

**INTELLIGENCE
HANDBOOK**



BEACH INTELLIGENCE

I-3

NAVAL AMPHIBIOUS TRAINING UNIT

PACIFIC FLEET

CORONADO, CALIFORNIA

CDR. HEM THOMPSON-

2ND MAW

I-3

USMC AIR STATION
CHERRY POINT
N.C.

FOREWARD

One of the primary objectives of Intelligence in any military operation is to reduce as far as possible all uncertainties regarding (1) the enemy, and (2) the area not under our control, and thus to assist the Commander in carrying out his mission.

The Beach Intelligence Course I-3, is a course of instruction designed to assist those who will be charged with the task of reducing the second of these uncertainties in an amphibious operation.

This handbook is a compilation of all printed materials issued in the course. It is issued in this form in the hope that it may be of value to the student officer as a future reference.

Beach Intelligence is a relatively new field about which there is still much to be learned. However, it is hoped that this course will prove a step in the right direction.



R. D. Flynn
Commander, USN
Officer-in-charge

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COURSE: I-3 BEACH INTELLIGENCE

MISSION: To provide a course concerning the Amphibious landing area and its military importance.

PURPOSE: To familiarize student officers with the hydrographic, beach, and inland terrain factors affecting beach selection and their tactical significance; to review the possible means of collecting information concerning those factors; to give student officers practical exercise in the preparation of beach studies, in amphibious sketching, and in the preliminary selection of beaches.

TYPE OF STUDENTS: Regular or reserve officers of the military establishment who have Intelligence Assignments.

<u>SCOPE:</u>		<u>HOURS</u>
1	Introduction	4
3	Hydrography	8
3	Beach and Inland Terrain	6
9	Collecting Beach Information	19
8	Beach Study & Selection	27
7	Conjunctural Subjects	1
8	Administration, Forum, and Graduation	5
	TOTAL:	<u>70</u>

LENGTH: Two weeks

QUOTA: Maximum: Forty-five (45)
Minimum: Five (5)

COURSE I-3 BEACH INTELLIGENCE

SYLLABUS

<u>SUBJECT</u>	<u>PURPOSE OR CONTENT</u>	<u>TIME</u>
A.	INTRODUCTION	4 hrs.
Basic Amphibious Concepts	Basic Amphibious Concepts of Command Relationship between basic decisions, and concept of operations ashore.	1 hr.
Planning and Intelligence	Review of intelligence considerations for planning an amphibious operation.	1 hr.
Factors of a Beach Study (Naval Considerations)	Analysis of the six principle hydrographic features which affect the selection of a landing area.	2 hrs. (1) (1)
(Landing Force Considerations)	Discussion of weather, terrain, enemy beach data, sociology and political information and their relationship to landing force selection of beaches.	(1)
B.	HYDROGRAPHY AND METEOROLOGY	8 hrs.
Basic Meteorology	Introduction to Meteorology and its importance to Amphibious Operations	2 hrs.
Ocean Waves, Sea and Swell--Forecasting Wind Waves and Swell --Swell Forecasting Procedures	Wave theory, formation of waves, wave motion, characteristics of waves and swells in the decay area, mass transport, relationships of velocity and length. Introduction to forecasting, discussion of fundamental relationships between winds and wave characteristics. Explanation of tables and graphs for forecasting swell, followed by examples of how they are used.	2 hrs.
Shallow Water Waves, Surf, and Breakers	Theoretical and empirical knowledge concerning the transitions occurring when waves enter shallow water, refraction, currents, types of breakers and the causes of plunging and spilling. Use of tables in computing Surf Safety Factors.	1½ hrs.
Measurement of Waves by Wave Tank Demonstration	Discussion and exercise with wave tank demonstration to show theoretical and observation means of computing wave length, period and velocity.	½ hr.
Surf Observation Procedures	Observing surf and recording results to obtain surf types, Wave period, Littoral current and breaker angle.	2 hrs.

<u>SUBJECT</u>	<u>PURPOSE OR CONTENT</u>	<u>TIME</u>
3.	BEACH AND TERRAIN INLAND	6 hrs.
Natural Beach Features	Discussion of Beach Features which are significant in an amphibious operation and the methods used to identify these features.	1 hr.
Shoreline Processes	Discussion of the long term processes and changes occurring in shorelines, Erosion, deposition, formation of bars, spits, and basins, the profile of equilibrium. An introduction to geomorphology. Discussion of the short term action, their effect on the existence and the character of beaches.	1 hr.
Beach Trafficability	A discussion of the factors which enter into the trafficability of beaches.	1 hr.
Obstacles	Discussion of various types of artificial inshore and beach obstacles and their identification.	1 hr.
Terrain Appreciation	A discussion of terrain as it affects the selection of the landing area, the amphibious assault, and the scheme of maneuver inland, Basic terrain considerations in offense and defense.	2 hrs.
D.	COLLECTING BEACH INFORMATION	19 hrs.
Tide and Current Tables	Discussion and explanation of Tide and Current. Use of tide and current tables, and practical work by students.	2 hrs.
Amphibious Reconnaissance Patrols	Presentation and discussion of patrol's reports and sketch of the beach being studied.	1 hr.
Submarine Reconnaissance	Capabilities and limitations of the submarine as a reconnaissance agency, the use and limitations of periscope photography.	1 hr.
Underwater Demolition Teams	Functions and limitation of UDT as a reconnaissance agency, scope and use of UDT reports.	1 hr.
Sources of Intelligence Information	Sources of background information available and their use. Pilot charts, sailing directions, sea and swell charts. Form, content and use of strategic studies prepared by high level intelligence agencies with particular attention to the portion dealing with oceanography, coasts and landing beaches.	1 hr.

