show the vehicle priority number. The vehicle templates are then "paper-loaded" on the deck or platform, using the trial and error method. Care must be exercised to insure that these templates are so loaded that they can be unloaded according to the desired priority. When the Troop TQM has "paper-loaded" the deck or platform to his satisfaction, he then traces the vehicle templates into their relative location on the deck. When general cargo occupies certain portions of a deck, it should be shown on the stowage diagram together with its cubic feet, weight, and if palletized, the number of pallets. If there is sufficient space for the stowage of cargo under vehicles, the cubic space occupied by the cargo and the height of the cargo should be shown. The priority number, description and organization to which the vehicle belongs are shown at the lower portion of each diagram. If many vehicles are loaded on one diagram, this information can be placed on the reverse side of the diagram.
3. *The Consolidated Embarkation and Tonnage Table (Form 5).*
The Consolidated Embarkation and Tonnage Table is a list of all units embarked on a ship, giving the total figures for personnel, total cubic feet, total square feet, and total short tons. This table provides a consolidated view of the embarkation and loading data for the ship, including names of individual units aboard and the cubic feet and weight of their cargo. The Consolidated Embarkation and Tonnage Table is prepared by the Troop TQM after his ship is loaded. The totals on this form should agree with the Grand Total on the Consolidated UP&T Table.

4. *The Profile Loading Plan (Form 6).*
The Profile Loading Plan gives the overall picture of the completed load. It is a profile view of the entire ship, showing the holds occupied by cargo and minimizing the spaces occupied by personnel and ship's stores. All general cargo and vehicles are listed by type and weight in the hold sections where stowed. The Profile Loading Plan is not drawn to scale. Total short tons and total lifts for each hold section are shown in the space provided at the bottom of the plan.

This plan is of special interest to the CO of Troops inasmuch as it pictures all cargo and vehicles aboard and shows their location. It also pictures the problems that are likely to be encountered if any attempt is made to alter the debarkation priority of vehicles or cargo.

The Profile Loading Plan is of interest to the Captain of the Ship as it indicates the weight of cargo and vehicles loaded in each hold section and shows the number of lifts that will be required to unload the hold section.

5. *The Consolidated Vehicle Table (Form 7).*
This table provides a summary of all vehicles, by types and the units to which they belong. Horizontal lines will bear the proper nomenclature of the vehicles. The totals in the extreme right column represent the total number of vehicles in the units, and the totals at the bottom of the table will represent the number of each type vehicle.

The Loading Plan

In reproducing the tentative and final loading plans, individual UP&Ts and C&LAs are eliminated and only the Consolidated UP&T and C&LA are included.

The Loading Plan for an individual ship to be submitted to higher echelons will include *only* the following forms in the indicated order:

1. Consolidated Embarkation and Tonnage Table (Form 5).
2. Consolidated UP&T Table (Form 1).
3. Consolidated C&LA (Form 2).
4. Vehicle Debarkation Priority Table (Form 3).
5. Stowage Diagram for each hold loaded with troop cargo (Form 4).
6. Profile Loading Plan (Form 6).
7. Consolidated Vehicle Table (Form 7).

Forms not to be included with Loading Plan.

1. Landing Force Embarkation and Tonnage Table (Form 8). This table will be submitted to higher echelons by Combat Teams, Groups, or Division. For example, the table to be submitted by an Army or Marine Division will include ships by Transport Division with totals for the Transport Division carrying the combat team, and totals for the Transport Squadron. It will also include totals for LST (or other type landing ships) Division, Squadrons or Flotillas.
2. Cargo Manifest (Form 9).
3. Individual UP&T Table (Form 1).
4. Individual C&LAs (Form 2).

FORM I

UNIT PERSONNEL AND TONNAGE TABLE

CONFIDENTIAL(When Completed)

Officer	Gen / Maj	Col / Capt	Lt Col / Lts&WO	Total	Staff NCO / Other Enl	Total	Total Personnel

	LINE		CLASS	STANDARD CARGO		SPECIALLY PREPARED CARGO (Pallets, Cargo Drums etc)		
				Cu Ft	Wt (lbs)	No.	Cu Ft	Wt(lbs)
TROOP SPACE CARGO	1	Baggage	II					
	2	Office Equipment	II					
	3	Total Troop Space Cargo						
UNIT GENERAL CARGO	4	Organizational Equipment	II					
	5	Mess Equipment	II					
	6	Camp Equipment	II					
	7	Special Equipment	II&IV					
	8	Aviation Material	IV&E					
	9	Total Unit General Cargo						
	10	Vehicles (Towed Guns etc)	II			X	X	X
	11	Heavy Lifts (Crated)				X	X	X
	12	Total Lifts (Lines 10&11)				X	X	X
BULK GENERAL CARGO — AMMO	13	Ammunition (Small Arms)	V					
	14	High Explosives	V					
	15	Pyrotechnics & Fuzes	V					
	16	Total Ammunition						
BULK GENERAL CARGO — OTHER	17	Gasoline	III					
	18	Other Petroleum Products	III					
	19	Water	I					
	20	Other Liquids						
	21	Rations	I					
	22	PX Supplies	I&II					
	23	Signal	II&IV					
	24	Engineer	II&IV					
	25	Ordnance	II&IV					
	26	Motor Parts	II&IV					
	27	Medical	II&IV					
	28	Chemical	II&IV					
	29	QM Supplies (General)	II&IV					
	30	Total Other Cargo						
	31	TOTAL CARGO (Add Lines 3,9,12,16 & 30)						
	32	Total Short Tons		X		X	X	

	SQ FT	CU FT	WT (lbs)	SHORT TONS	MEAS/TONS
GRAND TOTAL					

UNIT _____ CERTIFIED:

_____ Commanding
(Signature)

NAME OF SHIP _____ DATE _____

VEHICLE SUMMARY

VEHICLES	NO. OF LIFTS	SQ. FT.	CU. FT.	WEIGHT
Under 5-Tons				
5 to 10-Tons				
10 to 20-Tons				
20 to 30-Tons				
Over 30-Tons				
Total Vehicles				

Priority	Description	Length	Width	Height	Sq. Ft.	Cu. Ft.	Weight

CONFIDENTIAL(When completed)

ORGANIZATION

NAME OF SHIP

CARGO AND LOADING ANALYSIS

Form 2

LINE NO.	ORGANIZATION	DESCRIPTION	STANDARD CARGO					SPECIALLY PREPARED CARGO (Pallets, Cargo Drums, etc)				
			No. of Containers	Rounds or Gallons	SQ. FT.	CU. FT.	WT(lbs)	Number	CU. FT.	WT(lbs)	Rounds or Gallons	*Where Stowed

*To be filled in by TQM
CONFIDENTIAL
(When Completed)

Form 3*

VEHICLE DEBARKATION PRIORITY TABLE

CONFIDENTIAL(When Completed)

SHIP _____

Organization _____

Priority No.	Description	Organization	CARGO LOADED IN VEHICLES				Vehicle Serial Number	Where Stowed
			TYPE	No. of Conts.	Cu. ft.	Wt(lbs)		

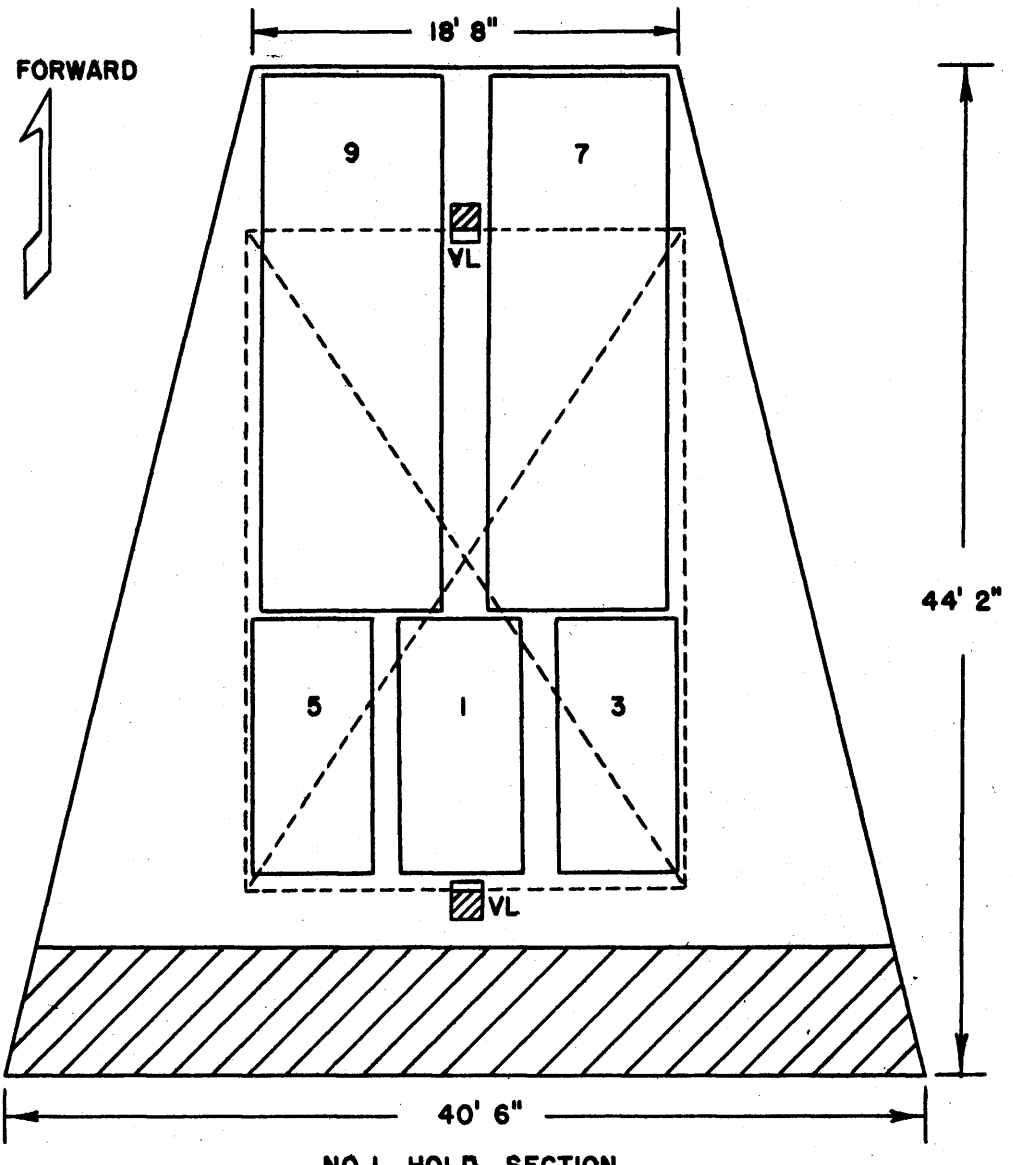
* To be filled by TQM

CONFIDENTIAL(When completed)

STOWAGE DIAGRAM

FORM 4

CONFIDENTIAL



NO. 1 HOLD SECTION

2 ND DECK

OVERHEAD SQUARE OF HATCH 19' 3" X 28' 10"

SCALE: 1/8" = 1' 0"

CLEARANCE TO
COAMING, 7' 2"
BOARDS, 10' 0"
GIRDERS, 8' 8"

SQ. FT. 1082
CU. FT. 8656

2-10 TON BOOMS
1-30 TON BOOM

PRIORITY	TYPE	ORGANIZATION
1	TRUCK, 1/4 TON RECON	CO. A
3	TRUCK, 1/4 TON RECON	CO. D
5	TRUCK, 1/4 TON RECON	CO. D
7	TRUCK, 2 1/2 TON CARGO	CO. B
9	TRUCK, 2 1/2 TON CARGO	CO. A

FORM NO. 5

CONSOLIDATED EMBARKATION AND TONNAGE TABLE

USS_____

ORGANIZATION	PERSONNEL			C A R G O		
	OFF.	ENL.	TOTAL	SQ.FT.	CU.FT.	TONS (short)
TOTAL						

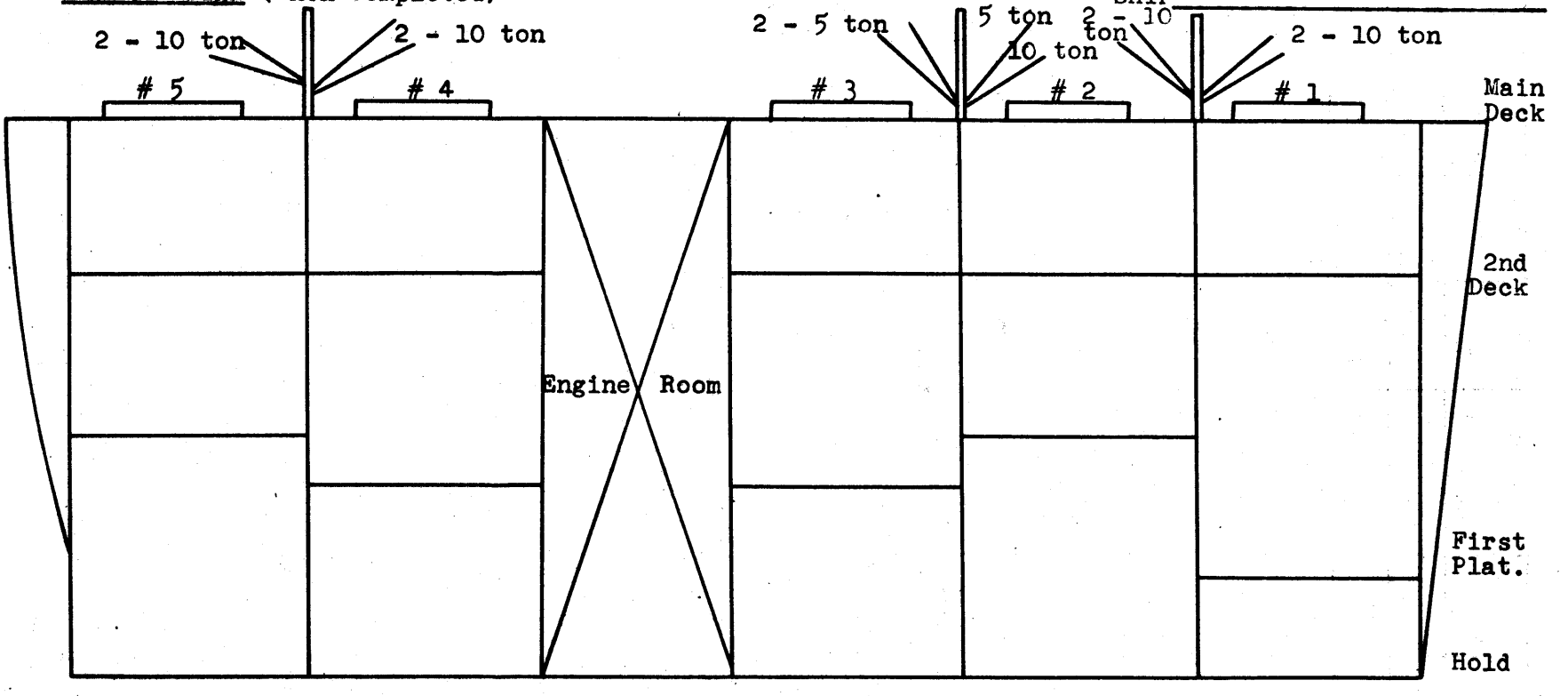
FORM 6

PROFILE LOADING PLAN

ORGANIZATION _____

CONFIDENTIAL (When Completed)

SHIP _____



Hold Sect.	No. 5	No. 4		No. 3	No. 2	No. 1
Short Tons						
No. Lifts						

CONFIDENTIAL
(When Completed)

FORM 7.

CONSOLIDATED VEHICLE TABLE

UNIT	Vehicle (By Type)																				TOTAL
TOTAL																					

LANDING FORCE EMBARKATION AND TONNAGE TABLE

FORM 8

TRANS DIV NUMBER	SHIP	UNIT EMBARKED	TROOP CAPACITY			TROOPS EMBARKED			CARGO CAP.	CARGO LOADED		C.C. of TROOPS
			OFF.	ENL.	TOTAL	OFF.	ENL.	TOTAL	CU. FT.	CU. FT.	SHORT TONS	

CARGO MANIFEST

ORGANIZATION _____

Line No.	Box No.	Description	Cu. Ft.	Weight

REPRODUCED BY AP&SC ARMY TOM
FORM NO. 9

CHAPTER VI

COMBAT UNIT LOADING

SECTION 1 — GENERAL

Combat Unit Loading–Definition

Combat Unit Loading, by definition, is the loading of personnel and materiel aboard ship in such a manner that, when the personnel is debarked, each man will have his fighting gear with him. Each machine gun section will have its weapons and each artillery section will have its gun and prime mover with it when it lands on the beach. The loading of a ship, in such a manner that every vehicle, round of ammunition, and box of rations is in its proper place aboard that ship, is the responsibility of the Troop TQM. The tactical plan is made by the CO of Troops, and the Troop TQM makes the loading plan to conform to the tactical plan. The Unit must "come out fighting".

Loading is planned and accomplished with deliberate care to contribute in every possible manner to progressive support of the tactical plan. Average combat loads are:

APAs—Loaded at 60% of capacity—800 tons.
AKAs—Loaded at 60% of capacity—1500 to 1600 tons, depending on booms and hatches.
APs—Loaded at 60% of capacity—800 tons.
AKs—Loaded at 60% of capacity—1200 tons.

It must be remembered that the first supplies loaded into a ship are the last to be unloaded, and neither the wishes nor orders of any one concerned can change the sequence once the ship is loaded. The characteristics of ships prevent any shifting of cargo after the ship is under way. Last minute changes confuse the loading and probably do more harm than good, because in the resulting confusion high priority materials may be placed in inaccessible places.

Distribution of Loading Plans

A loading plan is made from the information supplied by the Division TQM and the CO of Troops. A minimum of seventy-five (75) copies of the loading plan should be prepared, distribution to be made as directed by the Division TQM. (Distribution will vary according to the requests of higher echelons and interested individuals). Stencils should be bound and retained.

The mechanism of a satisfactory combat loading resolves itself into careful planning based upon the exchange of complete and accurate data between the Ship and the Unit to be embarked. This data is comprised of capacity by space and weight; handling facilities in the ship; and cube, weight and priority of cargo to be loaded.

Responsibilities of Transport Division Commander

Transport Division Commanders are responsible for allocation of troops and cargo to ships within their Divisions. Such allocation is based on a thorough study of the personnel and tonnage tables of the regimental combat teams and accompanying units, the tactical plan of the combat team

commanders, the capacities and abilities of the ships of the Division, and the recommendations of the Commander of the Regimental Combat Team concerned. It is necessary that the Regimental Combat Team Commander make tentative loading plans in advance for presentation to the Transport Division Commander at least seven days prior to the loading.

The Commander of the Landing Force appoints a CO of Troops and a Troop TQM for each ship (APA, AKA, LST, etc.) assigned for the use of his command. Each Troop TQM must have suitable assistants.

Loading

Based on the approved Consolidated UP&T Table, loading plans are prepared for each ship. The CO of Troops and the Troop TQM insure that desired priorities for discharge are observed and that the loading of the ship is in accordance with the approved plan. In loading, the following points must be observed:

1. Ship's crew will furnish winchmen and hatch tenders.
2. Ships must be supplied with adequate cargo handling gear to facilitate discharge.
3. Loading will be under the direction of the Captain of the Ship, assisted by the Ship TQM and the Troop TQM.
4. Loading of cargo will be completed, if practicable, at least twenty-four hours prior to embarkation time so that troop loading details can be released to their organization commanders for final instructions, etc.
5. CG Army Port and Service Command or Naval District Commander will furnish necessary dock equipment, technical assistance, dunnage, personnel, tools and material necessary to properly shore and secure cargo, etc., depending on whether ships are loaded under Army or Navy jurisdiction.

Loading A Transdiv

So far as possible, Transport Divisions are loaded so the ships will complete the discharge of cargo simultaneously, once the required troop units have landed. Cargo carried by each Transport Division will, as a general rule, be limited to that amount which could be discharged in friendly territory under ideal beach and boat conditions in about eight hours. For initial planning purposes, it is assumed that under such conditions a Transport Division can discharge about 4500 short tons. After troops and their combat equipment are assigned, the desired balance may be achieved by varying the amount of "B" rations, maintenance supplies, petroleum products, and ammunition assigned to individual ships. Cargo of this character is so loaded that approximately equal quantities of each of these classes will have been discharged after the lapse of any given time.

Debarkation Priority

Great care must be exercised so that each ship is loaded in the manner best designed to support the tactical plan of the Landing Force Commander, and to assure the most expeditious discharge of troops and cargo. To achieve this end, the priority in which all items of cargo will be needed on the beach must be known.

Stowage of Cargo

For rapid discharge, ships should be so loaded that all holds may be worked

simultaneously and continuously with a minimum of shifting of cargo handling gear, and at approximately the same rate of discharge. In order to accomplish this, a detailed knowledge of the cargo and the ship is necessary. The number of lifts, their weights, and the type of boats required for their movement must be considered in loading each hold. It it essential that the number and total square footage of vehicles, and the cubage and short ton weights of cargo be known for each vessel.

It is generally impossible during the planning stage to predict the course of battle sufficiently well to know precisely what supplies will be needed at any moment. Experience has shown that after troops with their fighting equipment have debarked in proper priority, it is advisable that some of all types of supplies be accessible at all times. To accomplish this, ammunition of all types, water, rations and petroleum products must be so spread throughout the ship that they are readily available on call. Ammunition and cargo petroleum products need not be stowed in specially constructed spaces. Cargo gasoline and ammunition, other than small arms, must not be stowed in the same hold section. Vehicles are loaded with fuel tanks three-quarters full. Within each hatch the best method of stowage, to allow for unpredictable demands, is to divide cargo for that hold into classes, and to stow the classes in vertical planes radiating from the center of the hatch.

Use of Cargo Nets

Where cargo nets are used, cargo on the hatch squares should be in nets ready for lifting. High priority vehicles should have slings in place and be combat loaded. Loaded vehicles should not be heavier than the capacity of the smallest boat in which they may be loaded.

Use of Pallets

If pallets are used they should be on, or accessible to the hatch squares with slings in place. Pallets should never be loaded into LVTs or craft which are unable to beach unless cranes are available for unloading. Experience has shown that, for the early assault shipping on coral atolls, cargo should not be completely palletized. Therefore, it is recommended that not more than fifty percent of the total cargo to be unloaded in the assault phase be palletized. This cargo consists of:

1. Water.
2. Ammunition of all types.
3. Rations.
4. Petroleum.
5. Medical supplies.

When possible, the non-palletized small cargo is sent ashore first, using amphibian vehicles for its transportation. Palletized cargo is normally sent ashore only after it has been determined that landing boats can beach in sufficiently shallow water to permit the pallets to be dragged ashore, or after hoisting equipment is available on the beach for immediate unloading of boats or amphibian vehicles carrying pallets. Where other methods are not practicable, pallets having non-perishable cargo are unloaded into boats and non-palletized cargo into amphibian vehicles.

Cargo Handling Teams

Ships classed as APAs and AKAs are combatant vessels. The loading and unloading of ships of these classes is to be regarded as a military evolution, and every opportunity is to be taken to develop proficiency in personnel and

cargo handling at every occasion afforded. All cargo handling gear should be operated by ship's personnel whenever cargo is received or discharged. Whenever troops are to be embarked combat loaded, they should be drilled in their function of stowing and discharging equipment and supplies. In order to develop the cargo handling teams, men who will be assigned to unloading details should likewise stow the cargo which they may later be called upon to handle under combat conditions. As a standard, approximately two officers and twenty men per hold will be required as cargo handling details. Troops likewise, when embarked, will be trained daily in matters pertaining to prompt debarkation.

Transport Division—Composition

In the past, a Transport Division has consisted of three APAs, one AP and one AKA. However, due to the increased amounts of Army cargo necessary to sustain operations, and the ever increasing length of our supply lines, a new Transport Division has been formed. This Transport Division consists of five APAs and two AKAs.

Loading AKAs

AKAs should be loaded with the following in mind:

The equipment and vehicles necessary for combat should be loaded top hold stowage in such a manner that all special equipment, vehicles, and supplies required early in combat can be discharged with the same speed with which the APAs are discharged. This combat load includes the following:

1. All additional water over that carried on APAs or at least one five gallon container per individual in the entire force. This may be in fifty-five gallon drums if necessary.
2. Ammunition for all of the weapons of the troops on the AKA. Ammunition over five U/F for any weapon in the force where more than five U/F are prescribed.
3. Vehicles and other equipment needed for combat or supply.

Bulk General Cargo

All bulk general cargo, i.e., Engineer, Quartermaster and other maintenance items required for thirty day supply, should be loaded bottom hold stowage in such a manner that the troops will not suffer from the lack of any special equipment or supplies. If the AKA is withdrawn after the discharge of a combat load, stocks of bulk general cargo can, for the most part, be unpalletized.

Vehicles—Definition and Stowage

As considered in transport loading, a vehicle is a general term used to include trucks, tractors, trailers, tanks, mounted guns, vans, power shovels and other equipment which because of large dimensions require special consideration in loading and stowage. Factors that must be considered in the handling and stowage of vehicles are:

1. Capacity of booms.
2. Dimensions of hatches.
3. Minimum clearance.
4. Turning radius of vehicle wheels.
5. Position of stanchions, hatch coamings or obstructions.
6. Relative accessibility of prime movers and towed vehicle.
7. Established priorities for unloading.

Combat Loading Vehicles

Each vehicle to be embarked will be assigned a debarkation priority number, corresponding to the order in which it is to leave the ship. Is is the responsibility of the Troop TQM to communicate this information to the troops in order that vehicles may be properly marked. This may be done with chalk or soap. Prior to loading, each vehicle will be stocked with its combat load; gas tank three-quarters full, ten gallons reserve gasoline in expeditionary containers, one gallon reserve oil and three to five class C rations for driver and assistant. Ignition keys will remain in vehicles. If the voyage will exceed a period of five days, the combat load must be removed or the springs blocked up to protect them. Vehicles must be carefully checked for fuel leaks and electrical short circuits. Provision will be made for grounding each vehicle when embarked in the ship. Protection against "drowning" upon debarkation from small craft is also essential.

When gasoline-driven vehicles are stowed on weather decks, they should be in a location where fire would do the least damage to the ship. When they are stowed in exhaust ventilated spaces below, ventilation is kept in continuous operation while they are aboard.

Use of Dunnage

It is impractical to stow vehicles over other material without considerable dunnage. Stowage of vehicles in holds often results in considerable lost space unless temporary decks are constructed. For the above reasons, 'tween deck compartments are generally most economical for the stowage of vehicles.

To prevent shifting at sea, vehicles should be wheel-chocked and secured to stanchions or ring-bolts. Cargo security is a ship's responsibility and ship's personnel do the work of securing cargo assisted when necessary by troop labor.

Preparation of Stowage Diagrams

In preparing a stowage diagram it is usually best to start with the vehicles. First, a diagram of the hold or deck is drawn to scale, showing hatch opening, stanchions and obstructions; templates of each vehicle are then cut to the same scale and numbered to correspond to unloading priorities previously established. Templates are placed on the diagram and by the trial and error method a suitable arrangement is decided upon with high priority vehicles near or under the hatch opening and low priority vehicles well forward, aft, or outboard. Lines are then drawn around each template and vehicle numbers recorded on the diagram as each is removed. Care should be taken to see that each vehicle can actually be lowered and moved into the space allotted. Boom capacities will restrict heavy vehicles, such as tanks, to a particular hold section.

Combat loading is planned with a view to opening all hatches at the same time, working them continuously, and emptying them simultaneously. In order to attain this end, accurate experience tables are necessary. When applying these tables to a specific problem, time taken to shift rig, for example from heavy lift boom to yard-and-stay, must be considered in addition to rate of discharge. The number of lifts taken to open each hold must also be considered. Experience has demonstrated that with sufficient boats fifteen tons per hatch per hour is a reasonable overall average for unloading.

CHAPTER VI

COMBAT UNIT LOADING

SECTION 2 — ARRANGEMENTS PRIOR TO EMBARKATION

As soon as embarkation groups are assigned to Transport Divisions, each Troop TQM will be directed to report for temporary duty to the CO of Troops of the unit which will be embarked on the ship to which the Troop TQM is assigned. The Division TQM should issue ships' characteristics data to the Troop TQM at the earliest possible time. Ships' characteristics data are kept on file by the AP&SC TQM School, Jodo Temple, 1429 Makiki Street, Honolulu, and may be secured by the embarking Division or Task Group. The Troop TQM will proceed to the ship to which he is assigned and make a survey of the ship to determine whether any alterations have been made in the ship since it was last surveyed. The Troop TQM must make a complete survey of the ship which will include the available cargo space, cargo handling gear, fresh water capacity, laundry and dispensary facilities, number and type of landing craft, etc. After completing his survey, the Troop TQM will return to the unit which he is to embark for planning and consultation.

Required Information for Planning

The Troop TQM must have the following information from the Division TQM in order to start his preliminary planning.

1. Name and characteristics of the ship.
2. The troop unit assignments, including the name of the CO of Troops.
3. Cube and weight data of the cargo.
4. Date and place the ship will be available.

Consolidated UP&T Table and C&LA

Under the direction of the CO of Troops, each Troop TQM will prepare a Consolidated UP&T Table and a Consolidated C&LA. With the assistance of the Ship TQM he will formulate tentative Loading Plans. In order to do so, it will be necessary that he:

1. Be furnished a complete UP&T Table (Form 1) for each of the separate units or detachments to be embarked on his ship.
2. Be furnished a complete C&LA for each of the separate units or detachments to be embarked on his ship.
3. Be furnished a UP&T and C&LA from Division "4" (or the "4" of the highest Echelon to be embarked) covering all supplies and equipment under the control of these higher echelons to be embarked on the ship with their unloading priority.
4. Secure from the CO of Troops his desired debarkation priority for personnel, supplies, equipment, and vehicles.
5. Familiarize himself with the general tactical plan, and with the specific tactical plan involving the embarked troop units.

Preparation of Loading Plan

After units have submitted the desired information on the proper forms, the Troop TQM will consolidate this information. He will then proceed to prepare his loading plan by filling out the following forms:

1. Stowage Diagram (Form 4).
2. Profile Loading Plan (Form 6).
3. Consolidated Embarkation and Tonnage Table (Form 5).
4. Consolidated Vehicle Table (Form 7).

All plans are approved by the CO of Troops and the Ship's Captain. After the loading plans have been approved, no changes should be made without the written agreement of both parties.

All loading should be completed twenty-four hours prior to sailing. For rapid discharge, ships should be so loaded that all holds may be worked simultaneously and continuously with a minimum of shifting of cargo and loading gear and at approximately the same rate of discharge. Normally, loading will be on a twenty-four hour basis. Consequently, the Troop TQM must have an assistant who is capable of representing him. During the loading phase, the Troop TQM should live aboard the ship where he will be available at all times.

Arrival and Assembly of Cargo at the Pier

Due to the limited space available at the pier for stowage of cargo, it is imperative that cargo arrive at the pier at the time prescribed and not before or after the time set. The Troop TQM is responsible for the arrival and assembly of cargo on the pier in order to meet the prescribed loading schedule, and for securing, through the Ship TQM, approval of the Captain of the Ship for the scheduled arrival of the advance loading, billeting and mess details, and the main body of troops. The Ship TQM should, under the direction of the Captain of the Ship, prepare a proper loading schedule, assure that the ship is prepared to receive troops and take steps necessary to facilitate the loading of cargo and embarkation of troops.

Responsibilities of Troop TQM

At the earliest practicable time, the Troop TQM should proceed to the Port of Embarkation. He will effect coordination of plans with the Ship's Officers, familiarize himself with port cargo handling facilities, provide accurate data on personnel and cargo to be embarked, and arrange for the prompt and proper assembly of cargo to be loaded. The responsibility for proper combat loading and unloading of the ship in accordance with the Tactical Plan of the CO of Troops is vested in the Troop TQM. The tentative loading and unloading plans are prepared by the Troop TQM under the direction and supervision of the CO of Troops, and with the assistance, when practicable, of the Ship TQM.

Surveying

In order that the capabilities of the ship assigned to the embarking unit be utilized to their fullest extent, it is necessary that the Troop TQM survey the ship at the earliest practicable time. The Troop TQM will want the following essential information before he begins to plan his loading.

1. The exact dimensions of each hold section with their cubic capacities, size of hatch openings, and clearances to coaming, girders and boards.

SYMBOLS FOR SURVEYING

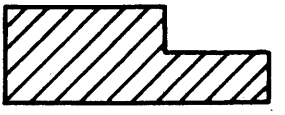
STANCHIONS



FRAMES



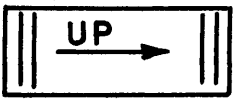
OBSTRUCTIONS (MISC.)



VERTICAL LADDERS



LADDER (STAIRS)



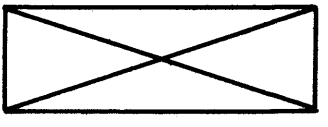
RAISED PLATFORM



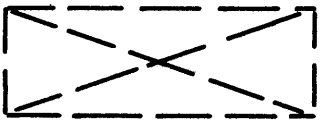
OVERHEAD OBSTRUCTION



SQUARE OF HATCH

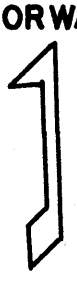


OVERHEAD SQUARE OF HATCH

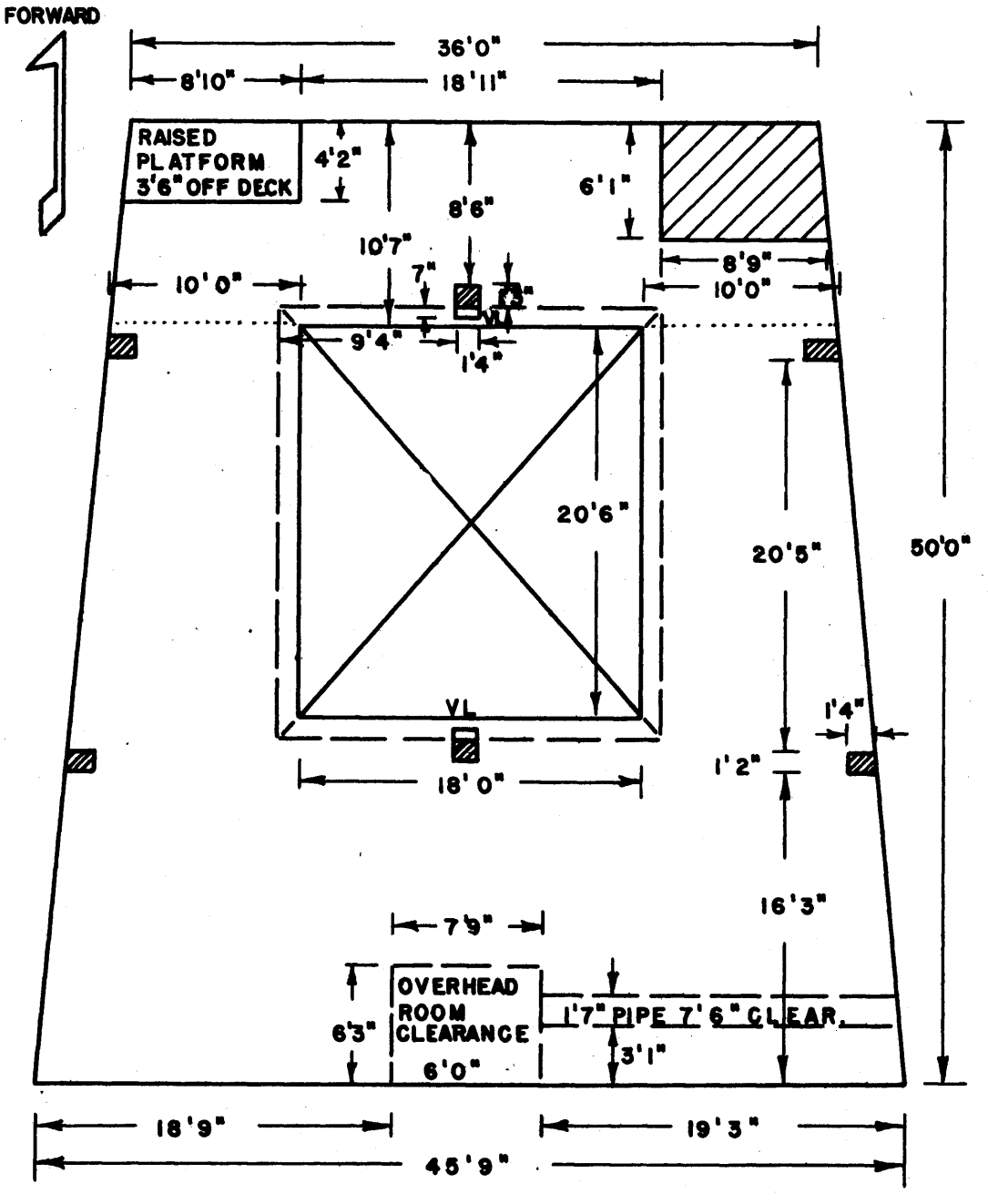


SKIN OR BULKHEAD

DIRECTION



A TYPICAL DRAWING SHOWING METHOD OF SURVEYING



NO. 2 HOLD SECTION

2 ND PLATFORM

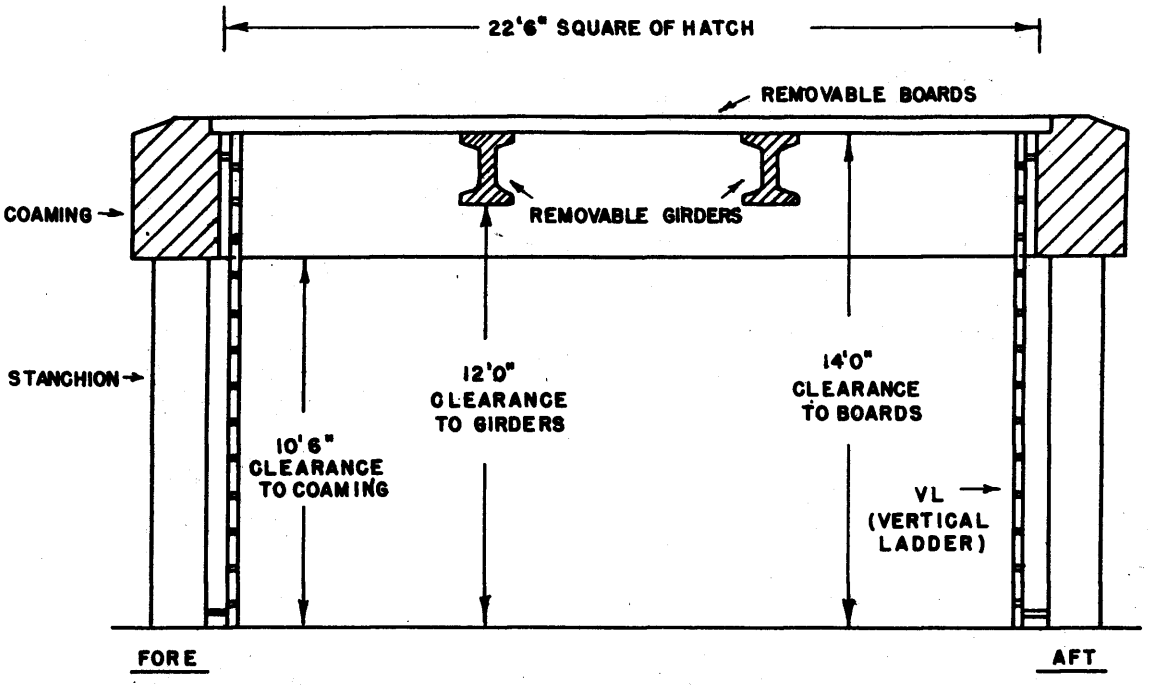
SQUARE OF HATCH OVERHEAD 20'0" x 22'6"

SCALE 1/8" TO 1'0"

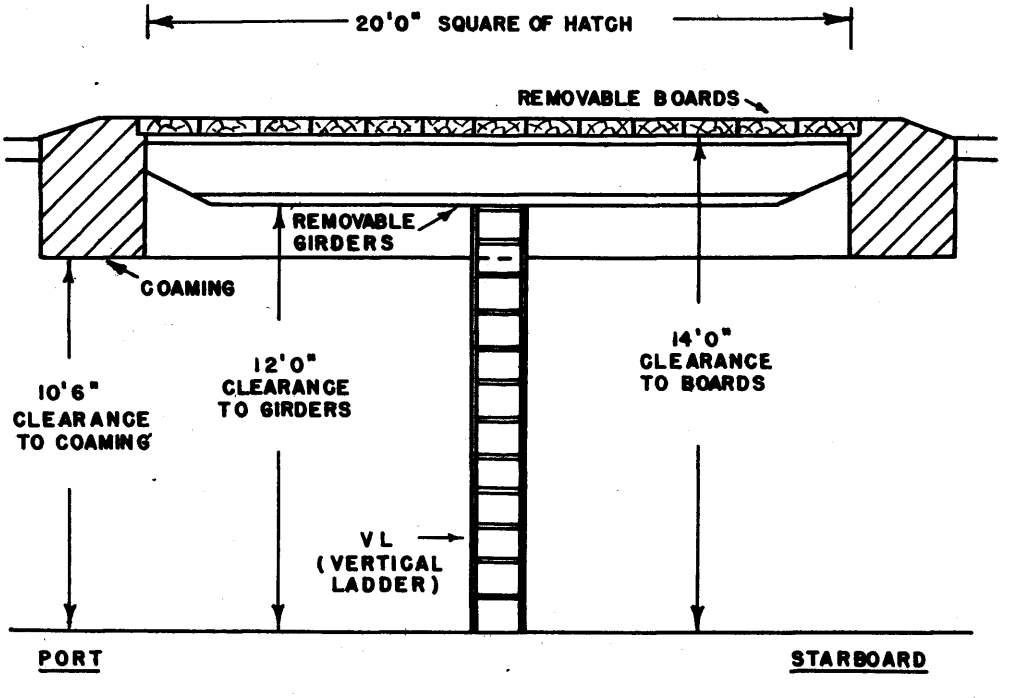
CLEARANCE TO
BOARDS: 14'0"
GIRDERS: 12'0"
COAMING: 10'6"

SQ. FT. : 1966
CU. FT. : 20643

2 - 10 TON BOOMS



CROSS SECTION OF A HOLD
SECTION COMPARTMENT
LOOKING FROM PORT SIDE.



CROSS SECTION OF A HOLD
SECTION COMPARTMENT
LOOKING FORWARD

2. The boom locations and their capacities.
3. Billeting, messing and sanitary facilities for troops.
4. Number and type of landing craft available.
5. The availability and amount of cargo handling gear.
6. Laundry and dispensary facilities available to the troops and the fresh water capacity of the ship.

In making a survey of the hold sections and in determining the cubic capacity, size of hatch openings, and the various clearances, the Troop TQM should put this information on paper. For this purpose, he should use actual drawings of the various hold sections which show their capabilities and limitations. Drawings should be made using a scale of 1/8" to 1' and all measurements should be made parallel to or at right angles to the bulkheads. All obstructions, stanchions and vertical ladders should be shown and should be tied in from two directions. The square footage and cubic capacity of the holds, decks and platforms, clearances to the coaming, girders and boards, as well as any overhead obstructions should be carefully computed. For uniformity and simplification standardized symbols should be used.

Advance Detail

An advance detail will report to each ship twenty-four hours before the commencement of loading. It is composed of the following:

1. Troop TQM.
2. Two Assistant Troop TQMs.
3. One Officer and twenty enlisted men for each troop cargo hatch, including two NCOs per hatch to supervise the hold loading detail.
4. Billeting Officer.
5. One NCO for each embarking unit to assist the Billeting Officer.
6. One NCO and two privates from each organization to identify cargo.
7. Two Officers and necessary enlisted men to form the Ship's Guard.
8. Troop Mess Officer and cooks, messmen, bakers and butchers as specified by each ship.

Arrangements Prior to Arrival of Troops

Prior to the arrival of the troops, the following arrangements must be completed:

1. A roster of cooks, messmen, bakers and butchers must be set up.
2. Ship's Guard must be established.
3. Plans for billeting and messing of troops must be formulated.
4. Cleaning details must be formed and assigned.
5. Troop gun crews must be instructed and stationed.
6. Guides to insure orderly embarkation must be instructed and posted.
7. Provisions for troops at general drills, for general military training, and for recreation enroute must be made.

Final Loading Plans

After all plans have been coordinated and full details obtained, the Ship TQM is responsible for providing the Captain of the Ship with final loading plans based on the approved Consolidated UP&T Tables, and C&LA Forms, debarkation priorities, tentative loading plans and accurate ship's characteristics. These final loading plans have as their guiding basis the expeditious unloading of the vessel during combat.

CHAPTER VI

COMBAT UNIT LOADING

SECTION 3 — LOADING

Responsibilities of the Troop TQM

During loading, the Troop TQM, as directed by the CO of Troops, will:

1. As the representative of the CO of Troops maintain liaison through the Ship TQM with the Captain of the Ship.
2. Insure that cargo is properly assembled on the docks in order that the loading at all holds progresses without delay.
3. Supervise activities of billeting party and coordinate initial mess and police details through respective officers.
4. Insure by frequent inspection that Loading and Stowage Plans are being carried out.
5. Ascertain that all material embarked is properly marked.
6. With the assistance of the Ship TQM assign elements of the Ship's Platoon to those sections of the ship which it is intended they will load and unload.
7. Keep interested parties informed of the status of loading.
8. Be prepared to render decisions on loading difficulties and problems which may arise.
9. Report immediately to the CO of Troops any changes which must be made in the approved Loading and Stowage Plan.

Serialization of Vehicles

The serialization of vehicles at the POE is the responsibility of the Troop TQM and consists of arranging the vehicles in the reverse order indicated on the Consolidated Debarkation Priority Table. The vehicle to be unloaded last will be the first to be loaded on the ship. The priority number must be marked on each vehicle in such a manner that it will be readily recognizable. Such markings must necessarily be coordinated with the work of the waterproofing detail.

Distribution of Cargo

The Troop TQM should attempt to equalize the number of cargo lifts that will be required to unload the troop cargo contents of each hold section. Available landing craft (LCMs and LCVPs) and the size and number of booms servicing the hold sections will be important factors to consider. Combat loading necessitates that each class of supply be distributed over several holds in order that the flow of supplies to the beach will include some of all types of critical supplies. In addition, if all of a certain type of supply were stowed in a hold section and the boom servicing that hold were demolished by shellfire or become inoperative, none of that type of supply could be unloaded until the boom could be replaced or an improvised rig built.

Stowage of Cargo

In stowing supplies in a hold compartment, make each layer of supplies a composite layer of several types. This stowage arrangement makes it possible to unload, with a minimum of delay, some of any item that may become first priority as a result of operations ashore. This particularly applies to deep tanks, which when opened, should afford access to at least four of the top priority fuels (in drums). Items of high priority should be stowed on or near the square of the hatch, or in the most accessible location on that level. Conversely, low priority items are stowed farthest from the square of the hatch or in the least accessible location on that level.

Use of Dunnage and Shoring

In order to prevent the shifting and chafing of cargo, dunnage and shoring are used. However, in the interest of expeditious unloading, dunnage should be held to a minimum. Usually three layers of dunnage (1" board of random lengths) are used. Normally the first layer is placed fore and aft over the cargo. The second layer is laid athwartships with the third layer again placed fore and aft. Inasmuch as dunnage is a source of valuable field engineering material, it should be sent ashore as soon as the ship has been unloaded.

Stowage of High Priority Items

Certain bulk general cargo supplies will be high in priority and they must be stowed accordingly. The Troop TQM must topstow a sufficient quantity of these high priority items to meet the demands of operations ashore. Normally 20% of each high priority item of supply should be stowed where it can be unloaded without delay and be sent ashore, the balance of that type of supply to be unloaded later.

Stowage of High Explosives and Gasoline

Present Navy regulations specify that high explosive ammunition and gasoline cannot be stowed in the same hold section. This restriction does not apply to the stowage of small arms ammunition and gasoline.

Stowage of Vehicles

When vehicles are stowed in such a manner that they cannot be rolled to the square of the hatch, valuable unloading time is lost while the Ship's Platoon maneuvers the vehicles into position. Vehicles should be stowed fore and aft to counteract the roll of the ship. However, some vehicles must be stowed athwartships in order to utilize the cargo space to the maximum.

Distribution of Cargo Within the Transport Division

Supplies must be properly distributed among the ships of a Transport Division. All cargo of one type must not be loaded into any one ship. Should the ship be sunk by enemy action that type of cargo would be lost.

Final Stowage Diagram

After the loading of all troop material has been accomplished the Ship and Troop TQMs must together prepare the final Stowage Diagram of the ship. This Diagram will show the final disposition of all troop material within the ship.

Ship's Platoon

The CO of Troops will furnish the Ship's Platoon or working party for

each hold that is to be loaded. The Ship's Platoon will be responsible for both the loading and the unloading of the ship. During the loading the Ship's Platoon will determine the best gear for handling each type of cargo. By loading the cargo and vehicles aboard, the Ship's Platoon will know the location of the various supplies and vehicles.

Estimation of Unloading Time

When the ship is loaded and is at sea, the Troop TQM, working in conjunction with the ship's Cargo Officer, should inform the CO of Troops and the Captain of the Ship of the approximate time required for unloading. In making this estimate, the Troop TQM considers the number and type of landing craft (assume some boats to be beach casualties or not available for some similar reason); the number of men to be debarked (224 pounds or 13.5 cubic feet per man); and the number of lifts per hatch. This is valuable information for the Captain of the Ship in that he must know approximately how long the ship will be required to remain in the transport area. The CO of Troops desires this information in order that he may make definite plans for extended operations ashore.

Duties of Captain of the Ship During Loading

During the progress of the loading the duties of the Captain of the Ship are:

1. To examine the loading plan and approve any changes which necessarily develop.
2. To maintain cargo spaces and handling gear in a state of readiness to receive the Landing Force cargo.
3. To assure that a part of every hold served by a boom is used for the stowage of Landing Force cargo.
4. To safeguard cargo from damage or pilferage while aboard the ship.
5. To inform the CO of Troops of the sequence in which it is desired that equipment and supplies to be embarked shall arrive at the ship's side.
6. To supervise the stowage of cargo to avoid overload, guard against unnecessary fire hazards, insure proper trim, prevent list caused by improper weight distribution or future shifting, and provide for the maximum stability in the event of possible damage.

Duties of CO of Troops During Loading

Duties of the CO of Troops during loading are:

1. To properly regulate the time and order of arrival of cargo at the ship.
2. To furnish Troop TQM with the required data and information in order that he can perform his required duties.
3. To insure that equipment and supplies embarked are essential to the combat mission and in accordance with administrative decisions regarding operations in the particular theater.
4. To insure that material embarked is properly marked.
5. To insure that equipment and supplies to be embarked are segregated before arrival at shipside and arranged in the order requested.
6. To safeguard cargo from damage and pilferage before loaded and arrange with the Captain of the Ship to assist in safeguarding it when aboard.

CHAPTER VI

COMBAT UNIT LOADING

SECTION 4 — UNLOADING

The Troop TQM's responsibilities do not cease after he has loaded his ship. Detailed plans for the unloading of the ship must be made to include such information as the number and kind of landing craft needed to unload each hold section; the troop detail necessary to perform the actual unloading; the number and type of cargo nets, salmon boards, slings, etc., needed for unloading each deck and platform of the hold section; and a vehicle and cargo priority list. Other pertinent data which will interest the Troop TQM and influence his plan for unloading is: how long will it take to debark the troops, and how much time will be required to open the hatches and then re-rig the booms to work the cargo after the hatches have been opened. This information can be secured from the Ship TQM or the Cargo Officer.

Responsibilities of Troop TQM During Unloading

During the unloading phase the Troop TQM will:

1. Direct activities of the Ship's Platoon and take steps to insure the unloading of materiel in accordance with the debarkation priorities established by the CO of Troops.
2. Maintain a running record of materiel unloaded and the beaches to which it is sent.
3. In the absence of the CO of Troops make such decisions as are necessary with regards to the unloading of the ship. Due regard must be taken of the supply policies of the Landing Force Commander and other higher authority as laid down in administrative orders and other directives.
4. Keep interested parties informed as to the status of the unloading. It is highly desirable to unload a proportionate amount of each type of supply initially. Therefore, if the ship were damaged or forced to leave the unloading area by enemy action before the unloading was completed, the troops ashore would have ammunition, water, rations, and gasoline in balanced quantities.

The logistical support of the initial landings is closely tied together with the movement of the personnel and vehicles of the landing teams from ship to shore. There are only a limited number of landing craft and when these craft are landing personnel, few if any supplies can be loaded. Therefore, the tactical and logistical phase of the landing are very closely interwoven. The Troop TQM assigned to each ship coordinates and combines the CO of Troops' tactical plan of debarkation, the logistical plan made by the embarked unit's S-4, and the capabilities of the ship. The result of the Troop TQM's work is a loading plan which allocates ship's space for each and every type of equipment and supply. With the loading plan completed, the Troop TQM can then determine the landing boat space necessary to move personnel, materiel, and supplies to the beach. All plans made by the Troop TQM are submitted to the CO of Troops for approval.

Unloading Plan

An unloading plan, regardless of form, is necessary to insure that priorities of landing materiel will be followed as outlined by the CO of Troops. Upon these priorities depend the success or failure of the tactical plan. Transport personnel have no authority to change priorities either to suit their own convenience or to suit their conception of the problem to be met. A list must be made for each hold section of the ship showing the priority of unloading. Attached to each hold section unloading list should be a directory of names, ratings and duties of all ship and troop personnel assigned to work at that hold section. Copies of such lists and directories should be issued to each officer who may be concerned with directing activities at that hold.

Preparation of Unloading Schedule

In the preparation of the unloading schedule, the type of cargo, where it is stowed, and the type of boat required for its removal from the ship to the shore are all indicated. A schedule is prepared for each hold section and enough copies are prepared so that all interested parties may have one. Detailed instructions for the unloading of the hold section are given and from the time the "commence unloading" signal has been given, the unloading schedule will generally govern. Initially no cargo should be discharged until ordered by proper authority.

Ship's Platoon

On board ship the unloading is done by the Ship's Platoon under the direction of the Troop TQM. This platoon usually consists of two officers and one hundred enlisted men. The platoon is divided into working parties for each hold section being unloaded. The details in each hold section of the ship attach vehicle slings, load cargo nets, fasten steadying lines to vehicles, and signal the winch operator when to start hoisting the cargo. Other personnel from the Ship's Platoon are detailed to load and stow cargo into the landing boats at the side of the ship.

Duties of CO of Ship's Platoon

1. Make assignments of men to shifts and hold sections where they will work.
2. Supervise the working details making sure that the men stay where they are assigned.
3. Arrange for meals of the working details.
4. Ascertain that all the orders of the Troop TQM are being carried out.

This officer should be so thoroughly acquainted with the loading and unloading plan and the ship, that he will be able to complete all phases of the operation in the event the Troop TQM becomes a casualty.

Duties of the NCO Assigned for Supervision of Hold Section

1. He should know the exact unloading priority for that hold section and supervise the unloading according to plan.
2. He is responsible that his crew is on hand for work at the times specified.
3. He must keep an accurate running record of what supplies and equipment have been loaded during the loading operations and also during the unloading operations.

The Ship's Platoon normally board the ship in advance of the loading operation and will be billeted and messed aboard.

Additional Personnel for Ship's Platoon

It is obvious that it would be physically impossible for one hundred men to unload the mass of supplies on a ship in the desired length of time. It is imperative that the CO of Troops realize this and reinforce the Ship's Platoon with extra cooks, spare drivers, and such personnel as will be available on the ship after the assault waves leave for the beach.

Troops not included in working details will stay clear of the hatches when cargo is being loaded or unloaded. Ship's company will operate ship's cargo handling equipment and gear.

Unloading Technique

A rapid debarkation of troops and materiel reduces exposure of transports to enemy action during that period when they are most vulnerable. However, materiel must not be placed upon the beach until the landing force is ready to receive it—close liaison between troops and transports must be maintained in order to meet these conflicting conditions. Under conditions in which the beaches and the beach approaches are relatively free from underwater obstructions, or sufficiently free to permit a practicable movement of landing boats to the beach, transport unloading will be principally carried on by landing boats.

During the unloading phase, landing craft such as LCTs, LSMs, or LSTs may be available for cargo unloading on the beach. Landing boats, LVTs and DUKWs will keep well clear of such craft during beaching operations. Troops, tanks, artillery, combat equipment and supplies are moved ashore by landing boats, LVTs and DUKWs taking advantage of all beach approaches available for water transportation. These movements are either "on call" from the shore, or as directed by the responsible military authority afloat charged with control. Boats must be loaded at the ship's side with consideration for the problem of unloading them at the beach. Trailers must have tongues forward. Only one class of supply should be loaded in a boat for one trip. This will save time in the long run and avoid confusion at the beach. Over-loading of any boat, but particularly a ramped boat with the load too far forward will delay it at the beach for a considerable period. Man-handling cargo over the bow when the ramp cannot be lowered is obviously inefficient. Once the landing has begun, cargo must be landed as fast as possible, in accordance with the tactical plan.

Use of LCTs in Unloading

After the initial assault waves have landed and beachheads are secured, LCTs are invaluable for expeditious unloading of APAs and AKAs. Under the control of the Transport Squadron or Division Commander, they should be allocated among the various transports as the tactical situation requires.

Unloading Vehicles and Equipment

When the signal to "commence unloading" is given, vehicles will be the first concern of the Troop TQM. The desired priority as set up by the CO of Troops for the unloading of the vehicles must be carefully followed. Vehicles must be loaded with great care to insure that they are headed toward the bow of the boat. Crews of vehicles should embark in the boats immediately before the vehicles are loaded. These crews, with the aid of the boat

crew, insure proper loading of the boat. Whenever possible towed vehicles and guns should be loaded in the same boat as the prime mover.

When unloading bulk cargo, all booms must be kept in use continuously. Extensive use must be made of cargo nets. In order to speed up the unloading, the filled cargo net should be left in the landing boat. After the boat has been unloaded at the beach, the empty cargo nets should be returned to the ship. If men are to accompany the load, the boat should move from the working hatch to a nearby debarkation net to receive the men.

Flag Signals To Identify Cargo

In order to expedite the unloading and to identify the type of cargo carried, landing craft display a colored flag by day and colored light at night as they approach the Traffic Control Boat and the beach. The following colored signals are used for this purpose:

1. Cargo requiring handling by personnel ..... Red
2. Cargo requiring use of tractor ..... Yellow
3. Self propelled cargo ..... Blue

Estimation of Unloading Time

The Troop TQM must calculate the approximate time required for unloading. The Captain of the Ship must have this information in that he must know approximately how long the ship will be required to remain in the transport area. The CO of Troops desires this information in order that he may make definite plans for extended operations ashore. In making this estimate, the Troop TQM must consider the number and types of landing craft available, the number of men to be debarked and the number of lifts per hatch. It must be assumed that boats will be beach casualties or not be available for some other reason. Any time lost because of enemy action, inclement weather, or the unavailability of landing boats will lengthen the unloading time in direct proportion. The quantity of supply and time in which it must be handled is of particular interest because of the practical labor requirements necessary to accomplish the job.

When unloading, experience has determined that with sufficient boats, a figure of fifteen tons per hatch per hour is a reasonable overall figure. Hourly rates for some types of cargo are as follows:

CARGO	WEIGHT
90 Drums Gasoline	17.7 Tons
3-2½ Ton Trucks	7.5 Tons
2 Light Tanks	25.0 Tons
Small Arms Ammunition	21.5 Tons
General Cargo	15.0 Tons

Experience has shown that the loading rate is a fairly good unit of measure in estimating the unloading time required, although it is usually slower than the rate of discharge. Upon the completion of unloading, and when directed, the Troop TQM returns to his regular duties and renders such reports on his activities as may be requested.

Typical Unloading Plan

The following will not apply to any particular ship or any specific situation but may serve as an outline or model in drawing up unloading plans:

D minus 1 Day

1. Check all vehicles, including batteries, tires, gas, lights, springs and ignition keys.

2. Test motors of vehicles carried as deck load.
3. Distribute C, K, and D rations to troops.
4. Water cans placed in boats.
5. Place small arms ammunition (cases) in boats as ordered.
6. Spot unit's combat equipment needed in first trip of boats.
7. Fill all nets with highest priority cargo. Attach slings to equipment or vehicles which will be the first to be unloaded.
8. Carefully check all combat equipment.

H minus 6 Hours

1. Move combat equipment to points where it will be hoisted out, or passed into boats with hand lines.
2. Remove all covers, tarpaulins, guys, stays, lashings.
3. Make final police of troop spaces.
4. Rig booms, warm up winches, make boats ready for lowering.
5. Muster troops. Move to debarkation stations.
6. Station unloading details.
7. Lower away all boats.
8. Clear and open hatches.
9. Debark troops and combat equipment.
10. Unload cargo when "ready" signal received from the beach or Control Boat.

Debarkation Stations

Troops, other than those lowered in boats, debark by debarkation nets over the side at debarkation stations. Each APA should have not less than four debarkation stations on each side. Each AKA should have not less than two per side. Debarkation stations are designated by number and color from forward to aft as follows:

	STARBOARD	PORT	COLOR
Debarkation Station	No. 1	No. 2	Red
Debarkation Station	No. 3	No. 4	White
Debarkation Station	No. 5	No. 6	Blue
Debarkation Station	No. 7	No. 8	Yellow
Debarkation Station	No. 9	No. 10	Green

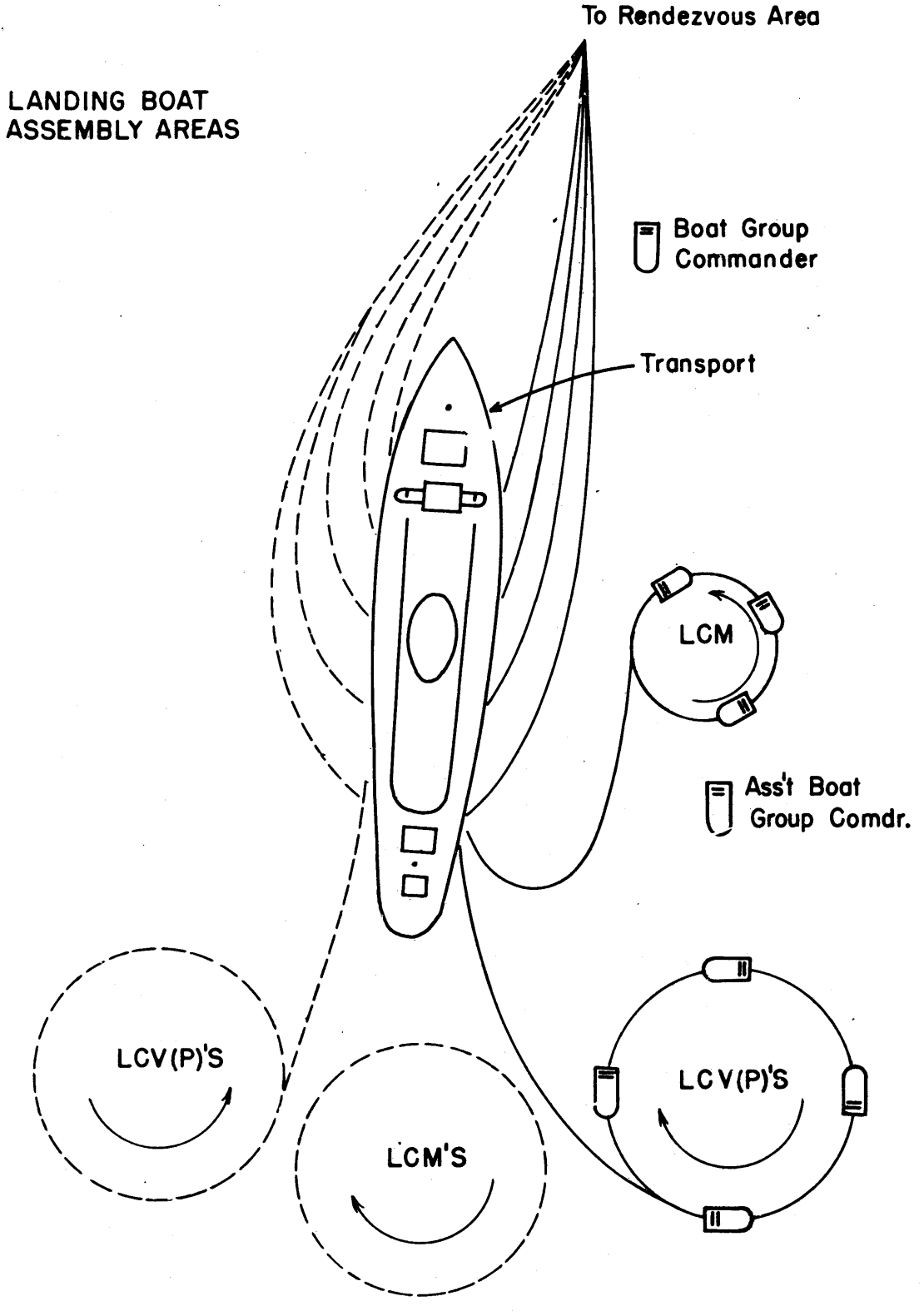
Landing boats proceed to the debarkation station when called alongside. The following signals are used at the debarkation stations to call landing boats:

By Day	Green Flag	LCV(P)
By Day	Red Flag	LCM
By Night	Green Light	LCV(P)
By Night	Red Light	LCM

Bullhorns and voice projection equipment may be used for calling boats alongside the transport debarkation stations, and provide an excellent supplementary means of communication. All landing boats in the assembly area must keep a sharp watch on the transport debarkation stations. When the signal is given at a debarkation station for a particular type of landing boat, the landing boat nearest the debarkation station proceeds from the assembly area circle to the debarkation station. The Assistant Boat Group Commander is responsible for the prompt movement of landing boats to the debarkation stations.

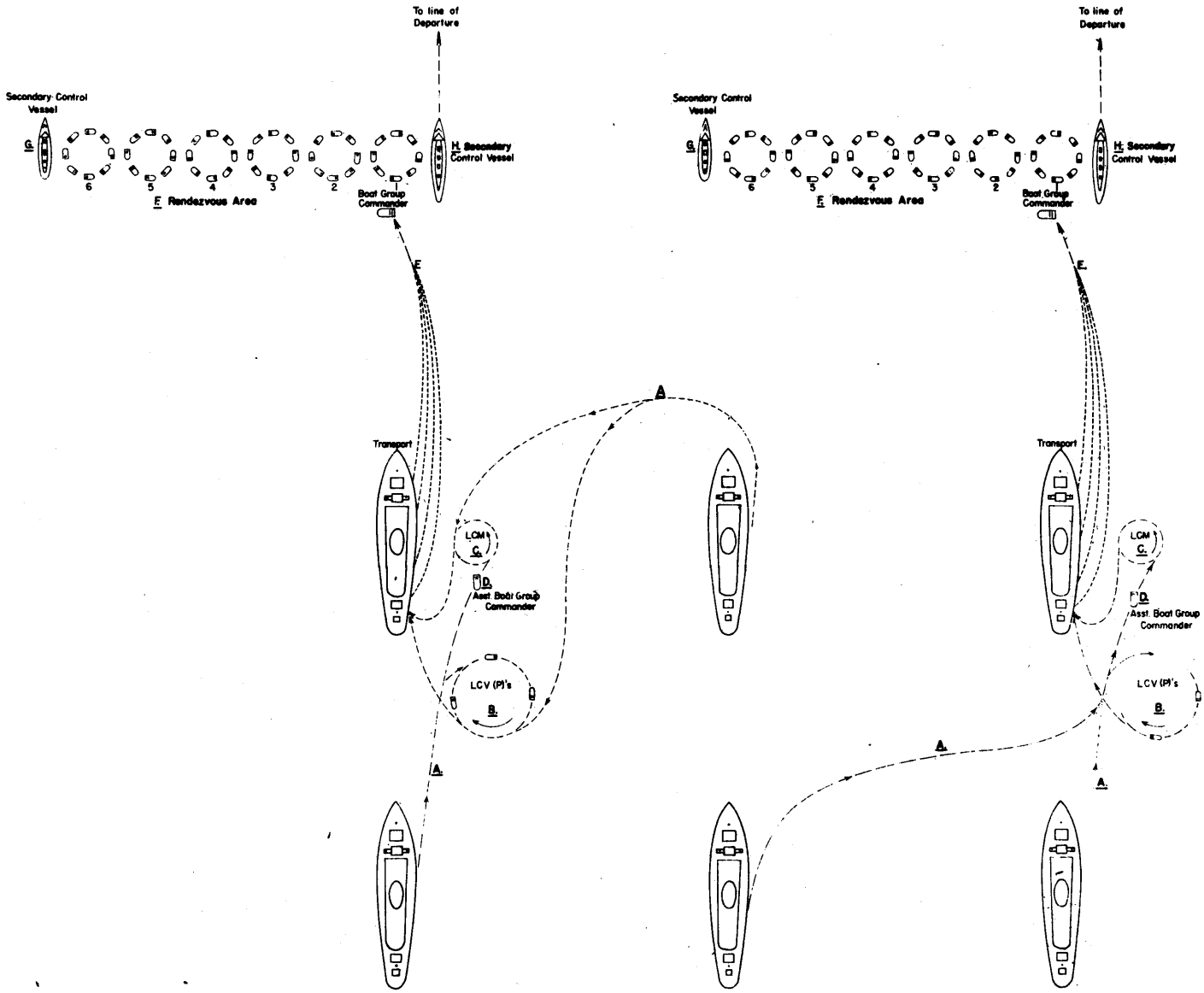
Debarkation Officer

A ship's officer, trained as a Debarkation Officer is stationed on the bridge. He is in general charge of the unloading and his primary task is to have the proper type of boat at a debarkation station when needed. He is



Debarkation from one side indicated by full line.
Debarkation may be from Port as well as Starboard as indicated by dotted lines.
When debarkation is from both sides, LCM's circle astern.

LANDING BOATS IN THE TRANSPORT AREA



A. Landing boats of reserve APA's and AKA's proceed to Assembly Areas of Assault Transports in accordance with boat employment plans.

B. LCV(P) Assembly Areas.

C. LCM Assembly Areas.

D. The Assistant Boat Group Commander supervises the assembly areas.

E. Loaded landing boats proceed to Rendezvous Area.

F. Landing boats take proper station in Rendezvous Area.

G-H Control Vessels mark the flanks of the Rendezvous Area.

I- Reference—FTP167, paragraphs 412, 413, 419, 424, 427, 428, 431 and 445.

furnished a debarkation schedule which indicates the type of boat required at each station. This schedule is furnished by the CO of Troops. The Debarkation Officer keeps a record of the boats which have been loaded and dispatched. He maintains direct communication with the after signal station and each debarkation station. A signalman is stationed at the after signal station which is located so as to be clearly visible to all boats in the assembly areas. The signalman's duty is to order boats from the assembly areas to the debarkation stations.

Composition of Debarkation Station

Personnel assigned to each debarkation station—a troop officer and a navy officer, a boatswain's mate, a signalman and a checker.

Duties of Debarkation Station Officers

The troop officer and the navy officer are assigned to the station to insure that troops and equipment are properly loaded into landing boats. In order to accomplish this, they must be furnished a vehicle debarkation priority table. This table should show the type of boat required for each piece of equipment, thus they will be able to indicate the type of boat needed at all times.

Duties of Boatswain's Mate

The boatswain's mate is in charge of the unloading of the hold section. He is the technical advisor to the members of the Ship's Platoon.

Duties of Signalman

A signalman, trained in debarkation signals, maintains communication with the Debarkation Officer and the after signal station by means of a sound-powered telephone. He keeps the Debarkation Officer informed of the following:

1. When ready for a boat.
2. When boat is almost loaded.
3. When the loaded boat departs and the number of the boat.

Duties of the Checker

The checker is an army enlisted man and is responsible for keeping a record of the supplies and equipment unloaded from the hold section. He may be required to prepare the cargo unloading ticket in quadruplicate. This ticket describes the supplies loaded in each landing boat or amphibian vehicle. One copy is retained by the checker and later forwarded to the TQM. The other three copies are given to the coxswain. Upon approaching the Control Boat, the coxswain delivers one copy of the cargo unloading ticket to the Control Officer. The remaining two copies are turned over to a representative of the Shore Party Commander at the beach. The checker and the signalman work as a team. The former informs the latter of unloading conditions in the hold.

It is essential that prior designation of men to serve as checkers and signalmen be made. A listing of the men and their duties should be made for each hold section for each shift. Information as to the rigging of the booms for initial discharge and other information of interest to the boatswain's mate regarding the necessary cargo handling gear required for each hold section should also be included.

Traffic Control

The necessity for traffic control commences immediately upon beaching of the assault waves and such neutralization of the beachhead as permits extensive unloading operations on the beach. During this phase, the primary function of landing boats, LVTs and DUKWs becomes the rapid and orderly unloading of transports and cargo vessels in order to reduce the time of their exposure in the assault area to a minimum. The Beachmaster at the designated beach determines the time and place for beaching and unloading landing boats, LVTs and DUKWs. The traffic control boat will guide landing boats, LVTs and DUKWs to the designated landing beaches, as directed by the Beachmaster.

Obstructions in the approach to landing beaches may consist of natural obstacles, such as barrier reefs, coral heads and pinnacles, sand bars and rocks; man-made obstacles may include horned sculleys, tetrahedrons, jetted rails, pipes, hedgehogs, cribs, log barriers and wire fencing, supplemented by various types of mines. The condition of surf and tide have a direct effect on the ability of the various types of landing boats and amphibious vehicles to negotiate these obstacles. The degree to which the beach approaches are obstructed determine to a large extent the methods of the landing assault and the landing boat, LVT and DUKW employment. Where the approaches are reasonably clear, permitting access to a considerable portion of the beaches, landing boats should be used as the primary means of transporting assault troops. Even under conditions favorable to the beaching of landing boats, armored and unarmored LVTs may be used to precede the assault waves of landing boats. The character of the terrain beyond the beaches, and the tactical plan of the Troop Commander will directly affect the type of water transportation to be employed. When either natural or artificial obstructions block free approach to the beaches, LVTs will be preferred for the assault waves.

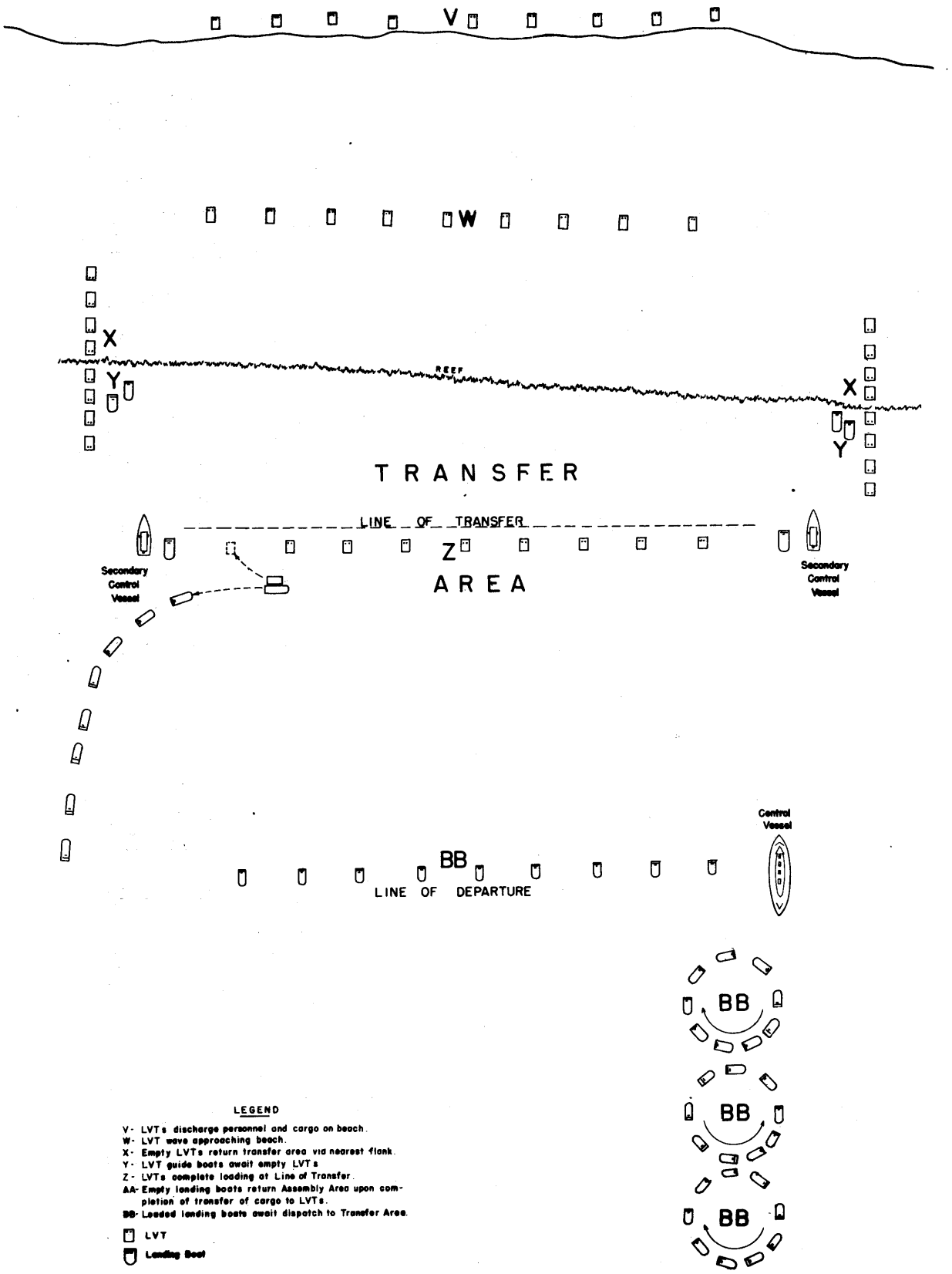
DUKWs are generally employed in the Ship-to-Shore Movement under conditions in which the beach is obstructed and not accessible to landing boats. The movement of assault personnel and cargo must be made over these obstructions. When it is desirable to move personnel and cargo directly from the transporting vessel to unloading areas inland, DUKWs may be used.

Line of Transfer

The "Line of Transfer" will be employed in situations where landing boats are unable to beach because of artificial or natural obstructions to the landing approaches. It is the station at which transfer is made of personnel and equipment of troops from landing boats to LVTs and DUKWs. It will be located by the Traffic Control Officer in an area safe for landing boat navigation, immediately seaward of the breaker line and natural and artificial obstructions to the beach approaches and beyond the range of small arms fire from the beach. The control vessel at a designated beach will direct the transfer operations, the movement of LVTs to and from the beach and the movement of landing boats to and from the transfer area.

Landing boats, LVTs and DUKWs will maneuver slowly in the vicinity of the traffic control station until directed to a landing beach by either the Traffic Control Officer or by the Beachmaster. When directed, landing boats, LVTs and DUKWs will proceed from the traffic control station to the designated beach in an orderly manner. Empty landing boats, LVTs

TRANSFER OPERATIONS



LEGEND

V- LVTs discharge personnel and cargo on beach.
W- LVT wave approaching beach.
X- Empty LVTs return transfer area via nearest flank.
Y- LVT guide boats await empty LVTs.
Z- LVTs complete loading at Line of Transfer.
AA- Empty landing boats return Assembly Area upon completion of transfer of cargo to LVTs.
BB- Loaded landing boats await dispatch to Transfer Area.

LVT

Landing Boat

and DUKWs returning from the beach will proceed to the vessel to which attached, and as directed by the Traffic Control Officer.

Traffic Control Officer

The Traffic Control Officer will:

1. Establish the line of transfer and mark it, either by a traffic control boat, or by buoys. A NAN flag will be flown from the traffic control boat or the buoys marking the traffic control station.
2. Direct LVTs and DUKWs to proper stations abreast on the line of transfer approximately fifty yards apart.
3. Direct landing boats to proceed alongside designated LVTs and DUKWs on the line of transfer and to transfer troop personnel and cargo to the LVTs and DUKWs.
4. Direct LVTs and DUKWs to proceed to the designated landing beach.
5. Direct empty landing boats to proceed to the landing boat assembly area.

Landing Boat Procedure

Upon approaching the line of transfer, landing boats will:

1. Reduce speed and proceed to the LVT or DUKW designated by the Traffic Control Officer.
2. Come alongside the LVT or DUKW and lash securing lines.
3. Disembark troop personnel and transfer equipment and cargo to the LVT or DUKW.
4. Upon loading the LVT or DUKW to capacity, proceed to a succeeding LVT or DUKW as directed and disembark troop personnel and transfer cargo.
5. Upon completion of unloading proceed from the line of transfer to the landing boat assembly area, or as directed by Traffic Control Officer.

LVT and DUKW Procedure

Upon discharging assault waves, LVTs and DUKWs will:

1. Return to the line of transfer.
2. Take station in line abreast formation on the line of transfer maintaining fifty yards distance from the next adjacent LVT or DUKW.
3. Assist landing boats in securing alongside for transfer of troop personnel and cargo.
4. Receive troop personnel and cargo from landing boat to capacity as determined by circumstances.
5. Proceed to landing beach when directed by the Traffic Control Officer or the Beachmaster.

Termination of Line of Transfer

When a channel has been cleared and marked through artificial or natural obstructions to the landing beach the transfer of personnel and cargo from landing boats to LVTs and DUKWs will cease. The Traffic Control Officer will direct landing boats, LVTs and DUKWs to the landing beaches. The traffic control station will continue to function as previously set forth. Landing boats will return to the boat group assembly area as directed by the Traffic Control Officer. LVTs and DUKWs will assist in unloading operations as directed.

Preparation of Unloading Plan

An unloading plan is prepared for each hold section showing the operation to be followed in discharging the vehicles and cargo, and also listing the various details required for performing the work.

UNLOADING PLAN—#2 HOLD SECTION

PRIORITY NUMBER	TYPE OF VEHICLE	WHERE STOWED	BOAT REQUIRED
1	2½ Ton Truck wo/w	2H UT	LCM
3	2½ Ton Truck wo/w	2H UT	LCM
6	¼ Ton Truck	2H UT	LCVP
25	¼ Ton Truck	2H UT	LCVP
27	¼ Ton Truck	2H UT	LCVP

1. Discharge vehicles first.
2. Open to lower tween deck.
3. Discharge:
   a. Ammunition.
   b. Water.
   c. Rations.
   d. Miscellaneous Cargo.
4. Open to hold:
   a. Discharge Gasoline.

UNLOADING DETAIL

FIRST SHIFT

Lt. R. B. Brown—In Charge
S/Sgt. J. C. Green
Sgt. B. B. Blue
Cpl. J. L. Doakes
Pfc. C. C. North
Pvt. E. W. Rich
Pvt. D. F. Grew
Pvt. V. C. Lewis
Pvt. F. T. Cary
Pvt. L. R. Fry
Pvt. G. G. Jay

SECOND SHIFT

Lt. B. C. Day—In Charge
Sgt. E. F. Gray
Cpl. H. I. Jones
Cpl. K. L. Macy
Pfc. N. O. Pray
Pfc. R. S. Tate
Pfc. U. V. Wade
Pvt. A. B. Coe
Pvt. D. E. Fay
Pvt. G. H. Jack
Pvt. K. T. Stevens

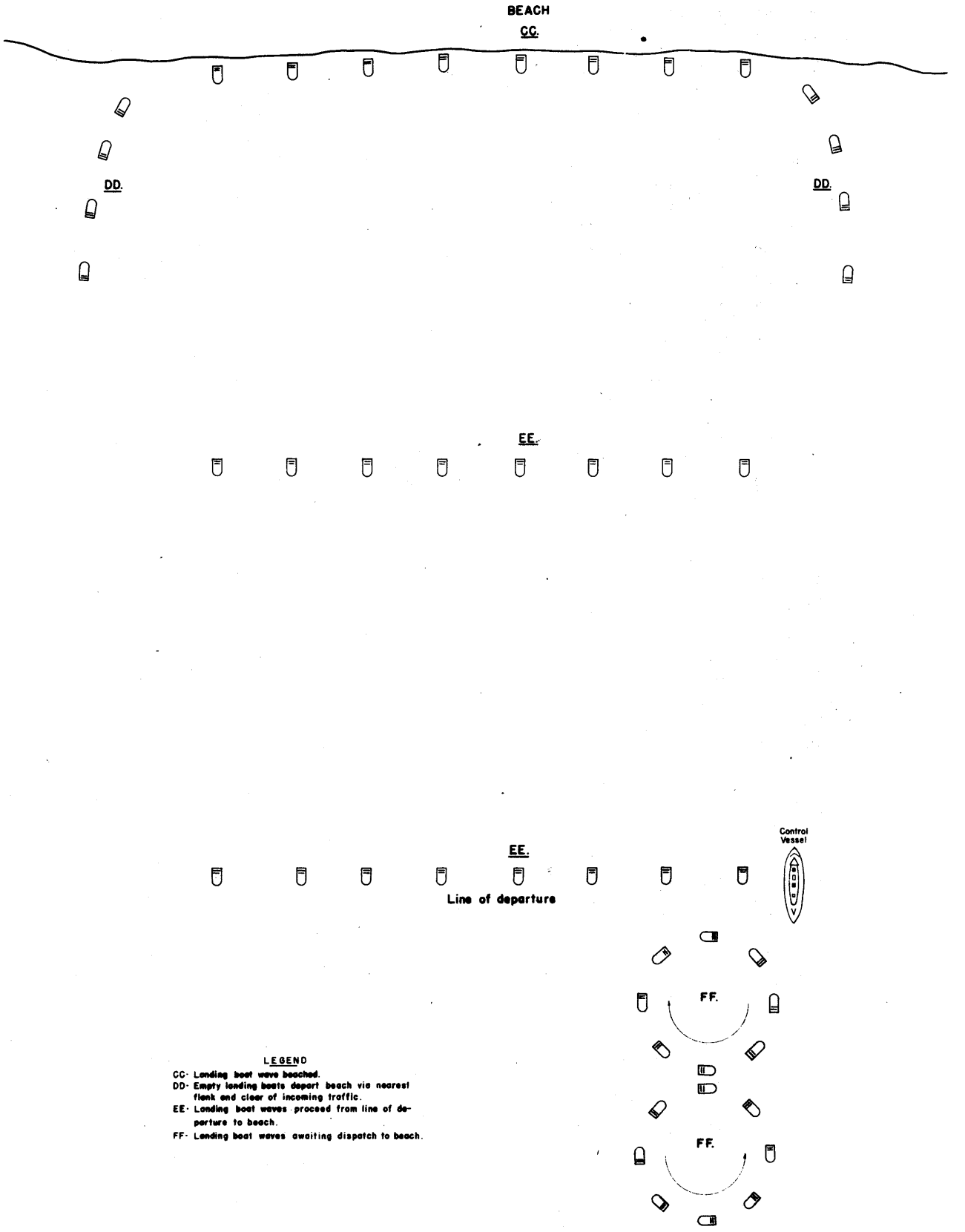
HOLD CHECKER
Sgt. R. M. Green

GEAR REQUIRED
Vehicle Slings, Gasoline Slings, Cargo Nets

SIGNALMAN
S/3C I. M. Jack

RIG BOOMS FOR DISCHARGE
Starboard

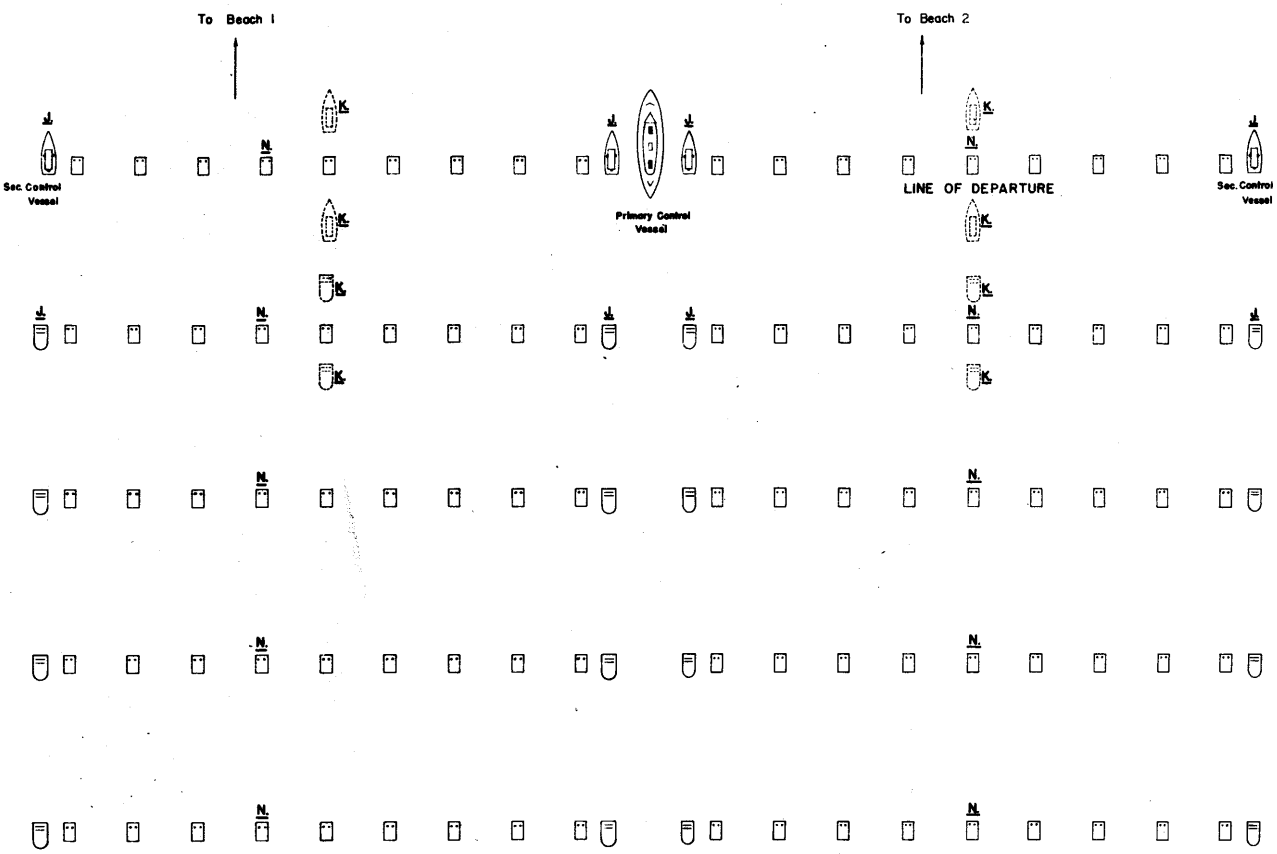
MOVEMENT OF LANDING BOAT WAVES FROM LINE OF DEPARTURE TO BEACH

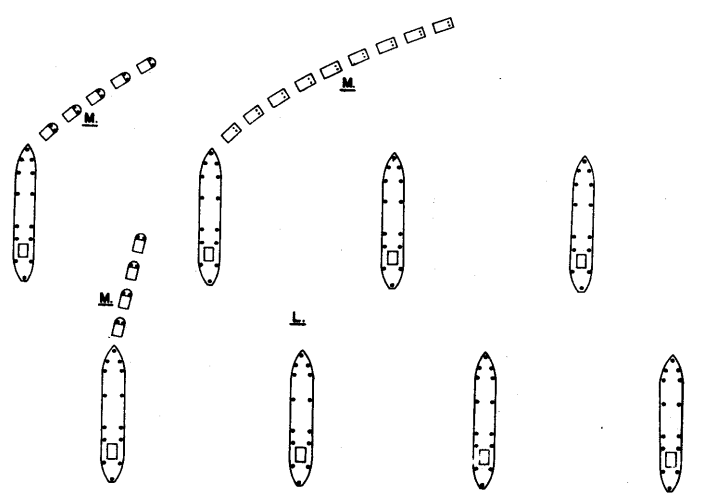


LEGEND

CC- Landing boat wave beached.
DD- Empty landing boats depart beach via nearest flank and clear of incoming traffic.
EE- Landing boat waves proceed from line of departure to beach.
FF- Landing boat waves awaiting dispatch to beach.

LVT AND DUKW WAVES AT LINE OF DEPARTURE



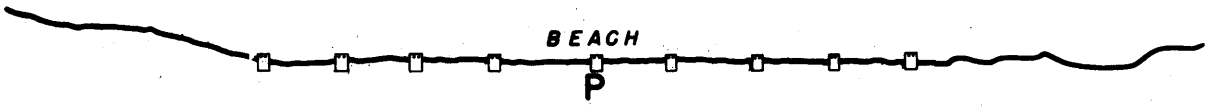


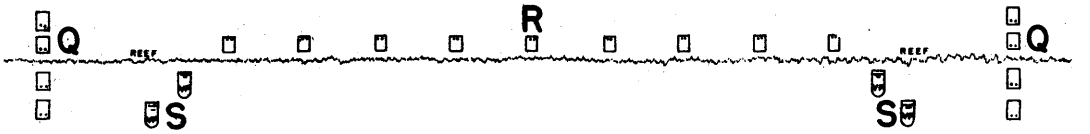
J. LVT wave guide boats.
K. Alternate position for LVT wave guide boats.
L. Tractor unit takes station in designated area as close to Line of Departure as practicable and discharges LVT'S and DUKW'S.
M. LVT'S and DUKW'S proceed to vicinity of Line of Departure and form into waves as set forth in the landing diagram.
N. LVT and DUKW waves keep station until dispatched to landing beach by Control Vessels.
O. Control Vessel maintains station at Line of Departure and dispatches waves to beach.

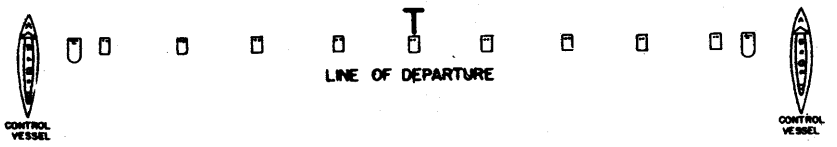
LVT

Landing Boat

MOVEMENT OF ASSAULT WAVES FROM LINE OF DEPARTURE TO BEACH











MOVEMENT OF ASSAULT WAVES FROM LINE OF DEPARTURE TO BEACH

P. LVT's beach and discharge personnel and cargo.

Q. Unloaded LVT's return from beach at nearest flank.

R. LVT waves proceed to beach.

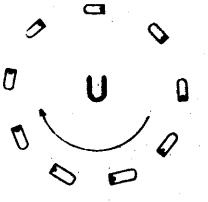
S. LVT wave guide boats await return of LVT's from beach.

T. LVT waves await dispatch to beach.

U. Landing boat waves await transfer operations.

LVT

Landing Boat





CHAPTER VI

COMBAT UNIT LOADING

SECTION 5 — REEMBARKATION

Responsibilities of Troop TQM During Reembarkation

As directed by his CO of Troops, the Troop TQM during reembarkation will:

1. Establish liaison with the Shore Party Commander and indicate in what order of priority equipment and supplies should be returned to the ship.
2. Supervise the reloading of supplies and equipment to agree insofar as possible with the original loading and stowage diagrams.
3. Maintain a record of supplies and equipment reembarked.
4. Keep interested parties informed as to the status of the loading.

During the reembarkation, the Troop TQM should either go ashore or send his Assistant TQM ashore to supervise the flow of supplies and vehicles back to the ship. He must exercise care to insure that the supplies that are to be loaded in the hold are sent out to the ship first.

CHAPTER VI

COMBAT UNIT LOADING

SECTION 6 — TROOP TQM CHECK LIST

Prior to Preparation of Loading Plan

1. Obtain personnel list of troops to be embarked from the Division TQM.
2. Obtain correct UP&T Tables for all units to be embarked from the CO of Troops.
3. Obtain Vehicle Debarkation Priority Table from CO of Troops.
4. Obtain from Division TQM the name of ship and when, where, and how ship will dock.
5. Obtain from G-4 the list of bulk general cargo to be stowed aboard the ship.
6. Verify all ship's characteristics.
7. Obtain a copy of the Ship's Regulations, extract information of interest to the Troop TQM, and turn Regulations over to the CO of Troops.
8. Study previous loading plans of the ship, if available.
9. Discuss problems with ship's officers and get their recommendations.
10. Discuss the tactical plan with the CO of Troops in order that your stowage plan will conform to the tactical plan.
11. Obtain from G-4 a schedule for the delivery of supplies and equipment to the pier.
12. Be sure the CO of Troops has designated both Mess and Billeting Officers.
13. Check with the Ship's Officers regarding the adequacy of the Ship's Store, and if inadequate, make arrangements for an Army PX aboard.
14. Check ship's gear and see if all loading slings, rollers, cargo nets, jacks, etc., needed will be available.
15. Check with Division TQM regarding the availability of banding equipment and supplies for the repair of pallets aboard ship.
16. Be certain that items such as cleaning and preserving materials can be stowed where they will be accessible.
17. Ascertain that all supplies and equipment are properly marked.
18. Determine if a public address system and mimeograph are available aboard ship for the use of troops.

During Preparation of Loading Plan

1. Inform the G-4 of the percentage of troop cargo and billeting space that will be occupied by the personnel and cargo to be embarked.

2. Plan to have all hatches loading simultaneously.
3. Inform the Division TQM of any changes or omissions necessitated by the ship's characteristics.
4. Consider the number of slow and fast lifts and ascertain whether the booms can be re-rigged after all the heavy lifts are completed to permit faster operation.
5. Determine whether or not the loading equipment will be available at the destination. If it is to be unavailable, what substitutes do you plan for unloading.
6. Select capable assistants and instruct them in their duties.

During Loading

1. Keep up with major changes and alter your loading plan accordingly.
2. Check to see that copies of the loading plan are available to all persons involved in the loading.
3. Check to see that provisions have been made for a pier guard.
4. Arrange for the billeting and messing of the ship's working detail.
5. Arrange for working reliefs with an Officer in charge of each.
6. Check with the Pier Control Officer and make the necessary arrangements to have engineers available at the pier to secure vehicles in the holds and make all necessary repairs.
7. Be certain that sufficient dunnage is on the pier and on the ship.
8. Be sure guns and vehicles to be stowed have been properly serviced and waterproofed.
9. Arrange for space on the dock for parking vehicles to be loaded.
10. Secure an adequate number of finger lifts in order to keep all supplies moving.
11. Keep the Division TQM advised of the status of loading through the Pier Control Officer.

At Sea

1. Make a daily inspection of all cargo for fire hazards, slackening of lashings on vehicles, looseness of wheel blocks, evidence of cargo shifting.
2. Place guards on any cargo that might be easily pilfered and arrange for guard reliefs.
3. Double check "dangerous cargo" stowage.
4. Replace broken straps on pallets.
5. Prepare a master list for unloading; showing type of boat necessary, what it will carry, and the hatch to which it will report.
6. Arrange for adequate supervision of unloading from each hold, attempting to use the same NCOs who loaded the hold.
7. Arrange for all drivers to report to their vehicles at the time of debarkation.
8. Give a copy of your debarkation plans to the Naval Debarkation Officer in sufficient time for him to study and establish boat priority for each hold.

During Unloading

1. Work with the ship's Cargo Officer and keep a running record of percentage of unloading completed.
2. Arrange for communication between the Troop TQM and the beach where the supplies are being unloaded.
3. Follow the tactical unloading priority list explicitly.

After the Operation

1. Turn over a revised set of the ship's characteristics based on actual measurements to the Ship's TQM.
2. Submit a complete digest of the entire operation to the Division TQM with all records and data for the files of the G-4.
3. Submit your recommendations regarding Troop TQM aspects with regard to future operations to the Division TQM.

CHAPTER VI

COMBAT UNIT LOADING

SECTION 7 — THE SHORE PARTY

Definition and Purpose

A Shore Party is a special task organization charged with the responsibility of unloading materiel and supplies at the beach and the movement of these supplies to beach dumps.

Composition

The Shore Party consists of components of both the Landing Force and the Naval Force. The organization of the Landing Force component is dependent upon the tactical and logistical requirements of the anticipated operation. The Naval component may be a beach battalion or one or more beach parties, depending upon the size of the operation and the demands for shore party work.

Allocation of Shore Parties

The number of shore parties required will of necessity vary with the size of the Landing Force, and the character and number of beaches to be utilized. Normally a Shore Party is provided for each landing team.

Command

The commanding officer of the Shore Party is known as the Shore Party Commander. This officer is normally designated by the Landing Force Commander, and is preferably an engineer officer of field grade. Shore Party Commanders should be military officers, Army or Marine, and only military officers will suceed to command within the Shore Party.

Responsibility of Shore Party Commanders

Each Shore Party Commander is responsible to the senior troop commander operating in the zone which his shore party serves. He exercises control of all activities in the immediate area delimited by the senior troop commander in that zone. The Beachmaster is the naval officer in charge of the naval section of the Shore Party and acts as an assistant to the Shore Party Commander and is his advisor on naval matters. The responsibility of the Shore Party Commander for the movement and segregation of supplies terminates when the supplies are placed in beach dumps or transfer points. The protection and issue of these supplies continues to be the responsibility of the Shore Party Commander until such time as the normal supply agencies are ashore and functioning.

Duties of Shore Party

The general duties and subdivisions of the Shore Party are as follows:

1. The Headquarters furnishes the command section as well as various specialists needed for the work on the beach.
2. The Shore Platoon furnishes the weapons responsible for local

security, and the road, demolition and other necessary details for the operation of the beach.

3. The Service Platoon furnishes the carrying parties and is responsible for unloading boats and moving supplies to dumps inland off the beach.
4. The Ship's Platoon furnishes the details for unloading the ship. This party does not land until the ship is entirely unloaded.
5. The Beach Party (Naval) directs boat traffic, salvages boats, provides emergency medical treatment of the Shore Party, evacuates casualties and repairs broken down and damaged boats. It also provides ship-to-shore communications.
6. The Communications platoon provides lateral communication between the beaches and communication with combat troops ahead.

Shore Parties are organized units in the same sense as are the tactical units of the Landing Force. They are organized to fit the specific tactical and logistical situation and are trained as a coordinated unit prior to active operations. The Shore Party is reinforced by such tactical and service troops as the logistical requirements of the operation demand. It must have the special equipment and training required for the performance of its missions. In the study of a contemplated operation, command decisions with reference to the attachment of combat and service troops to the basic shore party must be made. The elements of the military component of the Shore Party must be such as to perform the effective discharge of their duties.

Attached Tactical Troops

Depending upon the study of the enemy possibilities within the contemplated area, such troop units as anti-aircraft, anti-mechanized, etc., may be required. When such units are intended primarily for the defense of the beach, they may be attached to, or made part of, the Shore Party in order that proper coordination may be obtained.

Attached Service Troops

The logistical study of the contemplated operation may reveal that service troops will be required to augment the Shore Party. Such troops may include the following:

1. Labor units (Port companies, etc.).
2. Amphibian Vehicle units.
3. Motor Transport units.
4. Quartermaster units.
5. Military Police units.
6. Ordnance units.
7. Civil Affairs personnel.
8. Chemical Warfare units.
9. Communication units.
10. Medical units.
11. Bomb Disposal units.

Landing the Shore Party

The Shore Party will be subdivided into components capable of immediately supporting assault elements of the Landing Force. Elements of the Shore Party must be landed in the proper sequence and given sufficient priority to insure not only the success, but also the proper control of all Shore Party

functions. In common with other troop units, tactical considerations govern the landing of Shore Party personnel. In no case will Shore Party personnel be assigned to boat spaces merely to fill up the boat.

The Reconnaissance Section should normally go ashore with the leading wave of the reserve infantry companies. The Communication Section should follow the reconnaissance elements. The remaining elements should go ashore in accordance with the tactical and logistical requirements. All elements of the Shore Party, including engineering heavy equipment, should be ashore and organized prior to the volume landing of supplies.

Dump Locations

Prior to landing, dump locations will tentatively be selected from a study of maps and aerial photographs.

These locations will be confirmed by personal reconnaissance immediately on landing. The Shore Party will establish dumps in the beach area for the following.

1. Ammunition.
2. Rations.
3. Water.
4. Vehicles.
5. Gasoline.
6. Medical.
7. Miscellaneous supplies.

The medical point may be used for casualty evacuation. However, in order to expedite the removal of casualties from shore to ship, they may be evacuated at any point designated by the Shore Party Commander and approved by the Beachmaster.

CHAPTER VII

GARRISON FORCE LOADING

SECTION 1 — GENERAL

Garrison Forces must move into newly occupied areas as quickly as possible after the military situation ashore has become stabilized. This is necessary so that air and anti-aircraft defensive works may be made operable and that assault and supporting naval forces may be withdrawn to continue offensive missions. For this reason ships carrying Garrison Forces must arrive at newly captured positions shortly after the combatant troop-carrying ships. Generally, it is necessary for this purpose, to use ships of the U. S. Merchant Marine. These ships do not have armament, speed or communication facilities comparable to those of the combatant troop carriers, nor are they manned by crews experienced in this type of naval operation. Yet they are subject to the same forms of enemy action as any of the combatant ships. They may anchor in small land-locked harbors for the period of unloading. Here they are especially vulnerable and numerous fleet units must be maintained in the immediate vicinity for their protection. Every effort must be made in planning embarkation of Garrison Forces to insure that personnel and materiel can be landed in their order of use and that ships can be completely unloaded in the shortest possible time. This requires that the Garrison Forces and ships involved be highly organized for embarkation and debarkation.

Garrison Forces should be activated as early as possible before an operation with all elements of the permanent garrison included under the command of one officer. As soon as activated, such forces, whether, predominantly Army, Navy or Marine, should be assigned to the operational control of the Commanding General Expeditionary Troops for the purpose of preparation for embarkation. That officer will acquaint the Garrison Force Commander with the nature and priority of the tasks which his force is expected to accomplish and will issue instructions for the preparation of lists of equipment and supplies which the Garrison Force will require and the priority in which they should be landed at the objective. He will then order the Garrison Force Commander to report to the Commander Landing Force with whom arrangements will be made for transportation of Garrison Force personnel and equipment which is to be embarked with Assault Forces.

Prior to preparation of loading plans the officer personnel who are to supervise the loading must be appointed by the Garrison Force Commander. Amphibious Force Circular Letter AL15-44, dated 3 April 1944, specifies that the officer in general charge of all troop loading (Garrison Force TQM) must be of the rank of Lieutenant Colonel or above. Under his command shall be two officers of field grade, one of whom will be on duty at the piers at all times, and for each ship a loading officer of the rank of First Lieutenant or above, who shall be designated as Troop TQM.

Duties of Garrison Force TQM

1. Work in close cooperation with G-4.
2. Secure from G-4 an approved list of TE equipment to be taken on the movement.
3. Select sufficient and suitable officer Assistants and enlisted personnel.
4. Establish temporary office headquarters at the AP&SC Army TQM Office. The AP&SC Army TQM will aid and advise the Garrison Force TQM.
5. Contact and instruct all units comprising the Garrison Force in the preparation of UP&T Tables, C&LAs, Drayage Tickets, and Packing and Crating Requests.
6. Collect all unit UP&T Tables and C&LAs and consolidate 48 hours before bookings are due.
   a. Packing and crating must be finished before UP&T Table and C&LAs are made.
   b. Each box, crate, bale, vehicle, etc., must have accurate weight and cubage. Inaccuracy may cause certain cargo to be left behind on the piers.
   c. Only allocated tonnage may be booked. Authorization to take additional cargo must be had from CinCPOA and ComGenPOA.
   d. UP&T Tables made out improperly will hinder the Garrison Force TQM in making plans.
7. Submit UP&T Tables and C&LAs to Cargo Booking Officer (ATD) for booking.
8. Aid and advise the Cargo Planning Officer (ATD) in the making of Stowage plans.
9. Check and supervise the actual loading in conjunction with ATD.
10. Maintain constant contact with all agencies for latest changes in cargo, personnel, and sailing dates.

Duties of Unit Commander

1. Secure from G-4 a list of TE equipment authorized to be taken on the movement.
2. Prepare accurate requests for packing and crating of supplies.
3. Submit packing and crating requests to the Garrison Force Supply Liaison Officer (Packing and Crating Officer).
4. Prepare an accurate UP&T Table and C&LA.
5. Submit UP&T Table and C&LA to Garrison Force TQM.
6. Appoint Unit Officer (Troop TQM) who will:
   a. Act as Liaison Officer between Unit and Garrison Force.
   b. Witness the actual loading of the unit's cargo on the designated ship and know where all types of cargo are stowed.

Supply Liaison Officer

The Garrison Force Commander should select a Supply Liaison Officer who will consolidate all requests for packing and crating materials.

Cargo Booking

In order that AP&SC can book the cargo, it is necessary for the Garrison Force TQM to submit to Army Transport Division (ATD) the completed

UP&T Tables and C&LAs for all units to be embarked on the ship. Prior to submitting these forms, the Garrison Force TQM should screen them to insure that they are properly prepared and that the units are not bringing unauthorized material.

Preparation of Loading Plan

After the cargo is booked, Army Transport Division (ATD) makes the loading plan. It is highly recommended that the Troop TQM be present during the planning stage. The Troop TQM (selected by the Garrison Force TQM from one of the units embarking) should assist in the physical loading of the ship. During the loading phase the Troop TQM should live aboard the ship where he will be available at all times.

Regulating Officer

It is recommended that the Regulating Officer establish contact with all units in an echelon and determine their geographical location. It will be necessary for the Regulating Officer to have a contact officer in each unit so that when cargo is to be moved the necessary arrangements can be made. The Regulating Officer should keep a record of all cargo moved to the piers and assist the Troop TQM in securing any equipment or cargo that is required. It is recommended that the Regulating Officer establish his headquarters at the AP&SC Regulating Point several days prior to the movement of cargo.

Pier Detail

It is necessary for the Garrison Force to provide a pier detail consisting of two officers and approximately fifty enlisted men. This detail should be formed into two shifts in order that they may operate on a twenty-four hour basis.

Troop Movement Liaison Officer

Troop Movement Liaison Officer should report to Troop Movement Section, AP&SC, on the first day that the cargo is moved to the piers. He should work with the Troop Movement Section and assist in the preparation of the embarkation plan and in the preparation of a plan for moving the troops from the staging areas to the piers.

Preparation of Cargo and Loading Analysis (C&LA)

Army Port and Service Command is charged with the responsibility of maintaining records concerning the shipment of Army units from the Hawaiian Islands. These records must be detailed enough to permit the duplication of cargo lost at sea and to provide an adequate basis for the payment of wharfage tolls. Therefore, it becomes the responsibility of the Unit Commander to prepare a C&LA Form in such detail that the necessary information can be secured. Inasmuch as there is a specific charge for each type of cargo (explosives, lumber, iron and steel, vehicles, general merchandise, etc.) the C&LA should list cargo by type. This detailed and accurate C&LA should then be turned in to the Garrison Force TQM who will screen the C&LA and then submit it to Army Transport Division.

Cargo Tally (Drayage Ticket)

In order that AP&SC can keep a record of the cargo moved to the pier, it is required that the Cargo Tally (Drayage Ticket) be prepared in quintuplicate

for each truck load or railroad carload of supplies and/or equipment sent to the piers. It is the responsibility of the supply agency or the unit sending the supplies to prepare these forms correctly. Upon the arrival of the cargo at the pier, FOUR copies of these tallies will be turned over to the ATD Pier Officer and the fifth copy will be returned by the driver to the supply agency.

Responsibilities of AP&SC

Higher headquarters has charged the Commanding General, Army Port and Service Command (AP&SC) with certain responsibilities in the moving of Army units from the Island of Oahu. Listed among the responsibilities are the following:

1. Furnish information on loading dates, loading points, pier areas.
2. Provide packing and crating materials and palletizing supplies.
3. Maintain adequate records to permit the duplication of Army cargo lost at sea.
4. Account for all personnel moved by water transportation in the Pacific Ocean Area.
5. Book all Army cargo with Office of Joint Shipping.
6. Load and manifest outgoing Army water-borne cargo.
7. Move troops and impedimenta by train or motor convoy to the port of embarkation.
8. Control all rail transportation used by the Army in the Pacific Ocean Area.
9. Maintain records of all Army cargo moved over piers by the Territory of Hawaii, the Inter-Island Steam Navigation Co., and the Oahu Railroad and Land Co., so that tolls can be accurately calculated.
10. Maintain liaison with Commander in Chief of the Pacific Ocean Area, Commandant of the 14th Naval District, Commander in Chief of the Pacific Fleet, and the War Shipping Administration in all matters affecting the point use of shipping.
11. Act as Army consignor for all movements of Army units and supplies from ports within the Hawaiian area to advanced bases established or to be established.

Services Performed by AP&SC

1. Book all Army cargo and personnel.
2. Prepare the cargo loading plan.
3. Prepare a pier stowage plan.
4. Train Troop TQMs as requested by the Garrison Force Commander.
5. Provide checkers at the pier to record the arrival of supplies and equipment.
6. Provide stevedores to load the ship.
7. Provide the necessary dock equipment.
8. Prepare the embarkation plan and supervise the actual embarkation of troops.
9. Arrange transportation for cargo and personnel from staging areas to the piers.
10. Receive passenger lists and make the proper distribution.

Garrison Force Responsibilities

1. Book all Army cargo and personnel through AP&SC.
2. Select the Garrison Force TQM or Troop Loading Officer.
3. Select a Supply Liaison Officer to secure and consolidate requests for all packing and crating materials from all units of the Garrison Force.
4. Provide a Troop TQM to assist in the physical loading of the ship, and carry out the ordinary duties of that position with the exception of the preparation of loading and stowage plans.
5. Select a Regulating Officer to regulate the movement of cargo.
6. Provide a Pier Officer to be in charge of the physical stocking of the pier.
7. Select a Transportation Liaison Officer to assist in the preparation of plans in the moving of personnel from staging areas to the piers.

CHAPTER VII

GARRISON FORCE LOADING

SECTION 2 — LOADING

The Commander Joint Expeditionary Force (or AdComPhibsFor acting therefor) assumes operational control of vessels as soon as they are assigned to move the first echelon of Garrison Forces. The screening of cargo and personnel and the approval of priorities is the responsibility of the Commanding General Expeditionary Troops. When this has been accomplished, the Commander Joint Expeditionary Force issues loading orders. The Garrison Force Commander and the Convoy Commodore make a general plan for the distribution of troops and cargo in the various ships and the Garrison Force Commander and his loading officers consult with the loading agency responsible for preparing the stowage plan. Both the Commander Joint Expeditionary Force and the Commanding General Expeditionary Troops, or the Convoy Commodore and Garrison Force Commander acting for them, approve these plans when made.

Responsibilities of Garrison Force Commander

The Garrison Force Commander is responsible for the preparation of the UP&T Tables and C&LAs for all units of the Garrison Force. These forms for units in the first echelon must be approved by the Commanding General Expeditionary Troops. They are then turned over to the loading agency (ATD or Navy Freight office) which is responsible for the loading of the ships.

Loading Agency

The loading agency is then responsible for preparing the loading and stowage plan and the actual supervision of loading. Prior to loading, the Master of each vessel approves the plans for his ship. Changes must be approved by the Commanding General Expeditionary Troops or by the Garrison Force Commander acting for him. The loading agency is responsible for furnishing properly prepared loading and stowage plans for distribution, as directed in the loading order.

Preparation of Stowage Plans

In the preparation of stowage plans the following basic rules should be observed:

1. Ships must be loaded for discharge in accordance with established priorities.
2. Supplies of all types should be distributed evenly among all the ships. This is especially applicable to rations, lumber, cement, marston mat, and petroleum products.
3. Ships should be loaded so that they all may be unloaded simultaneously and complete unloading at approximately the same time.
4. Each ship should be loaded so that the maximum number of holds or sets of gear may be worked over the entire unloading period, with a minimum of shifting of cargo handling gear. Consideration

must be given, however, to the difficulty of unloading the number one hold of most ships.

5. No piece of equipment should be loaded which cannot be readily unloaded with the ship's own gear, unless it is known that adequate hoisting cranes are available at destination.
6. No piece of equipment which cannot be unloaded into an LCM should be loaded so that it blocks discharge of other cargo.
7. The excessive use of dunnage greatly reduces the speed of unloading and should be avoided.
8. Heavy non-mobile lifts should be stowed in or near the square of the hatch.
9. A profile loading plan should be made showing for each hold section the types of cargo stowed, the amount of each type in short tons, and the approximate location in the hold.

Loading Technique

When AKs, APs, and XAPs are used as Garrison Force transports for an amphibious operation, the following points should be taken into consideration:

1. Ships must be loaded in a modified combat fashion. By this, is meant that the cargo must be loaded with consideration to unloading it, but this should not curtail the total amount of cargo on board. Air and submarine attacks may be expected by these ships and rapid unloading is mandatory.
2. The quantities of material shipped in the initial phase should be limited to essentials for which there will be an actual need in the first two or three weeks.
3. All heavy machinery, particularly bulldozers, heavy caterpillars and other prime movers necessary for initial work on the beaches should be combat loaded in LSTs ready for immediate access.
4. Vehicles which cannot be loaded into an LCM should not be stowed on the square of the hatch.
5. The number one hatch should have nothing in it but small easily manhandled packages, when unloading at sea is a possibility. Some consideration should also be given along this line to the after hatch.

Embarkation Plan

While stowage plans are being made, the Garrison Force Commander should make his assignment of personnel or "Embarkation Plan". This plan assigns the various units under his command to the ships upon which they will embark.

Ship's Platoon (Loading-Unloading Team)

The Garrison Force Commander assigns a Ship's Platoon composed of two officers and one hundred enlisted men and at least one cook and six messmen to each ship. The Ship's Platoon is under the control of the Troop TQM. It is essential that the Ship's Platoon be selected principally from a previously organized unit of which the officers and men are known to each other. It is the duty of the Troop TQM to organize the Ship's Platoon into two shifts and to divide the men in each shift among the holds. Each hold detail should be under the command of a competent non-commissioned officer. It is important that each hold be unloaded by the same group that loaded it. At this time also, the Garrison Force Commander must appoint and organize the Beach and Shore Parties.

Types of Vessels

The abreviations AP, AK, XAP, and XAK, refer to the following vessels:

AP, AK.....Navy-manned transports and cargo vessels.
XAP, XAK.....Civilian-manned transports and cargo vessels.

It may be necessary for some time in the future to employ XAPs and XAKs in the early echelons of offensive operations. These ships are not normally equipped to operate and discharge cargo as is required of them. For this reason, certain equipment and Naval personnel are assigned to these ships for the period when they are operating in the forward area.

Commanding Officer of Naval Units

An officer of sufficient rank and experience to coordinate the activities of the various naval units is assigned as Commander of the Naval Detachment on every civilian-manned XAP and XAK ordered into a combat area. The Cargo Officer assigned to each ship, the CO of Troops, and the officers in charge of the Armed Guard, the Communication Liaison Group, the Boat Group, and the Cargo Handling Detail all report to the Commanding Officer of the Naval Detachment.

Personnel Assigned to Merchant Ships

There are at present four distinct groups of naval personnel assigned to vessels of these types as follows:

1. Armed Guard.
2. Communication Liaison Group.
3. Boat Group.
4. Cargo Handling Group.

Boat Group

The Boat Officer on board will command not only the ship's boats, but also all boats assigned for unloading the ship. It is his duty to meet the boat demands of the Cargo Officer as expeditiously as possible.

Cargo Handling Group

An experienced naval Cargo Loading and Unloading Officer and a competent assistant should be assigned to each Cargo Handling Group. This officer is responsible for the proper stowage of cargo in accordance with the approved plans.

It is the duty of the CO of Troops on board each ship to assure that insofar as possible all demands of the Cargo Officer for troop labor are met, and to exercise such supervision of working details as are necessary to insure the most efficient operation.

Officers and men of the Cargo Handling Group should board the ship prior to loading, and assist in the loading of the ship. They should become familiar with the facilities for handling cargo, with the cargo spaces, and the loading plans. These loading groups should be regarded as teams and be trained and assigned as units, being removed as units when their ships ars allocated to routes outside the forward combat zones.

The Cargo Handling Group provides four winchmen and two hatch tenders for each cargo handling section, four deck petty officers to take charge of the forward and after group of hatches, and two deck petty officers to assist in directing the operation of boats alongside. The loading and discharge of cargo should be planned on a 24 hour basis.

Cargo Handling Equipment

Cargo handling equipment should be made available in accordance with requirements of the cargo loaded aboard the ship. The necessary gear should be selected from the cargo handling gear list by the ship's Cargo Officer and approved by the Force Supply Officer.

Coordination of Loading

Coordination and general supervision of loading of ships of the first echelon is exercised by the Commanding General Expeditionary Troops who should establish TQM offices at or near the piers for this purpose. He should insure that all arrangements for loading on the piers are properly made, that ships are being loaded in accordance with previously approved plans, that cargo is being checked and manifested and that loading will be completed on schedule.

Pier Details

Work on the piers is performed by details assigned by the Commander Garrison Force supplemented as necessary by regular longshoremen and mechanical equipment with its operating personnel. For each ship a 50 man working detail of troops should be maintained on the pier. Where sufficient Garrison Force personnel are not available for this work, arrangements may be made, through Commander Joint Expeditionary Force, for the employment of longshoremen.

Commander Joint Expeditionary Force

The Commander Joint Expeditionary Force should issue orders for the movement of ships to and from the piers and make arrangements for berths, longshoremen, pier equipment and the assistance of technical advisory personnel from port authorities as required.

The schedule of loading should allow adequate time for loading each ship. Because of the scarcity of berths and the complexity of ship movement arrangements during loading periods, no extra time can be allowed. Every effort must be made to anticipate completion dates in order to allow for unforeseen delays.

Insofar as practicable the embarkation of the main body of personnel should be scheduled after completion of loading and just prior to sailing.

Convoy Commodore

The Convoy Commodore and his staff officers should observe the loading of all ships of the Transport Squadron. An intimate knowledge of the cargo of each ship and the manner of stowage is prerequisite to intelligent direction of the unloading.

Commander Garrison Force

Prior to embarkation the Commander Garrison Force should provide copies of his Embarkation Plan to the Commanding General Expeditionary Troops. Such plan should show for each ship the names of the units or detachments to be embarked and the number of officers and enlisted personnel in each of the units or detachments, as well as the total number of officers and enlisted men to be embarked.

Responsibilities Aboard Ship

The Captain of the Ship or the Master is responsible for:

1. The safety of his ship.
2. The gear for handling cargo.
3. Working of the hatch assigned to the ship's company.

He retains responsibility for his ship and crew in accordance with law. He may advise loading officers as to methods of handling specific types of cargo.

The CO of Troops is responsible for:

1. The berthing, messing and discipline of all military personnel aboard the ship.
2. Seeing that the men are at their proper stations when cargo is being discharged.
3. Working closely with the Troop TQM in order to expedite the discharging of cargo.

Responsibilities in Task Group or Unit Garrison Forces

The Task Group or Unit Commander is responsible for:

1. Navigation and safety measures.
2. Defense of transports.
3. Unloading and discharge of transports.
4. Assignment of appropriate landing craft to ships.
5. Proper loading of landing craft.
6. Safety of landing craft while alongside transports.
7. Dissemination of information regarding air attacks to ships and landing craft and transmission to Naval Base Commander.
8. Transmission of reports regarding unloading to higher authority.
9. Reloading of transports.

The Naval Base Commander is responsible for:

1. Expediting unloading and turnaround of landing craft.
2. Loading of landing craft with outgoing cargo.
3. Assignment of landing craft to transports as requested by Task Group or Unit Commander.
4. All operations on shore connected with discharge of incoming cargo, dispersal of same, and loading of outgoing cargo.

CHAPTER VII

GARRISON FORCE LOADING

SECTION 3 — UNLOADING

Cargo Handling Teams

In amphibious operations it is sometimes necessary to unload cargo from Garrison Force ships under the most difficult conditions. LSTs, landing craft and landing boats are loaded alongside ships lying-to or anchored in open roadsteads. Unless this cargo is unloaded expeditiously, it may mean the difference between the success or failure of the amphibious operation. It may also result in the loss of the transports or cargo vessels themselves.

Combat cargo handling by ships engaged in, or supporting an amphibious operation is a "Military Evolution" which requires trained cargo handling teams just as much as the battery of the vessel requires trained gun crews.

Each XAP or XAK of the Garrison Force having naval crews should organize cargo handling teams composed of winchmen, hatchtenders, and deck petty officer supervisors. The standard cargo handling team based on a five cargo hatch ship will be composed of:

20 Winchmen.
10 Hatchtenders.
2 Deck petty officers for forward hatch group.
2 Deck petty officers for after hatch group.
2 Deck petty officers for controlling boats coming alongside.

The ships of the Garrison Group are commanded by a senior naval officer as Convoy Commodore. He is embarked on an AP or XAP, flagship of the convoy. The direct responsibility for the rapid and efficient unloading of all ships of the Garrison Force Group rests on the Convoy Commodore. Members of his staff include several naval officers experienced in the discharge of cargo. Sufficient voice radio equipment should be installed on the flagship for maintenance of administrative channels of communication with beach unloading points, Garrison Force Headquarters, boat pools, radio equipped landing craft, and ships of the convoy.

The Garrison Force TQM who is in overall charge of the loading is responsible to the Commodore and the Garrison Force Commander for unloading. He will establish his headquarters ashore and maintain communication with the Commodore. One of his field officer assistants shall exercise supervision of the movement of materiel on shore. The other field officer will report to the Commodore as liaison with the Troop TQM aboard the ships.

Craft available for unloading Garrison Force ships includes:

1. LSTs and LCTs.
2. LCMs and LCVPs.
3. Pontoon barges.

Discharge of Cargo

LSTs and LCTs should be used for unloading the largest holds. LCMs and LCVPs should be loaded with general cargo or vehicles, but not both. The

type of load should be planned in each case to assure minimum delay at the beach. Loading of the larger craft should be so arranged that advantage may be taken of favorable tide conditions. Smaller craft should be kept fully employed at holds not being unloaded into larger craft. By this method, surprisingly large amounts of cargo can be unloaded over a period of hours.

Unloading will continue on all ships on a 24 hour basis, unless the Commodore is otherwise advised by the officer in tactical command. When unloading at night, ships will use only necessary cargo lights and they should be shielded to provide only sufficient illumination on deck and overside to permit working cargo with safety. Lights in the holds should be so placed that they cannot be seen from above and do not brightly illuminate the squares of the hatches.

Each compartment will be cleared of all cargo before the next below is opened. When each hold is completely unloaded, work details will immediately clean up, cover hatches and batten down ready for sea.

Cargo Handling Group

The Navy Cargo Officer is responsible to the Convoy Commodore for the efficient unloading of his ship, and will be the final authority on the ship as to what is unloaded, where, and how. His decisions must be in full accord with the plans of the Garrison Force Commander. He is also responsible for preparing an unloading progress report. This report is submitted to the Convoy Commodore twice daily. All winchmen and hatchtenders are under the direct control of the Cargo Officer.

Communications Officers, Gunnery Officers and other naval personnel aboard ship should do all in their power to facilitate unloading operations as directed by the Cargo Officer.

Members of the merchant crew capable of operating cargo handling gear should operate under the ship's officers during unloading, and should take their regular turns with the naval details.

Salmon boards and ordinary cargo pallets will not be used for unloading except for bags of cement, flour, sugar, coffee and such other articles which because of the nature of their packaging require such special handling. Multiple chime hooks will be used for unloading petroleum products in drums, eight drums to a lift when the size of the landing craft and hatch opening permit. Cargo nets will be used for unloading other packaged material. They should be returned to the ship as soon as unloaded and should not be used for dragging cargo from the boats to dumps. Nets should be distributed among the hatches where they are needed. Working details should fill nets to their capacity by stacking rather than throwing packages into nets. Many hours may be saved on the ship regardless of boat or beach conditions, if in each hold one load is always ready for the hook and another being prepared.

CHAPTER VIII

PREPARATION AND MOVEMENT OF CARGO

SECTION 1 — PALLETIZING AREA

Upon receipt of orders from Division Headquarters indicating the scope and details of an amphibious movement, the following Standard Operating Procedure should be followed in order to eliminate needless repetition in the issuance of instructions, and to facilitate and expedite engineer activities. The following is based on a reinforced Regimental Combat Team.

Coordination of Requests

One Engineer Officer will be assigned to G-4, TQM Section, and will coordinate all requests for engineer equipment, personnel and materiel, and such other matters as may pertain to the Engineers.

Responsibilities of Engineer Officer

An Engineer Officer will be stationed at the Palletizing Area during the period of activity to be available for technical advice and supervision of all engineer operations. Officer assistants and sufficient enlisted personnel will be assigned to him in order that he may carry out his responsibilities. All requirements of special staff officers for palletizing or loading will be requested through the Palletizing Officer. Under no conditions will higher echelons be contacted directly.

The following Provisional units should be established:

HEADQUARTERS COMMANDANT PALLETIZING AREA—He is charged with the routine administration and supply of the palletizing area provisional organization. Two NCOs should be available to assist the Headquarters Commandant in all administrative control and details. In addition, two teletype operators and two telephone operators are necessary to provide twenty-four hour continuous communication between the Regulating Point, and the Palletizing Area. The Headquarters Commandant is responsible for the distribution, care, and return of such items as cots, mess equipment, quarters, etc., required in billeting or administration. The Headquarters Commandant secures final clearance for the Palletizing Area. The subordinate units will be responsible to him for clearance for their respective areas.

TRANSPORTATION OFFICER—The Transportation Officer of the senior unit concerned controls all vehicles and materiel movements. He controls the drivers of all vehicles concerned and insures that the required vehicles reach the pier as the dispatcher calls for them. A detail of sufficient mechanics should be provided with tools (including wheelpullers) in order to properly disconnect battery cables, fan belts, and remove steering wheels when required before stowing in the ship.

DISPATCHER—One NCO should be designated by the CO of Troops for each ship as dispatcher for the respective pier. The disptacher directs the move-

ment of all vehicles on and off the pier. He works directly with and cooperates with the military police traffic control detail under the Pier Boss and the Transportation Officer.

PROVISIONAL AMMUNITION COMPANY—A Provisional Ordnance Ammunition Company should be furnished by the Division Ordnance Officer to handle all ammunition storage, sorting and palletizing. It is under direct control of the Ordnance Officer, but will be included in the administration, messing, and billeting by the Headquarters Commandant at the Palletizing Area.

PROVISIONAL SERVICE COMPANY—A Provisional Service Company should be organized to provide sufficient personnel to continue loading, palletizing, etc., on a twenty-four hour schedule.

GUARDS—The Palletizing Officer (thru G-4) should provide the Headquarters Commandant sufficient guard personnel with the Provisional Organization detailed to the Palletizing Area, to guard all installations. The Headquarters Commandant, will administer guard details as are required for:

1. Ammunition convoys (Truck or rail).
2. Separate dump areas (Ammunition, Quartermaster and General Supply).
3. Guards for any miscellaneous materiel or areas as required.

An adequate guard will be provided by infantry or engineer companies or special staff sections for their own supply dumps.

MESSING—All of the above mentioned personnel should be messed at the Palletizing Area in a mess established by the Headquarters Commandant. When details from the Palletizing Area are required at the pier, the Headquarters Commandant should make the necessary arrangements with the Pier Control Officer to have these men mess at the pier.

BILLETING—During operations, all of the above mentioned personnel should be billeted at the Palletizing Area and transported between the piers and the Palletizing Area by vehicles from the Provisional Truck Company. Transportation for all relief details should be arranged so that they will arrive one half hour prior to the commencement of an eight hour shift, in order that they may become acquainted with the work in progress.

SUPPLIES AND EQUIPMENT—All supplies and equipment required in the palletizing operations, including Cherry-Pickers, Cargo Lifts, and miscellaneous equipment, etc., should be received, cared for, and distributed by the Engineer Officer or his representative assigned to the Palletizing Area. He will return the equipment at the completion of the operation. For the purpose of otbaining control and smoothness of operation, any Palletizing Area or General Supply Dump should be sufficiently large to allow for the following classes of supply.

1. Chemical Warfare.
2. Engineer:
   a. Maintenance.
   b. Explosives.
3. Medical.
4. Ordnance:
   a. Armament Maintenance.
   b. Automotive Maintenance.
   c. Ammunition.
5. Quartermaster:
   a. Rations, B, C, D, K.
   b. Class 2, clothing and equipment, cleaning and preserving organ-

izational equipment. Motor gasoline, white gasoline, diesel oil, lubricants, airplane gasoline, tank fuel.

6. Signal.

The PALLETIZING AREA should also possess the following characteristics:

1. Facilities for motor truck circulation.
2. Railroad transportation.
3. Level surface permitting operation of high lifts and cranes.
4. Water hydrants or outlets permitting the filling of water containers.
5. Available space for motor vehicle pool of approximately 200 vehicles, tanks and towed weapons.

The following also should be provided:

1. Fire extinguishers.
2. A large wall tent for a field headquarters.
3. A telephone orderly stationed at the telephone at all times during operations.
4. Rubbish cans.
5. Directional signs to and in the area:

PALLETIZING AREA

6. Signs for subdivision of classes of supply:

CWS	ENG	MED	ORD	SIG	QM

7. "NO SMOKING" signs should be placed in areas where required and guards should be posted to insure fire safety.
8. Filled lister bags for use by labor details.
9. A water heating unit to prepare hot coffee.

The DIVISION ENGINEER should set up the following in the Palletizing Area:

1. A dunnage pile.
2. A compressor unit to cut stripping, blocks, and various size lumber for palletizing.
3. A dump for all palletizing supplies containing:
   a. Strapping.
   b. Banding seals.
   c. Cable and clamps.
   d. "S" hooks for tandem sled operation (hooks to be stapled on side of pallet).
   e. Strapping machines.
   f. Nails.
   g. Carpenter tools.
   h. Waterproof paper.
   i. Hydroseal.
   j. Paint brushes.
   k. Paint: red, blue, green, white, yellow, brown.
   l. Hoisting slings.

Nothing should be issued to staff sections except through the Engineer Palletizing Officer and on memorandum receipt. Running inventories should be kept at all times. A guard should be maintained to prevent promiscuous taking of supplies.

FILLING OF WATER CONTAINERS—Water tank trailers or tanks, truck mounted with multiple outlets, should be used to fill five gallon or fifty-five gallon water drums. All water containers and water trucks should be sterilized with live steam prior to filling. All water containers returned from a trial

operation should be emptied, sterilized, and refilled with fresh water. Under no circumstances should water be drawn except from an authorized source.

MECHANICAL EQUIPMENT—High lifts, cranes and portable self-generating mobile lights (for night operation) should be secured for the operation. High lifts and cranes should be provided with operators to operate on two twelve hour shifts, operators to be housed in immediate vicinity of the Palletizing Area. A mechanic for repair and maintenance of high lifts and cranes should be permanently attached to the operators' crew. Light units should be repaired and maintained by the Division Engineer. Fuel for high lifts, cranes and lights should be provided by the the Division Quartermaster. All vehicles not actively engaged in the field operation should be kept in a motor pool away from the active area. All labor details required by special staff sections should be requested through the Headquarters Commandant. Details for labor should be requested twenty-four hours in advance. Labor details will police areas in which they are working prior to being relieved.

SUGGESTED WORKING PLAN—To facilitate the palletizing of cargo, the following method may be employed: Empty pallets are delivered to the palletizing area and placed in stock pile centrally located in the area. Then double rows of pallets are laid out leaving trafficways between the double rows for the entrance of trucks. When the trucks bearing the supplies arrive they are directed between the double rows of pallets, the supplies unloaded and arranged directly on the pallets. The loads then are strapped to the pallets and they are moved to the storage area. As fast as the loaded pallets are removed, empty pallets are moved in to replace them. This method makes the process a nearly continuous one and expedites the process considerably. In order for this method to work well, the incoming supplies must be scheduled so that they are continually arriving by single truck and not by large convoys.

EQUIPMENT NECESSARY—The equipment used in the palletizing area includes the following:

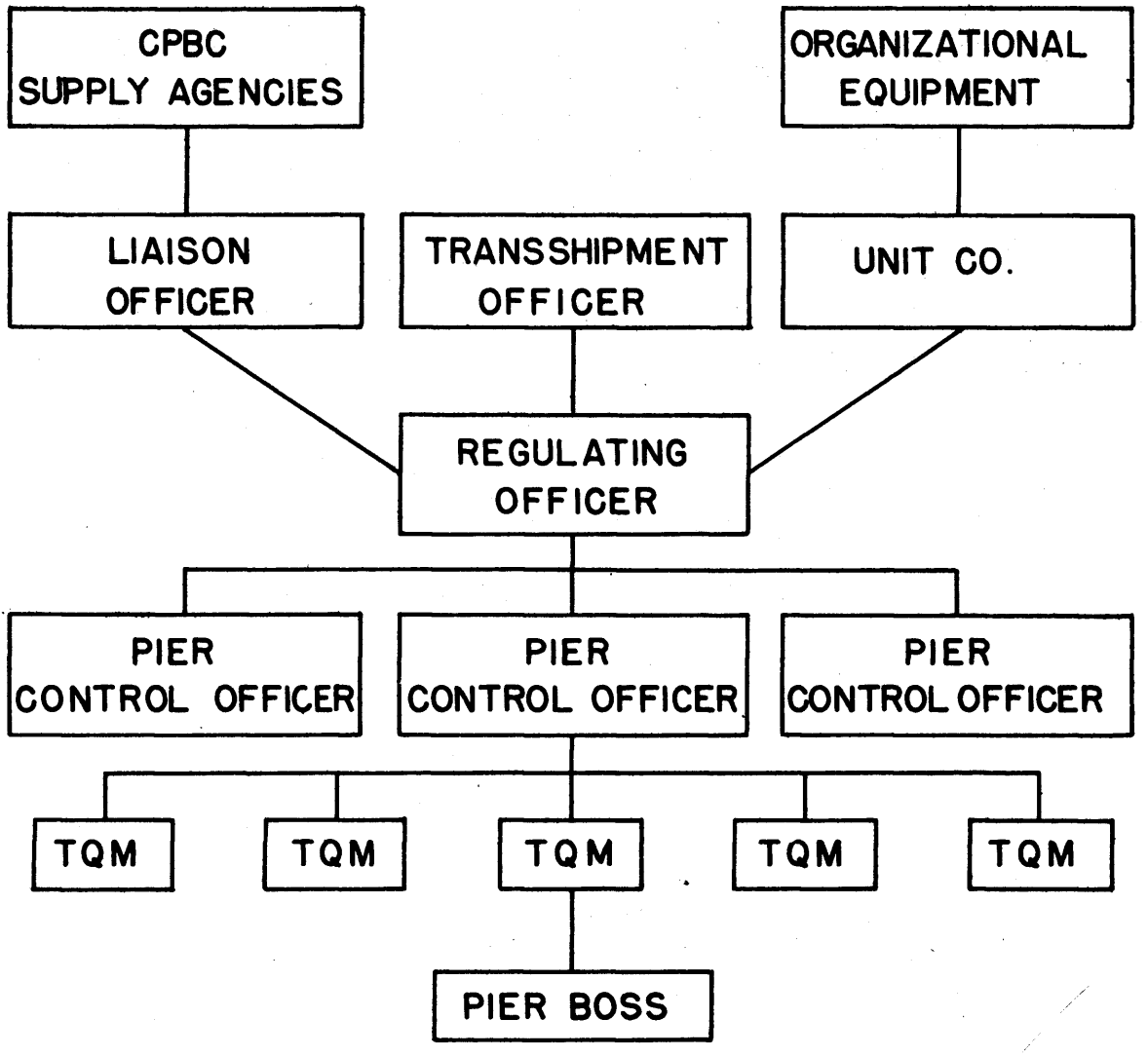
4 Lift trucks, 3 ton, 42" fingers.
2 Tractor Cranes, 5 ton.
4 Tractors.
20 Dock Trailers.
1 Air compressor, motorized.
5 Lighting Units, trailer mounted.

This equipment will vary somewhat at various times, but the above list is typical. Lift trucks are the most versatile pieces of equipment available, and are used for lifting, moving, stacking, loading and unloading pallets.

The Palletizing Area is sometimes referred to as the Transshipment Yard. On the island of Oahu, palletizing is done at Fort Kam.

FLOW OF MATERIAL AND CONTROL OF SUPPLIES

TRANSSHIPMENT YARD



CALL FOR SUPPLIES — UPWARD FLOW
MOVEMENT OF SUPPL.— DOWNWARD FLOW

CHAPTER VIII

PREPARATION AND MOVEMENT OF CARGO

SECTION 2 — PALLETIZING

Disadvantages of Palletizing

During the past year the palletizing of cargo has resulted in considerable discussion. In addition to opposition to a change from established methods of loading, palletization has the following disadvantages:

1. Pallets are costly in labor, time and material.
2. Pallets are wasteful of ship space.
3. Pallets are difficult to handle by inexperienced personnel.

Advantages of Palletizing

However, to counteract these disadvantages, the following benefits may be cited:

1. Moves supplies to beach dumps rapidly.
2. Reduces exhaustive labor, not only in unloading the ship, but also in moving cargo across the beach.
3. Eliminates extra handling, thus permitting the rapid unloading of small boats.
4. Reduces number of personnel needed on the beaches, this being particularly important when the beach is under enemy fire.
5. Prevents pilfering of supplies.
6. Simplifies the keeping of an accurate record of supplies received on the beach since only pallet numbers need be listed.

Pallets proved highly successful during the SAIPAN operation. When landing craft of all types were bottlenecked at the landing beaches and movement of cargo inland was continuing at a very slow rate, palletized supplies were dragged over coral reefs and overland to either dumps or front lines. The ease of handling palletized supplies was particularly apparent during the first seven days of the assault phase when congestion at the beaches had to be avoided due to the continuous artillery, mortar and air attacks on the landing beaches.

Towing of Pallets

Palletized cargo, including ammunition, can be towed from landing craft singly or in tandem by LVTs, both either water borne or operating over a coral reef. Palletized cargo can be towed through deep water to a beach without damaging contents of the pallet.

If pallets are going to be hauled only short distances, the present type is satisfactory. If pallets are going to be pulled several miles, as in an operation involving more than one beachhead, the present pallet has two weaknesses. When dragged over rough terrain any considerable distance, the wooden runners become chewed up and torn off and the steel cable tears through the cable hole on the runners. Both of these difficulties can easily be overcome. A two or three inch metal strip should be nailed along the length of the runners. This reduces friction and protects the timber. A metal core

should be inserted into the cable holes on the runners, thus preventing the cable from gripping and tearing through the wood so easily. With these improvements pallets can be pulled for long distances over rough terrain.

Tests have been conducted to develop a pallet suitable for use in amphibious operations in the Pacific Ocean Area. The major natural obstacle on most of the islands in this area is the long offshore coral reef generally covered with two or more feet of water. To be satisfactory, the pallet must be capable of withstanding the handling necessary to deliver it to the scene of the operation and then be towed to the place of utilization without losing or damaging any portion of the load originally secured to it. A portion of the mission accomplished by the pallet is illustrated by the following example. It would require thirty-six men, each making one trip, to hand carry the K rations on one pallet, whereas one tractor can tow two or three pallets much quicker without difficulty.

Pallet Load

The pallet was designed to handle a maximum load of 3000 pounds. However, it can be handled better with a lighter load and 2000 pounds has been adopted as the most desirable weight. In loading pallets with more than one type of material making up the load, it is important that the weight distribution be as symmetrical as possible to facilitate handling.

Height of Pallet Load

From the Troop TQM's point of view all pallets should be of the same height so that the cargo in the ship's holds can be floored over when necessary. Because of the variety of materials palletized, this is not possible without using large amounts of dunnage and wasting shipping space. However, the loaded pallet should not exceed forty inches from the bottom of the runner to the top of the load. This permits the load itself to be thirty-two inches in height. It is desirable to limit the height of the loaded pallet also from a stability standpoint. A lower center of gravity decreases the tendency of the pallet to tip over while it is being lifted or towed.

In some cases it is necessary that certain combinations of supplies and equipment be secured on a single pallet. This involves the arranging of the various sized boxes and articles so that a stable, secure load is obtained. This can be accomplished by using the rigid materials to be loaded on a particular pallet to make up the four corners and using any soft or non-rigid materials in the center. The load should be solid, square and level on top so that the pallet can be stacked, and whenever necessary, dunnage should be used to accomplish this.

Types of Cargo to be Palletized

Pallet loading may be successfully employed on the following types of cargo:

1. Ammunition.
2. Rations.
3. Petroleum products and water in expeditionary containers.
4. Small packages of uniform size.
5. Barbed wire and pickets.
6. Cement in paper bags.

Palletization of Ammunition

Palletization of separate loading ammunition should be done in such a manner that no one pallet of ammunition will contain complete rounds (fuses, projectiles, propelling charges, and primers), nor will any one pallet contain a combination of fuses and propelling charges, or primers and propelling

charges. Separate loading ammunition may be palletized in the following loads:

1. Projectiles only.
2. Propelling charges only.
3. Fuses only.
4. Projectiles and propelling charges only.
5. Fuses and primers only.

Only fixed and semi-fixed ammunition that is packed and shipped as complete rounds, and which remains in the original container until used, may be palletized as complete rounds.

By specifying standard methods of loading, mass production methods can be utilized and the time required for palletization thereby decreased.

Supply Liaison Officer

Upon receipt of movement orders from the Central Pacific Base Command, the major echelon of the units alerted should contact the AP&SC Army TQM office. A Supply Liaison Officer should be appointed to represent the units in all transactions with AP&SC in regard to securing palletizing supplies. It is preferable that an Engineer Officer be selected for this assignment for Divisions or similar organizations alerted for an amphibious operation. He should be relieved of all other duties as it will require his entire time to efficiently serve in this capacity. His work starts with the planning of palletizing of supplies and ends when the last unit is completely packed and ready to load aboard the ship. He is responsible for the following:

1. Receives from the officer in charge of palletizing a list of supplies needed, together with the number of personnel that will be required to do the work. This information should be furnished the AP&SC Army TQM Office so that necessary arrangements can be made for the assignment of a palletizing area and the issue of expendable supplies.
2. After work has actually started on the palletizing of supplies, the Supply Liaison Officer should maintain contact with the Officer in charge of palletizing in order that depleted stocks of supplies may be replenished. Such requirements will also be submitted to the AP&SC Army TQM Office. For duties of the Supply Liaison Officer with regard to packing and crating see Chapter VIII, Section 3.

General Policies on Palletizing

1. AP&SC will furnish all standard size pallets for use of the Task Forces.
2. Priorities are established on the basis of the time of embarkation. If more than one unit is being embarked on the same date, priority will be given to the unit submitting the request first.
3. Only those supplies as approved by the Commanding General Expeditionary Troops or by ComGenPOA will be palletized.
4. Supplies which have been palletized will not be depalletized without the approval of the AP&SC Army TQM.
5. Excess pallets or pallets which cannot be loaded on the ship because of inaccurate data or a change in loading plans will be turned in to the Staging Area Commander (Ft. Kam). Bulk supplies will be issued by the supply agencies of CPBC in lieu of the palletized supplies turned in.
6. Palletizing will be planned on a twenty-four hour basis by all units.

7. Water cans and/or drums will not be filled until the last possible moment and then only properly chlorinated water will be used.
8. Tools and equipment for palletizing will be controlled by the Staging Area Commander on a daily basis depending upon the need of the units staging.
9. The CG, AP&SC, will be the ruling agency on all R/S on staging tools and equipment lost or damaged in the staging areas.

Rule of Thumb for Assault Landing Forces

1. Supplies and equipment on APs, AKs or APAs and AKAs to be unloaded in landing boats should be palletized as far as practicable, other than that to be carried ashore by the combat troops.
2. Supplies and equipment on any type of ship to be unloaded by DUKWs or LVT(2)s should not be palletized.
3. Supplies and equipment to be unloaded from LSTs by means of pontoon causeway, lift trucks and cargo trucks, should be palletized.

Extent of Palletization

The use of palletized cargo tends to facilitate the handling of cargo at the beach and shore. However, it is considered that the use of pallets is not warranted during the early phases of the assault. Therefore, only approximately 50% of each type of supply should be palletized. Pallets should never be loaded into LVT(2)s or other craft which are unable to unload unless cranes or "A" frames are available for unloading.

The loss of space due to palletization and the future use of supplies for Garrison Force maintenance or transshipment to assault forces in the future should be the governing factors in determining the extent of palletization. Consistent with the operational plan as much of the supplies as possible should be palletized.

Stowage of Pallets on Ships

Although no absolute doctrine can be promulgated concerning the stowage of pallets, experience has shown that amidships holds are more adaptable to the stowage of pallets than extreme forward and aft holds. Where practicable, "lift" or "fork" trucks should be used to stow cargo in holds. These are generally available in warehouses and on well-equipped piers. Where the overhead clearances of the hold are insufficient to accommodate the forked trucks, the use of wheeled hydraulic jacks has proved satisfactory. When neither are available, three inch diameter rollers placed under the runners provide a simple means of stowing and moving pallets in the hold of a ship.

Stowage of Pallets on LSTs

LSTs on which it is intended to load pallets should be equipped with at least two fork trucks. Successful loading and unloading can then be accomplished in one of three ways:

1. Load the pallets in the aft end of the cargo hold tiered one, two, or three high by the fork trucks, and then load all wheeled vehicles in the forward section. After the vehicles have been unloaded, fork trucks carry the pallets to the ramp where they can be dragged ashore. Trucks may also be backed into the ship and loaded with pallets by the forked trucks.
2. Load all the pallets starboard and port from the forward to the

aft end of the cargo hold, leaving an aisle down the middle in which the wheeled vehicles are loaded. The vehicles and pallets may then be unloaded in the same manner as described in the preceding paragraph.

3. Load pallets on the Main Deck, dunnage over them, and then load vehicles on top of the pallets.

Pallet Statistics

Weight of pallet	225 pounds
Lumber required for one pallet	72 board feet
Hauling slings required (½" diameter)	2 (each 14 ft.)
Loading surface of pallet	24 square feet
Dimensions	4'x6'x8"
Maximum load	3000 pounds
Maximum height of load	3½ feet

An "S" hook ¾" in diameter of milled steel is secured to the pallet by 16d nails or 1" staples.

Material Factors

factors to estimate within 5% all basic material needs.

The following factors have been worked out with a view to predetermine with reasonable accuracy the material requirements for any given operation. Knowing the number of pallets allotted to an Amphibious Force by space limitations it is possible by multiplying the number of pallets by the following

Strapping 1¼"	113.5	Feet
Seal 1¼"	6.7	Units
Lumber 1"x6"	12.6	Feet
Lumber 1"x12"	.5	Foot
Lumber 2"x4"	3.5	Feet
Lumber 2"x6"	3.5	Feet
Lumber 2"x12"	.1	Foot
Sling (Snatch)	.01	Unit
Sling (Spreader)	.005	Unit
Sling (Double Spreader)	.005	Unit
"S" Hook	1.0	Units
Strapping Machine 1¼"	.1	Unit
Tinsmith Shear	.05	Unit
Nail, 16d	.4	Pound
Nail, 20d	.1	Pound
Nail, 8d	.04	Pound
Nail, 10d	.04	Pound
Nail, 12d	.04	Pound
Waterproof Paper 36" Wide	.03	Roll
Paint, Red	.002	Gallon
Paint, White	.002	Gallon
Paint, Black	.002	Gallon
Paint, Blue	.001	Gallon
Paint, Green	.002	Gallon
Paint Brush 1½"	.005	Unit
Paint Brush ½"	.005	Unit
Stencil Brush ¾"	.003	Unit
Stencil (3" Numbers 0 to 9)	.002	Set

**Jitney
**Dolly
**2½ Ton Roustabout
**Crane 20 Foot Boom
**Portable Light Unit
**High Lift (Finger Lift)
**Air Compressor
**Engineer Squad Carpenter Chest

**Number required depends on number and type of palletizing areas.

TYPE OF MATERIAL	LOAD PER PALLET	CAPACITY OF CONTAINER	CAPACITY PER LOADED PALLET	WEIGHT OF LOAD	WEIGHT OF LOADED PALLET	HT. IN INCHES OF LOADED PALLET	CU. FT. OF LOADED PALLET
SIGNAL SUPPLIES							
DR 4 REELS, W-110	18 REELS	1/2 MI. PER R'L	9 MILES	1440	1665	30	60
DR 4 REELS, W-130	18 REELS	2 MI. PER R'L	36 MILES	1530	1755	30	60
DR 5 REELS, W-110	8 REELS	1 MI. PER R'L	8 MILES	1336	1561	27	54
DR 8-6 REELS, W-130	14 BOXES	1 1/2 MI. PER B'X	21 MILES	1092	1317	37 1/2	75
ORDNANCE SUPPLIES							
.30 CAL. BALL, 8 RD., CLIPS, BOXES	20 BOXES	1344 RDS.	26880 RDS.	2260	2485	23 1/2	47
.30 CAL. BALL, 5 RD., CLIPS, BOXES	20 BOXES	1500 RDS.	30000 RDS.	2280	2505	23 1/2	47
.30 CAL. AP, 20 RD. CARTONS, BOXES	20 BOXES	1500 RDS.	30000 RDS.	2240	2465	23 1/2	47
.30 CAL. MG, 250 RD. BELTS, BOXES	20 BOXES	1250 RDS.	25000 RDS.	1860	2085	23 1/2	47
.50 CAL. MG, 9 TO 1 OR 2 TO 1, BOXES	20 BOXES	250 RDS.	5000 RDS.	1960	2185	23 1/2	47
.50 CAL. MG, 2 AP-2 INCEND.-1 TRACER-BOXES	20 BOXES	250 RDS.	5000 RDS.	2040	2265	23 1/2	47
.30 CAL. MG, 250 RD. BELTS, 4 TO 1, 4 TINS PER CRATE	32 CRATES	250 RDS. TIN 1000 RDS. CRT.	3200 RDS.	2464	2689	24	48
.30 CAL. CARBINE, BOXES	24 BOXES	3450 RDS.	82800 RDS.	2640	2865	21	42
.45 CAL. BALL, BOXES	27 BOXES	2000 RDS.	54000 RDS.	2997	3222	21	42
60 MM MORTAR, CLOVERLEAFS, CRATES	14 CRATES	18 RDS. CLVLF.	252 RDS.	1456	1681	40	80
81 MM MORTAR, LIGHT, UNCRATED, CLOVERLEAFS	42 CLOVER-LEAFS	6 RDS. PER CLVRLF.	252 RDS.	2437	2662	31 1/2	63
81 MM MORTAR, HEAVY, UNCRATED, CLOVERLEAFS	42 CLOVER-LEAFS	3 RDS. PER CLVRLF.	126 RDS.	1878	2103	31 1/2	63
81 MM MORTAR, LIGHT, CRATED, CLOVERLEAFS	30 CLOVER-LEAFS	6 RDS. PER CLVRLF.	180 RDS.	2070	2295	37	74
81 MM MORTAR, HEAVY, CRATED, CLOVERLEAFS	30 CLOVER-LEAFS	3 RDS. PER CLVRLF.	90 RDS.	1830	2055	37	74

TYPE OF MATERIAL	LOAD PER PALLET	CAPACITY OF CONTAINER	CAPACITY PER LOADED PALLET	WEIGHT OF LOAD	WEIGHT OF LOADED PALLET	HT. IN INCHES OF LOADED PALLET	CU. FT. OF LOADED PALLET
ORDNANCE SUPPLIES (CONT.)							
75 MM HOWITZER, CRATED, CLOVERL'FS	30 CLOVER LEAFS	3 RDS. PER CLVRLF.	90 RDS.	2400	2625	38	76
75 MM GUN, H.E., CRATED, CLOVERL'FS	- " -	- " -	90 RDS.	2460	2685	38	76
4.2 MORTAR, CHEMICAL, BOXES	28 BOXES	2 RDS.	56 RDS.	1848	2073	21	42
75 MM GUN, AP, 3 CLOVERL'FS / CRATE	8 CRATES	9 RDS.	72 RDS.	1864	2089	27 1/2	55
37 MM, BOXES	24 BOXES	20 RDS.	480 RDS.	2328	2553	37	74
40 MM, AA, BOXES	16 BOXES	24 RDS.	384 RDS.	2576	2801	35	70
90 MM, AA, BOXES	10 BOXES	4 RDS.	40 RDS.	2375	2600	34	68
105 MM HOWITZER, CRATED, CLOVERL'FS	16 CLVRLFS.	3 RDS./CLVLF	48 RDS.	2752	2977	32	64
155 MM HOWITZER PROJECTILES	18 PROJECT.		18 PROJECT.	1728	1953	15	30
155 MM HOWITZER POWDER, CRATES	18 CRATES	2 CHARGES	36 CHARGES	774	999	38 1/2	77
155 MM HOWITZER, FUSES & PRIMERS, BOXES	FUS. - 12 BXS. PRIM. - 6 BXS.	25 FUSES 50 PRIMERS	300 FUSES 300 PRIMERS	975	1200	17	34
3 IN. GUN, BOXES	12 BOXES	4 RDS.	48 RDS	1896	2121	31 1/2	63
GRENADE, RIFLE, IMPACT, T-2, BOXES	56 BOXES	10 GRENADES	560 GRENADES	1792	2017	34 1/2	69
GRENADE, AT, M9A1, BOXES	39 BOXES	10 GRENADES	390 GRENADES	1209	1434	28 1/2	57
SIGNALS, AIR & GROUND, BOXES	AIR 144 SIG. GROUND 50 SIG.	4 BOXES EA. 1 BOX EA.	RED, YELLOW, GREEN M-17, 18, 19, 20, 21, 22	1270	1495	36	72
SIGNALS, GROUND, BOXES	50 SIGNALS	2 BOXES EA.	M 17 — 22	781	1006	20 1/2	41
QUARTERMASTER SUPPLIES							
"K" RATIONS, CASES	36 CASES	12 RAT./CASE	432 RATIONS	1476	1701	33	66
"C" RATIONS, CASES	33 CASES	8 RAT./CASE	264 RATIONS	1254	1479	32	64
GASOLINE, 5 GAL. CANS	35 CANS	5 GAL. CAN	175 GAL.	1418	1643	28 1/2	57
OIL, 5 GAL. CANS	35 CANS	5 GAL. CAN	175 GAL.	1575	1800	28 1/2	57
BARBED WIRE, REELS	16 REELS	420 YDS.	6720 YDS	1680	1905	28	56
ANGLE IRON PICKETS, BUNDLES	25 BUNDLES	5 PICKETS	125 PICKETS	1250	1475	15 1/2	31

TYPE OF MATERIAL	LOAD PER PALLET	CAPACITY OF CONTAINER	CAPACITY PER LOADED PALLET	WEIGHT OF LOAD	WEIGHT OF LOADED PALLET	HT. IN INCHES OF LOADED PALLET	CU. FT. OF LOADED PALLET
QUARTERMASTER SUPPL. (CONT.)							
STD. EXPLOSIVE SLED NO. 1	30 SHAPED CHARGES, 40 FUSE LIGHTERS, 4000 FT. PRIMACORD			905	1130	26 1/2	53
STD. EXPLOSIVE SLED NO. 2	144 ROLLS TAPE, 80 BANGALORES 5 CRATERING CHGS. 1000 FT PRIMACORD 500 FT. TIME FUSES 40 FUSE LIGHTERS			2280	2305	29	58
STD. EXPLOSIVE SLED NO. 3	32 CASES TNT 1000 FT. PRIMACORD 800 FT. TIME FUSE 40 FUSE LIGHTERS			2270	2495	30	60
STD. EXPLOSIVE SLED NO. 4	33 CRATERING CHGS. 1000 FT. PRIMACORD 800 FT. TIME FUSE 40 FUSE LIGHTERS			1830	2055	33	66

TYPE OF MATERIAL	LOAD PER PALLET	CAPACITY OF CONTAINER	CAPACITY PER LOADED PALLET	WEIGHT OF LOAD	WEIGHT OF LOADED PALLET	HT. IN INCHES OF LOADED PALLET	CU. FT. OF LOADED PALLET
QUARTERMASTER SUPPL. (CONT.)							
WATER PURIF. UNIT SLED NO. 1	60 FT. SUCTION HOSE 200 FT. DISCHG. HOSE 3 BOOSTER PUMPS 1 BOX FITTINGS 1 BOX TOOLS, MISC.			1254	1479	40	80
WATER PURIF. UNIT SLED NO. 2	1 CANVAS - TANK & COVER 2 BOXES STAVES 200 LBS. ALUM. 100 LBS. SODA ASH			1200	1425	35	70
WATER PURIF. UNIT SLED NO. 3	1 CANVAS TANK 1 CHLORINATOR 1 FILTER			1300	1525	36	72

CHAPTER VIII

PREPARATION AND MOVEMENT OF CARGO

SECTION 3 — PACKING AND CRATING

Upon receipt of movement orders from Central Pacific Base Command, the major echelon alerted should contact the AP&SC Army TQM office. A Supply Liaison Officer should be appointed to represent the units alerted to deal with the Army TQM Office in the procurement of packing and crating supplies.

Garrison Force Supply Liaison Officer

The Supply Liaison Officer, appointed to represent a Garrison Force in its dealings with the AP&SC Army TQM Office, should be an officer who is moving with a late echelon of the Garrison Force, in order that it will not be necessary to "break in" a new officer after every two or three echelons have moved. In order to more expediently serve the units comprising the Garrison Force, this officer should be acquainted with the type of supplies with which he will be dealing. He alone represents the Garrison Force Commander in all transactions in regard to packing and crating. The following operating procedure has proved very satisfactory, and outlines the duties of the Supply Liaison Officer:

1. Secure from the Garrison Force G-4 a list of items that will be baled and crated and pass this information on down to the units.
2. Notify all units of the desirability of using as many standard size boxes as possible. These boxes are furnished in three sizes as follows:
   a. 12"x18"x36"
   b. 18"x18"x36"
   c. 24"x24"x42"
3. Consolidate the requisitions from the units and personally furnish a copy of the consolidated requisition and a copy of each individual requisition to the AP&SC Army TQM Office.
4. Receive all supplies requisitioned and make the breakdown for the individual units.
5. Arrange for labor details to assemble the boxes requisitioned and provide transportation to move them to the staging area.
6. Receipt for all items loaned on M/R and control the use of these items by the units under the command of his headquarters.
7. Contact additional units as soon as they are attached and provide them with the necessary information as to the correct procedure for securing packing and crating supplies.
8. Arrange for the turning in of excess materials to the South Sector Packing and Crating Mill, North Sector Packing and Crating Mill, or Staging Area Commander, Ft. Kam, depending upon where the units are staged.

Assault Force Supply Liaison Officer

The Supply Liaison Officer selected to represent a Division or similar organization also handles all palletizing requirements as outlined in Chapter VIII, Section 2. The duties of the Supply Liaison Officer for assault forces are as follows:

1. While palletizing of supplies is in progress, he receives from G-4 a list of packing and crating requirements for the Division and attached units. These requisitions are processed in the same manner as those for palletizing supplies. The Supply Liaison Officer should arrange to furnish the necessary labor details for the construction of packing boxes requisitioned, and provide the transportation and labor needed to pick up and deliver supplies and boxes to the points where the units are being staged.
2. He will receipt for all items loaned on M/R and control the use of these items by the units.
3. He will arrange for the return of excess supplies to the South Sector Packing and Crating Mill, North Sector Packing and Crating Mill, or Staging Area Commander, Ft. Kam, depending on where the units are staged.

The following factors are to be used in determining the amount of expendable materials needed for packing and crating.

Material	Quantity Required per Box
Banding 5/8"	14 ft
Seals 5/8"	2
Lumber 1"	33 Board Feet
Nails 6d and 8d	1 lb
Waterproof paper 36"	.083 Roll
Hydroseal	.083 Gallon

CHAPTER VIII

PREPARATION AND MOVEMENT OF CARGO

SECTION 4 — THE REGULATING POINT

The following procedure describes a suggested plan for the handling, preparing and moving of supplies and equipment from the supply agencies and staging areas to the piers.

A Regulating Point should be established at a location convenient to the piers and to the supply points in order to facilitate the control of all supplies, equipment and vehicles. This location should be at the AP&SC Regulating Point where adequate communication facilities are available. This will enable the Regulating Officer to have direct contact via telephone and teletype with the staging areas, palletizing area and the piers. Operations will be on a 24 hour basis.

Regulating Officer

A competent officer should be designated as the Regulating Officer and should be placed in complete charge of the Regulating Section. The Regulating Officer functions as the representative of the Division G-4. Inasmuch as the Division TQM is interested in the complete coordination of the loading activities of the Division and the Regulating Officer is concerned with the movement of all cargo, they must work closely together.

Responsibilities of the Regulating Officer

The Regulating Officer will be responsible for coordinating the movement of supplies and equipment from the Supply Agencies of CPBC to the Palletizing Area (Ft. Kam) and to the piers. It will be necessary for the Regulating Officer to constantly supervise the work of the special staff to make certain that all equipment and materiel will be ready for stowage on the piers in accordance with prescribed schedules. This will require that he be kept informed of the status of the palletizing of cargo, packing of supplies and organizational equipment, waterproofing of vehicles, etc.

The Regulating Officer will discharge his responsibilities by:

1. Planning the movement of Division supplies in cooperation with Division Branch Supply Officers, Division Transshipment Yard Officer, Division Quartermaster, Supply Agencies of CPBC, and Transportation Division of AP&SC.
2. Preparing delivery schedules for supplies and equipment.
3. Establishing Liaison Officers at the CPBC supply agencies.
4. Securing transportation for moving supplies under Division control and coordinating the movement of supplies from the CPBC supply agencies.
5. Marking the location of all units on a map of Oahu. The name and telephone number of a representative from each unit should also be marked on the map.
6. Securing from the units an estimate of the additional transportation they will need to move their supplies and equipment to the piers.

7. Preparing check lists to show when cargo must be at the pier, time cargo must leave staging area or supply depot, time cargo arrived at the pier.
8. Preparing charts that will show at all times the amount of cargo at each pier for each ship, the amount enroute to the piers, and the amount still in the staging area or supply depot.
9. Insuring that cargo arriving at the pier is accompanied by the proper tally (drayage ticket). This tally must be filled out in quintuplicate by the agency loading the vehicle or railroad car. One copy of each tally should be sent to the Regulating Officer so that he can maintain accurate records as to the amount of cargo delivered to the piers.
10. Arranging for the return of excess palletized supplies to the Supply Agencies of CPBC and the securing of bulk supplies immediately in lieu of those turned in.

Assistants to Regulating Officer

The Regulating Officer should be provided with the following assistants:

1. Assistant Regulating Officer—He will assist the Regulating Officer in supervising the work of the section. Sufficient enlisted personnel will be furnished for the maintenance of records.
2. Liaison Officers will see that supplies are moved from the CPBC supply depots and warehouses to the piers accurately and smoothly. A Liaison Officer should be placed with each of the CPBC supply agencies and should be furnished with delivery schedules and information of supplies on requisition. These officers will check out supplies from various depots and warehouses, verifying the count and quality. They will be responsible that the tally (drayage ticket) is made out in quintuplicate for each railroad car or truckload. The tally should be accurate and complete, giving both pier and ship number, article, box number or lot number (ammunition), weight and cube. Engineer and Chemical Liaison Officers will be responsible for submitting a list in duplicate of all Red Label supplies, Ammunition, Explosives, Pyrotechnics, and CWS supplies of a dangerous nature to the Regulating Officer 48 hours in advance of delivery to the piers. This list must have the supplies broken down by ships and piers. This information is requested by the Coast Guard in order that proper precautions may be taken.
3. Transshipment Yard Officer will be responsible for seeing that palletized supplies are delivered to the piers on the call of the Regulating Officer. He will be responsible for the preparation of the tally in quintuplicate for each railroad car or truckload of cargo leaving the yard.

Drayage Tickets

To insure that a correct and accurate check is kept on the supplies moved to the piers, a tally (drayage ticket) should be prepared in quintuplicate for each railroad car or truckload of supplies and equipment sent from the CPBC supply agencies, Transshipment Yard and the staging areas of the units.

These tallies are handled as follows:

By truck: 5 copies go with the truck driver. 1 copy to be signed by the

Pier Officer and returned to the Liaison Office. 4 copies collected by the Pier Officer.

1 copy retained by the Pier Officer.
1 copy sent to the Regulating Officer.
2 copies sent to Manifest Section, ATD, AP&SC.

Trucks should be dispatched as soon as loaded, rather than in a convoy, so that the flow of traffic into the piers may be smooth and organized. *By rail:* 5 copies sent by messenger to Pier Officer. On shipments by rail, the following data should be furnished:

1. Car number.
2. Destination.
3. Type and amount of supplies.
4. Estimated time of arrival.

Marking of Railroad Cars

Railroad cars will be marked on both sides with the pier number and ship number, making sure that when cars are shuttled back, old numbers are erased in order that cars will not be delivered to the wrong piers.

Dispatch of Vehicles and Cargo to Piers

Immediately upon notification from the Division TQM that a pier is ready for the stocking of cargo, the Regulating Officer will disptach all the supplies and equipment that are scheduled to be loaded at that pier. These supplies and equipment must be sent according to the predetermined priority of stowage. The Regulating Officer must keep in mind the fact that the cargo that will be needed first consists of supplies and equipment which will be loaded in the holds of the ship. Conversely, the last supplies to be dispatched to the piers will be those which are to be loaded in the upper portion of the ship.

CHAPTER VIII

PREPARATION AND MOVEMENT OF CARGO

SECTION 5 — PIER STOWAGE

Pier control is a necessary and vital phase of transport loading in an amphibious operation. Prior to the actual loading, a Pier Control Officer should be designated to act in direct liaison between the G-4 office, the Regulating Officer and the several Troop TQMs. A staff should be organized to function directly under the Pier Control Officer. In unloading a combat loaded vessel, approximately the same organization is required and the operation will be conducted in reverse.

Responsibilities of Pier Control Officer

The Pier Control Officer's direct responsibility is to control all cargo, materiel and vehicles from the time it reaches the pier until it has been stowed in the ship. He must keep accurate records at all times. This can be facilitated by making it mandatory that all units loading furnish a tally (drayage ticket) prepared in quintuplicate with each shipment. The shipment should be receipted for and one copy of the drayage ticket retained by the individual in charge or the driver concerned with the delivery. The remaining four copies should be held by the Pier Control Officer in separate files. One copy should be sent to the Regulating Officer, two copies sent to the ATD Pier Officer and the fourth copy retained by the Pier Control Officer. The Pier Control Officer should contact the Freight Office (Navy) and secure all information possible regarding the Navy Liaison Officers who may be detailed to assist him in securing Navy equipment and personnel.

Message Center

A message center should be provided for the Pier Control Officer consisting of a minimum of two telephone operators and two clerks. It should handle all incoming and outgoing messages and maintain a Unit Journal for the Pier Control Office. Teletype communication should be provided by the Signal Officer with sufficient personnel to maintain continuous operation. A public address system is desirable for calling individuals to the message center on large pier operations.

Control of Traffic

Sufficient military police should be provided by the Provost Marshal to control all vehicle traffic and parking according to the instructions of the Pier Control Officer and his Dispatchers.

Suggested Organization

All of the following personnel are directly responsible to the Pier Control Officer:

Pier Boss—An officer should be designated as Pier Boss for each pier required. He should supervise all work in relation to the individual pier and should check constantly to determine that all details are working and that the proper records are being maintained.

Officer (or NCO) in Charge: Forward Section (or After Section)—The officer or NCO in charge of the forward or after section of the ship should supervise the work of the Checkers for each respective hold. He should see that the stevedores and lift operators required at each hold section are working and see that any delay in loading is checked immediately and that all information is passed to the Pier Boss.

Hold Checkers—The checkers (one NCO for each hold) should maintain an accurate tally of all cargo, material and vehicles received for each hold section. This record should be kept in a bound book. They receipt all shipping tickets and retain two copies which should be collected at intervals by the Officer or NCO in charge of their hold section. This record also should be kept in a bound book. These tally books should not leave the pier, but should be turned over to the relieving checkers. When the operation is complete, tally books should be turned over to the Pier Control Officer.

Pier Loading Detail—This detail consists of four men for each hold section under the control of one officer and one NCO assistant for each pier. The officer in charge should place his men at hold sections as instructed by the Pier Boss.

Guard Detail—It is necessary to provide for a continuous guard detail for the period the supplies commence to reach the piers until the last item is loaded onto the ships. Guard details unless otherwise ordered should be provided on a twenty-four hour basis by the CO of Troops for each ship.

Engineer Detail—This detail should consist of one officer and twenty enlisted men. They should have such equipment and tools with them as may be required for lashing, chocking, repair of pallets, etc. They should work directly under the Troop TQM on the ship and the Pier Control Officer on the pier.

As a basis for planning, the following items represent the more important duties of the engineer detail, as determined by previous operations.

1. To supervise loading and spreading of dunnage.
2. To install necessary shoring and blocking of cargo, namely gasoline drums, cans, and such odd-sized items requiring like attention.
3. To prepare blocks for all vehicles and install same as required.
4. To secure deck loads.
5. To load as much extra lumber as the captain of the ship will allow for use at destination (construction purposes). This lumber may be loaded into lower holds where extra space is available. It is particularly desirable to use as dunnage serviceable lumber of random sizes (as required for shelter construction at destination).
6. To palletize spare parts that arrive at the pier loose.
7. To repair all damaged pallets.
8. To disassemble (if required) blades and yokes from D-7 or like tractors, and palletize the blades and yokes thus removed.
9. To assist in any work requiring engineer personnel, tools and equipment.
10. To maintain close liaison at all times with Pier Control Officer and Troop TQMs.

11. To arrange for movement of dunnage lumber from stock pile to pier site.
12. To maintain a running record of operations for use in planning future operations.

One company of the Engineer Battalion should be made available for engineer functions during the amphibious operation, particularly for the preparation of equipment for shipment, blocking and stowing vehicles in holds, etc. The company so assigned should function as nearly as possible to its normal T/O composition, i.e., Company Headquarters and three operating platoons.

Immediately upon receipt of orders for such details, the Company Commander of the assigned company should contact the S-3 or such officer designated by the Battalion Commander for full instructions pertaining to his assignment. It is his responsibility to properly supervise the actual operation of his unit, and to maintain close liaison with Battalion Headquarters and the Pier Control Officer in order that the operation of the engineer detail will be smooth and efficient. He should keep himself posted on all operations and plans, and anticipate engineer requirements.

Company Headquarters should furnish the necessary personnel to properly operate the Company Command Post established at or in close proximity to the Pier Control Office, and such personnel as may be required at the Regulating Point in order to provide continuous operation and liaison during the full twenty-four hour period. It is the function of this group to maintain liaison by telephone, to receive and dispatch messages, and to contact Engineer officers and personnel on duty in connection with loading operations. Personnel of Company Headquarters not actually required for Company Headquarters operation should be assigned to such duties as best serve the company's mission as a whole.

The three platoons comprising the operations group of the company function in three eight hour shifts under the direction of their respective officer and NCO assistants. The platoon leaders should familiarize the relieving platoon leader with information pertaining to unfinished tasks and general operations.

Messing

All pier working details should be provided with one hot meal each shift from messing facilities at the piers. A responsible mess sergeant and sufficient personnel should be provided.

Aid Station

An ambulance medical aid station should be maintained in continuous operation at the piers during all operations.

CHAPTER IX

LANDING SHIPS

SECTION 1 — LANDING SHIP DOCK (LSD)

The Landing Ship Dock (LSD) is a recent addition to the specialized fleet of the Amphibious Forces. Originally it was designed as a drydock capable of operation in forward areas to effect salvage and repair of smaller landing craft. Tactical development has resulted in their use as carriers of amphibious vehicles and tanks loaded in LCMs and LCTs. Speed of about fifteen knots permits thier assignment to Assault Transport Squadrons. Their multiple uses makes them extremely valuable in landing operations. It is necessary for them to flood down to launch their amphibious vehicles.

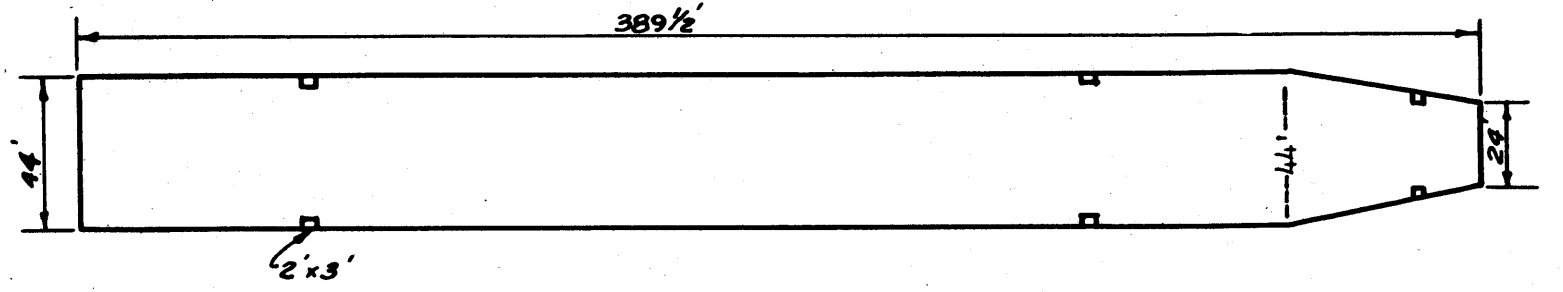
Capacities of LSD are as follows:

Troop officers—20.
Troop EM—230.
Ship has 2—35 ton cranes.
Number of LCMs—18 (with medium tanks).
Number of LVTs—45.
Number of LCTs—3.
Number of DUKWs—40.
Speed at full load 17 knots maximum.

A few LSDs have been decked over and are able to carry 18 LVTs on this deck.

DIAGRAM of LSD

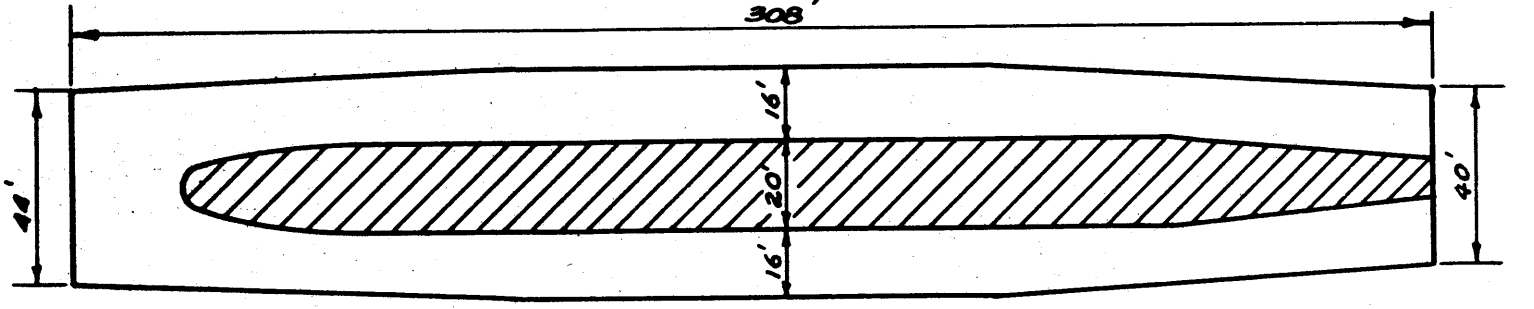
DOCK DECK



Dock Deck Sq.Ft. 16,691

DIAGRAM of LSV(1)

VEHICLE DECK



Overhead Clearance Vehicle Deck
Vehicle Deck Cargo Space. Sq.Ft. 15,700

CHAPTER IX

LANDING SHIPS

SECTION 2 — LANDING SHIP TANK (LST)

The wide use of the Landing Ship Tank, (LST), in all amphibious operations makes it one of the best known of the specialized amphibious force ships. Earlier types of the LST were equipped with elevators for unloading the main deck. The elevator of the LST 1-490 Class has been replaced by a ramp between the main and third decks. This ramp is forward of the old elevator position. LST 514-522 inclusive, 523-530 inclusive, 532-541 inclusive and those from 542 up all have the ramp instead of the elevator. The capacity of the elevator—ten tons and the capacity of the ramp to the main deck—seventeen tons must not be exceeded. The slow speed of the LST requires its movement in separate convoy. Use of these vessels in assault operations requires their dispatch to forward areas well in advance of the main body. Other characteristics requires special consideration to be given in their use.

Limitations and Capabilities

The LST was designed and built with the primary idea that it was to be used to transport heavy vehicles which could not be readily loaded aboard an AKA or APA. Their use, however, is not limited to shore-to-shore operations as they can and have constituted elements of ship-to-shore movements. Their tactical employment is wide, and in view of the vast operating area of which they are capable (12,000 miles maximum and six months provisions for crew and troops) they offer the Task Force Commander an arm heretofore unknown in amphibious warfare.

The LST is limited by its design to be a craft that is slow, hard to maneuver, and sluggish. Its shallow draft, necessary for beaching operations, and the construction of its bottom, make the ship vulnerable to underwater obstacles. The large, flat deck makes it an unusually good target for air bombardment. The LST's use is limited by the availability of beaches having characteristics favorable for the beaching of the ship.

An LST is capable of carrying complete company units of tank and tank destroyers, and may be operated from a friendly shore, combat loaded, and later employed in the unloading of transports. Under favorable conditions, the LST can place on the beach large numbers of heavy vehicles in a very short length of time.

The large, clear deck of the LST offers unlimited possibilities to the TQM charged with the responsibility of combat loading a select unit. The tank deck has neither stanchions nor bulkheads, is 28′6″ wide 229′5″ long and has an overhead clearance of 11′2″. Tank destroyers can be loaded two abreast with a half-track or similar vehicle occupying the center section. Medium tanks, light tanks, 2½-ton trucks, etc., can be loaded three abreast. Small vehicles such as ½-ton trucks, ¼-ton trucks, etc., can be loaded four abreast

without difficulty. The vehicles are secured with chain lashings to pad-eyes on the deck. Some passageway must be left between the vehicles.

The LST was not primarily designed to carry large quantities of general cargo or packaged goods. However, it is frequently necessary to load ammunition and rations aboard these ships. If a large amount of loose cargo is to be unloaded rapidly, it should be stowed outboard on each side of the tank deck and at the after end, leaving space sufficient to permit trucks to be backed in, thus permitting six or eight of them to be loaded simultaneously. Trucks and trailers should be fully loaded when embarked. The more rolling stock stowed, the faster the ship is able to unload when beached. If the ship is properly loaded, and with efficient unloading 500 tons of bulk cargo can be discharged within one daylight period. Each LST is allotted two finger lifts which are of great assistance in loading and unloading bulk cargo or pallets.

Dry stores should be loaded leaving a clearance of 18" from the overhead lights. This method of loading prevents the drying out of cargo and is a precautionary measure in eliminating fire hazards.

In the stowage of cargo, care must be taken not to block access to any fire-fighting equipment.

There is apparently no limit to the type of cargo that may be carried by LSTs. It varies from jeeps to large tanks with all classes of vehicles included, from small arms ammunition to large caliber ammunition and bombs, from cement to "C" rations, from gasoline in cans to diesel oil in the ballast tanks. The Cargo Officer must know how to handle and secure this cargo.

These craft are invaluable not only as freight carriers in the initial landing, but also as an important means of rapid delivery of bulk cargo to the position captured until adequate port facilities can be established.

Template Loading

The LST lends itself readily to the same type of template loading as is practiced in the preparation of an APA or AKA loading. Also a mock-up of the tank deck can be staked out on the ground and loading plans worked out in advance of a record loading.

Loading

There are three rows of vents on the main deck that are raised only a few inches above the deck. These vents do not appear as obstructions to vehicles but they are not to be loaded over. When loading the main deck, the TQM must maintain a fore-and-aft passageway.

All LSTs carry sufficient gear and have the necessary facilities for securing vehicles. Packaged cargo must be stowed very close and compact, and wedged in where possible, to avoid shifting.

Although the main deck is suitable for carrying vehicles, the Troop TQM should check to see whether the LST will carry an LCT, causeway or pontoon barge. If an LCT or a pontoon barge is loaded on the main deck, vehicles cannot be loaded there. However, if pontoon causeways are carried on the sides of the LST, the Troop TQM then must allow a space of 14′ on either side of the main deck so that the lashings for the causeway may be secured.

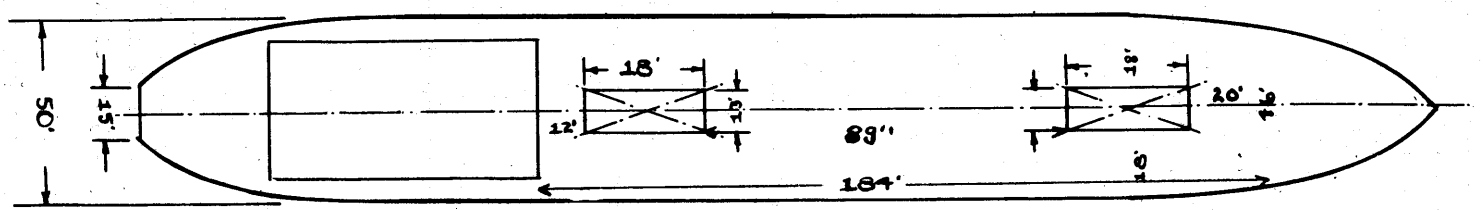
Unloading

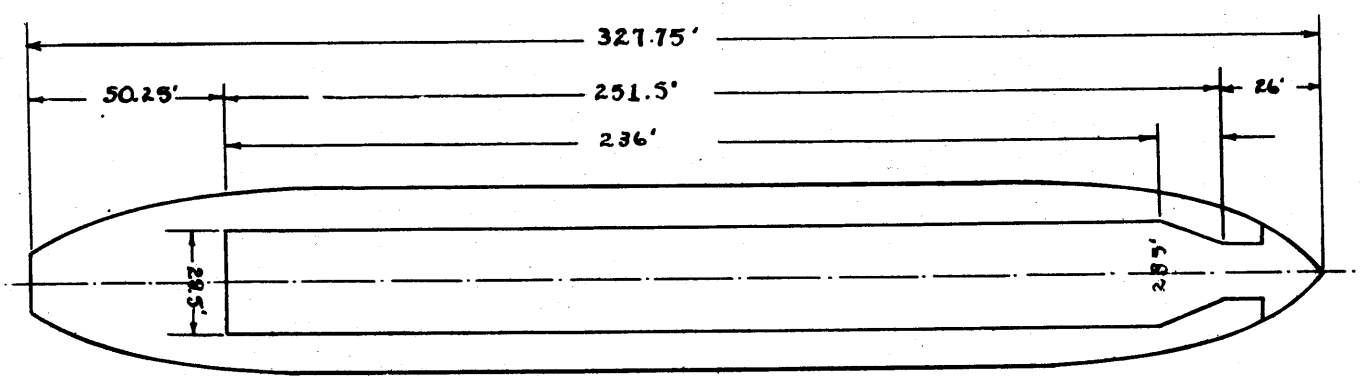
The technique of unloading under combat conditions requires careful and well-organized training. The submerging of one vehicle near the ramp of

L S T

LANDING SHIP TANK

SCALE 1/4" = 11 1/4"





OVERHEAD CLEARANCE OF TANK DECK 12'. 2"

TANK DECK CARGO SPACE 8000 sq. ft.

TANK DECK CARGO CAPACITY 96000 cu. ft.

MAIN DECK CARGO SPACE 8400 sq. ft.

DEADWEIGHT CARGO CAPACITY (BEACHING) 500 tons

DEADWEIGHT CARGO CAPACITY (OCEANGOING) 2100 tons

the LST would require a retraction and rebeaching before the remainder of the vehicles could be unloaded. A medium tank or D-7 tractor is required to recover vehicles that become submerged or drowned out while traversing the water from the ramp to the shore. Water-proofing has minimized the danger of drowned vehicles but the hazard is always present, and must be considered in the loading plan. One track-laying vehicle should be loaded last, thus making it the first to be unloaded so as to provide a recovery vehicle on the beach. It has been found that the usual tractors employed on the beach by shore parties do not have sufficient power to tow large tanks. If feasible, a medium tank or D-7 tractor should be included in all organic loads of combat loaded LSTs. This makes the ship independent of shore installations for the unloading operations.

Preparations Prior to Beaching

At least twelve hours before the hour for actual beaching final preparations for beaching should be started. Some of the principal operations to be accomplished are as follows:

1. Remove all dunnage, vehicle shoring, etc., from tank deck. The vehicles will then be held by chains alone.
2. Turn over all vehicle engines to insure that they will start. Check ventilators of tank deck while engines are being tested. If any vehicle is out of commission, make arrangements for getting it clear of the others or towing it to the beach.
3. About two hours before arrival, remove the vehicle lashing chains, clear the tank deck and test lights and ventilation.
4. Fifteen to thirty minutes before landing start all ventilator fans, make sure they are operating at full capacity. Begin warming up vehicles.
5. About five minutes before actual beaching, start opening the bow doors.

Capacities of an LST are generally as follows:

Troop Officers—12 to 16.

Troop enlisted—150.

Landing condition: Cargo load 500 tons; Draft forward 3′0″; Draft aft 9′6″.

Ocean going condition: Cargo load 2100 tons Draft forward 8′0″; Draft aft 14′4″.

Maximum load carried in main (weather) deck—350 tons.

Main (weather) Deck—6000 sq. ft. (not over 4500 sq. ft. net, because of ventilators, pad eyes, etc.).

Tank Deck—28 ft. x 226 ft.—6328 sq. ft. all net, of which 4707 sq. ft. are abaft of elevator.

LSTs have no booms and must be loaded:

1. Direct from beach over ramp in bow (preferred method).
2. From a lighter secured to the ramp.
3. By crane dock or by another ship; cargo then lowered by elevator —a slow laborious method.

Speed of ship maximum 10 knots.

Vehicle capacities are as follows:

Load for Tank Deck

Light tanks—39.
Medium tanks—20.
Heavy tanks—10.
LVTs—17.
2½-ton trucks—33.

Load for Main (weather) Deck

Jeeps—44.
LVTs—9.
2½-ton trucks—11.

CHAPTER IX

LANDING SHIPS

SECTION 3 — LANDING SHIP VEHICLE (LSV)

The Landing Ship Vehicle (LSV), is the newest addition to the fleet of specialized vessels for landing operations. LSVs (1) and (2) are converted from the "TERROR" class of cruiser mine layers and LSVs (3) (4) and (6) are conversions of the "AN" class of net tenders and carriers. Both types are designed to carry amphibious vehicles and troops. The LSV (1) and (2) cannot carry LVTs because of limited overhead clearance. The remaining LSVs can carry both DUKWs and LVTs. The LSV is fast enough to accompany Assault Transport Squadrons and is heavily armed to provide effective additional fire-power for the unit to which attached.

Loading of DUKWs

DUKWs may be loaded over the ramp of the LSV or may be hoisted aboard by means of the main deck crane which has a lifting capacity of 13½ tons. The crane, however, has a slow moving hook, requiring four minutes to lift a vehicle from the vehicle deck and place it in the water. Twenty-seven DUKWs can be carried.

Following is listed pertinent data:

Troop capacity, EM—750.
Troop officers—80.
LCVPs—16.
Time to lower Ramp—1 minute.
Overall length—453'10½".
Maximum Speed—20 knots.
Cruising Speed—16.8 knots.
Steaming Radius—14,200 miles.
Armament—
4—40 mm Twin.
20—20 mm A.A.

CHAPTER IX

LANDING SHIPS

SECTION 4 — LANDING SHIP MEDIUM (LSM)

The Landing Ship Medium (LSM), was originally designated the LCT (7). It was developed to meet the need for an ocean going tank lighter of the LCT type. It combines the features of most of the other specialized amphibious vessels—the bow gates of the LST, the well-deck of the LCT (6), and the conning tower of the LCI. Its speed and cruising range permits its operation with Transport Squadrons. Its cargo capacity is the same as the LCT (6).

Capabilities of the LSM

The LSM was designed primarily for transporting medium and heavy tanks, their personnel and equipment and landing them under their own power on beaches. This vessel has a carrying capacity of five medium or three heavy tanks or a pay load maximum of 165 tons. All types of motorized vehicles and artillery can also be carried and unloaded under their own power. The mission of the LSM makes it imperative that it be loaded and unloaded with the least possible delay.

Loading of Vehicles

When vehicles are to be loaded, they will be backed on and stowed in such a way that the ship will ride on an even keel. Vehicles should be properly shored and secured by the loading personnel to keep them from shifting.

The LSM is provided with a loading and unloading mat to be used when the ship is loading or unloading on the beach.

Pertinent data regarding ship's characteristics is listed below:

Ship—4 officers, 48 EM
Troop—2 officers, 52 EM
Length overall—203′ 6″
Cruising Radius—3500 miles.
Armament—6—20mm A. A.
Boats and Rafts—1—12′ Wherry—capacity 7 men
5—Balsa Floats—capacity each—25 men

INDEX

SUBJECT	CHAPTER	SECTION	PAGE
ADVANCE BASE	I		10
ADVANCE DETAIL	VI	2	6
AID STATION	VII	5	4
AIR FORCE	I		3
Component parts of	I		3
Use of	I		3
AKs			
Average load of	VI	1	1
Cargo handling teams for	VI	1	3, 4
	VII	3	1
AKAs			
Average load of	VI	1	1
Cargo handling teams for	VI	1	3, 4
Loading of	VI	1	4
AMMUNITION			
Definition of	V		3
Palletization of	VIII	2	2, 3
AMPHIBIAN VEHICLE UNITS	VI	7	2
AMPHIBIOUS AIR COMMANDER	I		1
AMPHIBIOUS OPERATION—Schedule for	I		11
AMPHIBIOUS TASK FORCE			
Administrative Commander	I		3, 6
Composition of	I		1
Definition of	I		1
Functions of	I		1
Organization of	I		1
AMPHIBIOUS TASK FORCE COMMANDER	I		3
Duties	I		3
Responsibilities	I		10
ANTI-SUBMARINE GROUP	I		3
APAs			
Average load of	VI	1	1
Beach Party complement	II	3	4
Cargo handling teams for	VI	1	3, 4
Landing Boat Group complement	II	3	4
Loading of	VI	1	1
Organization of	II	3	3, 4
APs			
Average load of	VI	1	1
Cargo handling teams for	VI	1	3, 4
ARMY OR LANDING FORCE	I		3
ARMY PORT & SERVICE COMMAND	VI	1	2
Responsibilities of	VII	1	4
Services performed by	VII	1	4
ARMY TACTICAL AIR FORCE	I		3
ARMY TQM			
Depalletizing	VIII	2	3
Duties of	III		1
Palletizing procedure	VIII	2	3
ASSAULT LANDING FORCE—Palletizing by	VIII	2	4

SUBJECT	CHAPTER	SECTION	PAGE
ATTACHED SERVICE TROOPS	VI	7	2
ATTACHED TACTICAL TROOPS	VI	7	2
AVIATION MATERIEL	V		2
BAGGAGE	V		2
BATTALION LANDING TEAM			
Composition of	I		13
Duties of commander of	I		11, 12
Planning schedule for	I		11
Preparation of Boat Assignment Table	I		12, 14
Preparation of Landing Diagram	I		16, 17
BEACHING, LSTs	IX	2	4
BEACHMASTER	I		5
BERTHING FACILITIES	I		6
BILLETING OFFICER	I		12
BOAT			
Coxswain	I		5
Division Commander	I		5
Formations	I		17
Group	VII	2	3
Group Commander	I		5
Officer	I		5
	VII	2	3
Pools	I		7, 8
Procedure	I		16
Signals for identifying cargo	VI	4	4
Space	I		14
	III		1
Team			
Assignment to	I		14
Commander	I		5, 17
Formation of	I		14
BOAT ASSIGNMENT TABLE	I		12
BOATSWAIN'S MATE	VI	4	8
BOMB DISPOSAL UNIT	VI	7	2
BULK GENERAL CARGO	V		1
	VI	1	4
CAMP EQUIPMENT	V		2
CAPTAIN OF THE SHIP			
Duties re unloading	VI	3	3
Responsibilities of	VII	2	5
CARGO			
Arrival and assembly at piers of	VI	2	2
Booking of	VII	1	2, 3
Bulk general	V		1
Combat unit loading of	VI	1	2
Discharge by Garrison Forces of	VII	3	1, 2
Discharge of	VI	1	2
Dispatch of	VIII	4	3
Distribution of	VI	1	2, 3
	VI	3	1, 2
Handling gear			
Procurement of	II	3	1
Responsibilities of	II	3	1
Identifying flag signals for	VI	4	4
Manifest	V		5
Nets	VI	1	3
Officer	VII	2	3
	VII	3	2

SUBJECT	CHAPTER	SECTION	PAGE
Pallets of	VI	1	3
Preparation and movement of	VIII		
Specially prepared	V		5
Standard	V		5
Stowage of	VI	3	2
Tally	VII	1	3, 4
Troop Space	V		1
Unloading time	VI	3	3
CARGO AND LOADING ANALYSIS	V		4-5
	VII	1	3
CHECKER, HOLD	VI	4	8
CHEMICAL			
Equipment	V		4
Unit	VI	7	2
CIVIL AFFAIRS PERSONNEL	VI	7	2
COMBAT UNIT LOADING	IV	1	1
Arrangements prior to embarkation	VI	2	1-6
Average loads in	VI	1	1
Check list for	VI	6	1-3
Debarkation priority in	VI	1	3
Definition of	VI	1	1
Distribution of loading plans	VI	1	1
Loading	VI	1	2
	VI	3	1-3
Of vehicles	VI	1	5
Planning for	IV	1	1
Points to observe in	VI	1	2
Reembarkation	VI	5	1
Stowage of cargo in	VI	1	2-3
Unloading	VI	4	1-15
COMMANDER JOINT EXPEDITIONARY FORCE	VII	2	1
COMMANDING OFFICER NAVAL UNIT	VII	2	3
COMMANDING OFFICER OF TROOPS	VII	2	5
Duties during loading	IV	3	1
	VI	3	3
Duties during unloading	VI	4	1
Planning by	VI	3	3
COMMERCIAL LOADING	IV	1	1
COMMUNICATION PLATOON	VI	7	2
CONTROL GROUP	I		5
CONVOY UNIT LOADING	IV	1	1
DIVISION TQM	IV	1	2
Duties of	VI	2	1
DRAYAGE TICKET	VII	1	3, 4
	VIII	4	2, 3
	VIII	5	1
DUKW			
Assignment table	I		14
Characteristics of	III		4-5
Landing Diagram	I		16
Uses of	VI	4	9
DUNNAGE	VI	1	5
	VI	3	2
	VIII	5	2
EMBARKATION PLAN	VII	2	2
ENGINEER DETAIL	VIII	5	2, 3

SUBJECT	CHAPTER	SECTION	PAGE
ENGINEER EQUIPMENT	V		3
ENGINEERING OFFICER	VIII	1	1
FIRE SUPPORT GROUP	I		3
FLAG SIGNALS, FOR IDENTIFYING CARGO	VI	4	4
FUZES	V		3
GARRISON			
Force	VII	1	5
Commander	I		10
TQM	VII	1	2, 3
Group	VII	3	1
Loading	VII	1	1-5
	VII	2	1-5
Unloading	VII	1	1-5
	VII	3	1-2
GASOLINE	V		3
	VI	3	2
GUARD DETAILS			
For palletizing area	VIII	1	2
For piers	VIII	5	2
HEADQUARTERS COMMANDANT	VIII	1	1
HEAVY LIFTS	V		3
HIGH EXPLOSIVES	V		3
ISLAND COMMANDERS	I		10
LABOR UNITS	VI	7	2
LANDING BOAT PROCEDURE	VI	4	11
LANDING CRAFT			
Availability for unloading	VII	3	1, 2
Characteristics of	III		1-10
DUKW	III		4-5
	VI	4	11
LCI	I		5
LCI(L)	III		1
LCM(3)	III		1
	VII	3	1, 2
LCT(5)	III		1
LCT(6)	III		1
LCVP	III		1
	VII	3	1, 2
LVT	VI	4	11
LVT(2)	III		2-3
LVT(4)	III		2-3
LVT(A)(1)	III		2-3
LVT(A)(2)	III		2-3
LVT(A)(4)	III		2-3
Symbols for	II	2	2
Use by Garrison Force of	VII	3	1, 2
LANDING DIAGRAM	I		16
LANDING FORCE			
Commander of	I		5
	VI	1	2
Component parts of	I		1, 3
Responsibilities of	I		3
LANDING SHIPS			
LSD	IX	1	1

SUBJECT	CHAPTER	SECTION	PAGE
LSM	IX	4	1
LST	IX	2	1-5
LSV	IX	3	1
LANDING TEAM COMMANDER	I		5
LCI(L)			
Characteristics of	III		1
Use of	I		5
LCM(3)	III		1
LCT(5)	III		1
	VI	4	3
LCT(6)	III		1
LCVP	III		1
LIAISON OFFICERS	VIII	4	1
LINE OF DEPARTURE			
Definition of	VI	4	9
Landing boat, DUKW and LVT procedure	VI	4	11
Termination of	VI	4	11
LIQUIDS	V		3
LOADING			
Agency	VII	2	1
Combat unit	IV	1	1
Commercial	IV	1	1
Convoy unit	IV	1	1
Coordination of	VII	2	4
Duties of Captain of Ship	VI	3	3
Duties of CO of Troops	VI	3	3
Facilities for	I		6
Final plans for	VI	2	6
Garrison Force	VII	1	1-5
Gasoline	VI	3	2
High Explosives	VI	3	2
High priority cargo	VI	3	2
LSTs	IX	2	
Organizational unit	IV	1	1
Plan	V		7
	VI	1	1
Points	VI	2	2
Team	VII	2	2
Technique	VII	2	2
Vehicles	VI	1	5
LOADING FORMS	V		1-17
Cargo and Loading analysis	V		4-5
	VII	1	3
Cargo Manifest	V		5
Consolidated C&LA	V		5
	VII	1	3
Consolidated Embarkation & Tonnage Table	V		6
Consolidated UP&T	V		4
Consolidated Vehicle Table	V		7
Instructions for preparation of	V		1-7
Profile Loading Plan	V		7
Stowage Diagram	V		6
Unit Personnel & Tonnage Table	V		1-4
Vehicle Debarkation Priority Table	V		6
Vehicle Summary	V		4
LSD	IX	1	1
LSM	IX	4	1
LST	IX	2	1-5

SUBJECT	CHAPTER	SECTION	PAGE
LSV	IX	3	1
LVT(2)	III		2-3
LVT(4)	III		2-3
LVT(A) (1)	III		2-3
LVT(A) (2)	III		2-3
LVT(A) (4)	III		2-3
MECHANICAL EQUIPMENT	VIII	1	4
MEDICAL EQUIPMENT	V		3
MEDICAL UNIT	VI	7	2
MERCHANT MARINE	VII	1	1
	VII	2	3
MESSAGE CENTER	VIII	5	1
MESS EQUIPMENT	V		2
MESSING			
At palletizing area	VIII	1	2
At piers	VIII	5	3
MILITARY POLICE UNITS	VI	7	2
MOTOR PARTS	V		3
MOTOR TRANSPORT UNITS	VI	7	2
NAVAL ATTACK FORCE	I		3
Commander	I		3
Component parts of	I		3
Responsibilities of	I		3
NAVAL BASE COMMANDER	VII	2	5
NAVAL CUSTOMS	II	1	1
NAVAL TERMINOLOGY	II	1	1-6
NAVAL TONNAGE TERMS			
Cargo tonnage	II	1	6
Deadweight tonnage	II	1	6
Displacement	II	1	6
Gross registered tonnage	II	1	6
Long ton	II	1	6
Measurement ton	II	1	6
Net registered tonnage	II	1	6
Registered ton	II	1	6
Short ton	II	1	6
Weight ton	II	1	6
NAVAL VESSELS, ORGANIZATION OF	II	3	1-4
NAVY CARGO OFFICER	VII	3	2
NAVY CARRIER GROUP	I		3
NAVY COVERING GROUP	I		3
NOMENCLATURE OF NAVAL SHIPS	II	2	1, 2
OFFICE EQUIPMENT	V		2
ORDNANCE			
Equipment	V		3
Officer	VIII	1	2
Units	VI	7	2
ORGANIZATION OF NAVAL VESSELS	II	3	1-4
Beach party complement	II	3	4
Boat group commander	II	3	2
Captain	II	3	1
Chaplain	II	3	2
Construction & repair	II	3	2
Dental officer	II	3	1
Engineering	II	3	2

SUBJECT	CHAPTER	SECTION	PAGE
Engineer officer	II	3	1
Executive officer	II	3	1
First Lieutenant	II	3	1
Gunnery	II	3	2
Gunnery officer	II	3	1
Landing boat group complement	II	3	4
Medical officer	II	3	1
Navigator	II	3	1
Supply officer	II	3	1
Watch & division officers	II	3	2
PACKING AND CRATING	VIII	3	1-2
PALLETIZING AREA			
Dispatcher for	VIII	1	1, 2
Engineer detail for	VIII	1	1
Guards for	VIII	1	2
Headquarters Commandant	VIII	1	1
Requirements for	VIII	1	2, 3
Transportation Officer	VIII	1	1
PALLETIZING			
Advantages of	VIII	2	1
Ammunition	VIII	2	2, 3
Area	VIII	1	1-5
Cargo	VI	1	3
	VIII	2	2
Disadvantages of	VIII	2	1
Extent of	VIII	2	4
For stowage on LSTs	VIII	2	4, 5
General policies for	VIII	2	3
Load and Height	VIII	2	2
Material factors for	VIII	2	5
Officer	VIII	1	1, 3
Procedure	VIII	2	3
Relative to stowage	VIII	2	4
Requests for	VIII	1	1
Rules for	VIII	2	4
Statistics on	VIII	2	5
Supplies and equipment used in	VIII	1	2, 3, 4
Use of	VI	1	3
PETROLEUM PRODUCTS	V		3
PIER			
Arrival & assembly of cargo at	VI	2	2
Boss	VIII	5	2
Control			
Assistants	VIII	5	1, 2
Officer	VIII	5	1
Responsibilities	VIII	5	1
Loading detail	VII	1	3
	VII	2	4
	VIII	5	2
Stowage procedure	VIII	5	1-3
PROFILE LOADING PLAN	V		3
PROVISIONAL AMMUNITION COMPANY	VIII	1	2
PROVISIONAL SERVICE COMPANY	VIII	1	2
PX SUPPLIES	V		3
PYROTECHNICS	V		3
QUARTERMASTER			
Supplies	V		4
Unit	VI	7	2

SUBJECT	CHAPTER	SECTION	PAGE
RAILROAD CARS, MARKING OF	VIII	4	3
RATIONS	V		3
REEMBARKATION	VI	5	1
REGIMENTAL COMBAT TEAM			
Component parts of	I		3
Duties of commander	I		11
Planning schedule for	I		11
TQM	IV	1	2
REGULATING OFFICER	VII	1	3, 5
	VIII	4	1
Assistants to	VIII	4	2
Responsibilities of	VIII	4	1, 2
REGULATING POINT	VIII	4	1-3
REHEARSAL			
Loading for	I		8
Operations at objective	I		9
Reembarkation and return	I		9
"S" DAY	I		6
SALVAGE GROUP	I		5
SHIPS			
Employment of	I		7
Crew-handling cargo	VI	1	2
Crew training	I		7
Pallet stowage on	VIII	2	4
Platoon	VI	3	3
	VI	7	2
	VII	2	2
SHIP TRANSPORT QUARTERMASTER	IV	1	2
Duties of	IV	2	1-2
	VI	2	2
Relationship to Troop TQM	IV	2	2
SHORE PARTY			
Amphibian Labor units	VI	7	2
Amphibian vehicle units	VI	7	2
Attached service troops	VI	7	2
Attached tactical troops	VI	7	2
Beachmaster	VI	7	1
Beach Party	VI	7	2
Boat priority for	I		16
Bomb disposal unit	VI	7	2
Chemical warfare unit	VI	7	2
Civil affairs personnel	VI	7	2
Communications unit	VI	7	2
Composition of	VI	7	1, 2
Dump locations	VI	7	3
Duties of	VI	7	1, 2
Headquarters of	VI	7	1
Landing of	VI	7	2, 3
Location of	VI	7	1
Medical unit	VI	7	2
Military police unit	VI	7	2
Motor transport unit	VI	7	2
Ordnance unit	VI	7	2
Purpose of	VI	7	1
Quartermaster unit	VI	7	2
Responsibilities of	VI	7	1
Service platoon	VI	7	2
Ship's platoon	VI	7	2

SUBJECT	CHAPTER	SECTION	PAGE
SHORE PARTY COMMANDER	I		5
Responsibilities of	VI	7	1
SHORE PLATOON	VI	7	1
SHORING	VI	3	2
SIGNAL EQUIPMENT	V		3
SIGNALMAN	VI	4	8
SPECIAL EQUIPMENT	V		2
STOWAGE			
Diagram	VI	1	5
	V		6
	VI	3	3
Garrison plans for	VII	2	1
High priority	VI	3	2
Of gasoline	VI	3	2
Of high explosives	VI	3	2
Of pallets	VIII	2	4
Of vehicles	VI	3	2
Plans	VI	2	1
SUPPLY LIAISON OFFICER	VIII	2	3
Assault force loading	VIII	3	2
Duties of	VIII	3	1, 2
Garrison force loading	VIII	3	1
	VII	1	2
SURVEYING	VI	2	2, 5
TASK FORCE COMMANDER	I		3
	VII	2	1
TASK GROUP	I		3
TASK GROUP COMMANDER	VII	2	5
TEMPLATE LOADING	IX	2	2
TRAFFIC CONTROL	VIII	5	1
	VI	4	9
Officer	VI	4	11
Station	I		5
TRAINING			
Beaches	I		7
Of ship's crew	I		7
Time required for	I		7
Unloading for	I		7
TRANSPORT AREA	I		5
TRANSPORT DIVISION	I		3
Commander	VI	1	1, 2
	I		5
Component parts of	I		3
Distribution of cargo in	VI	3	2
Loading of	VI	1	2
Schedule of employment for	I		7
TRANSPORT OPERATIONS			
Phase I	I		6-8
Phase II	I		8
Phase III	I		8
Phase IV	I		9-10
Phase V	I		9
Planning for	I		6
Rehearsal for	I		6
Training for	I		6
TRANSPORT QUARTERMASTER SCHOOL	VI	2	1
TRANSPORTATION LIAISON OFFICER	VII	1	5

SUBJECT	CHAPTER	SECTION	PAGE
TRANSPORTATION OFFICER	VIII	1	1
TRANSPORTS			
APA	VI	1	1
Availability of	I		6
Commander of	I		5
Definition of	I		5
Determination of number required	I		10
Determination of type required	I		10
Emplyoment of	I		8
Functions of	I		5
Loading gear for	VI	1	2
Loading of	IV	1	1
	IV	2	2
	I		8
Operations of	I		6
Upkeep planning for	I		11
TRANSPORT SQUADRON	I		3, 4
Commander	I		5
Component parts of	I		3
TROOPS			
Allocation of units	I		10
Arrival of	VI	2	6
Availability of	I		6
Billeting officer for	I		12
Commanding officer of	I		5
	VI	2	1
TROOP SPACE CARGO	V		2
TROOP TRANSPORT QUARTERMASTER	IV	3	1-4
Arrangements prior to arrival of troops	VI	2	6
Assault loading	VI	3	1-4
Assistants to	IV	1	2
	IV	3	1
Cargo planning by	VI	1	2
Check list for	VI	6	1-3
Combat unit loading by	VI	1	1-5
	VI	2	1-6
	IV	1	1
Convoy unit loading by	IV	1	1
Duties during reembarkation	VI	5	1
Duties of	IV	3	1-4
	VI	2	2
Garrison Force loading and unloading	VII	1	1-6
	VII	2	1-5
	VII	3	1-2
Information required by	VII	2	1
Loading plans for	VI	1	1
Naval data used by	II	1	1-6
	II	2	1-2
	II	3	1-4
Planning by	VI	2	1
Preparation of final loading plans by	VI	2	6
Preparation of loading plans by	VI	2	2
Preparation of stowage plans by	VI	1	5
Reembarkation	VI	5	1
Relationship with ship's officers	II	3	1-2
Requirements for	IV	3	2, 3
Relationship with ship TQM	IV	2	2

SUBJECT	CHAPTER	SECTION	PAGE
Responsibilities of	II	1	1
	IV	1	2
	IV	3	1-4
	VI	2	1-2
Surveying by	VI	2	2-5
Tonnage terms used by	II	1	5-6
Unloading responsibilities of	VI	4	1-12
UNIT GENERAL CARGO	V		1
UNLOADING			
Cargo handling group	VII	3	1
Debarkation stations	VI	4	5
Estimated time for	VI	3	3
	VI	4	4
Garrison force	VII	3	1-2
Personnel for	VI	4	3
Plan for	VI	4	2
Practice in	I		7
Responsibilities of TQM during	VI	4	1
Schedule, preparation of	VI	4	2
Teams	VII	3	1
Technique	VI	4	3
Time of	VI	4	4
Traffic control in	VI	4	9
Traffic control officer for	VI	4	11
Typical plan for	VI	4	4, 5, 12
Use of LCTs in	VI	4	3
Use of LSTs in	IX	2	2
Vehicles	VI	4	3, 4
UNIT PERSONNEL AND TONNAGE TABLE	VI	2	1
	V		1-4
VEHICLE DEBARKATION PRIORITY TABLE	V		6
VEHICLES			
Combat Loading of	VI	1	5
Definition of	V		2
Dispatch of	VIII	4	3
Dunnage for	VI	1	5
Loaded in LSTs	IX	2	5
Serialization of	VI	3	1
Stowage of	VI	1	5
	VI	3	2
Unloading of	VI	4	3, 4
VEHICLE SUMMARY	V		4
WATER	V		3
Cans and Drums	VIII	1	3, 4
WAVE COMMANDER	I		5