<u>SUBJECT</u>	<u>PURPOSE OR CONTENT</u>	<u>TIME</u>
Beach Interpretation Photographic	Resume of beach and hydrographic considerations, relation of beach types to various factors. Examination and discussion of beach and hydrographic features illustrated by photos.	2 hrs.
Aerial Photographic Interpretation	A review of aerial photography, basic types of photos, stereovision, importance of photographic interpretation to beach intelligence. Scale determination, object identification, practical work.	4 hrs.
Beach Reconnaissance Exercise	A study of beach information obtainable from inexperienced personnel. A practical exercise shows how information can be gathered by non-intelligence personnel that will provide intelligence with accurate essential information.	7 hrs.
E.	BEACH STUDY AND SELECTION	27 hrs.
Amphibious Sketch	Discussion of types, use, and methods of preparation of amphibious sketches. Practical exercise in making panoramic and shoreline sketches. Exercise using a shoreline sketch.	6 hrs.
Detailed Beach Problem	Students prepare by teams a detailed study of landing beach using aerial photography of area, UDT sketches and reports, charts and maps and reconnaissance reports.	12 hrs.
Landing Area Selection Problem	Introduces the problems confronting amphibious commanders in selecting a landing beach. Students given practical work in selecting a preferred and alternate landing beach in a simulated situation. Upon completion, problem is reviewed to emphasize the problems confronting the commander in selecting a landing area.	9 hrs.
F.	CONJUNCTIONAL SUBJECTS	1 hr.
Briefing Techniques	To give the student essential information on the speech science and art required for the presentation of an intelligence brief on a selected beach.	1 hr.
G.	ADMINISTRATION TIME AND REVIEW	5 hrs.

SUBJECTPURPOSE OF CONTENTTIME

Welcome and Introduction

Welcome of students to school with brief on base and school facilities, layout and regulations. Precis of course purpose and curriculum. Introduction of staff and students.

1 hr.

Forum and Critique

Discussion of new amphibious concepts (Classified). Review of course with students.

2 hrs.

Graduation and Administration

3 hrs.

SECTION A

INTRODUCTION

Basic Amphibious Concepts

Planning and Intelligence

Factors of a Beach Study (Naval Considerations)

Landing Troop Considerations

BASIC AMPHIBIOUS CONCEPTS

A. GENERAL

1. a. Definition. An amphibious operation is a landing made from ships or craft to achieve an objective on land. The forces involved depend primarily upon waterborne means for transport to the objective area, for initial tactical and logistical support, and for special equipment and techniques used in debarking.

b. Nature of an amphibious operation. An amphibious operation includes preparation of the objective for the landing, and operations of the forces involved in overwater movements, assault, and support. It is a joint operation when the assigned forces are composed of a significant elements of more than one service of the Department of Defense. An amphibious operation usually involves the following:

- (1) The preparation of plans and the training of attack force units for the particular operation.
- (2) The movement of forces to the objective and their protection and support by naval and air operations.
- (3) The preparation of the objective for the landing.
- (4) Landing troops, equipment and supplies over a beach and seizure of the objective.
- (5) Support of the landing and operations ashore by naval gunfire and air bombardment.
- (6) Landing and build-up of additional supplies, equipment and troops as required for logistical support and further operations.

2. The purpose of amphibious operations. Amphibious operations will have one or more of the following purposes:

a. Invasion. An invasion is a large scale operation to seize and secure a beachhead from which to launch and support a major land offensive such as the Normandy and Southern France operations of World War II.

b. Occupation. An occupation is a limited objective operation to seize and secure a land area for use as an air, naval or logistical base to support further operation or to deny use of the area to the enemy. Examples include the Admiralty Islands, Bougainville and Iwo Jima operations in World War II.

c. Raid. A raid is an operation, usually small scale, involving the temporary seizure of a limited objective or a swift penetration of hostile territory to secure information, to confuse the enemy or to destroy his installations. It ends with a planned withdrawal upon completion of the assigned mission. Examples include the Dieppe, Narvik, and Makin Island operations of World War II.

d. Demonstrations. A demonstration is an operation designed to confuse the enemy, to delay or reduce the effectiveness of his dispositions and to cause him to commit his reserves against the demonstrating force. When the demonstrating force is capable of

landing in enough strength to exploit a favorable situation, this operation is termed a demonstration in force, otherwise the landing force conceals its real strength to produce the desired effect.

3. Types of Movements. Amphibious operations are classified as either ship-to-shore, shore-to-shore or a combination of both.

a. The term ship-to-shore describes any operation requiring the transfer of troops, supplies and equipment from the transport or other ocean-going vessels into smaller landing craft or landing vehicles for movement to the beaches.

b. The term shore-to-shore describes the movement of the landing force element directly from the embarkation area to the landing beaches without transfer at sea. Amphibious shore-to-shore technique may also be used for special operations on navigable rivers and lakes. These operations may or may not have naval support.

4. Characteristics of Amphibious Operations. An Amphibious operation has a great shock effect on an enemy. The attacker exploits this initial paralyzing effect to land a force and accomplish his assigned mission.

a. An amphibious operation is offensive in character. The initiative is with the attacker. His choice of objectives and lines of approach are limited by his commander's directive, his mission, the enemy, the weather, terrain and sea approaches, and the supporting capabilities of naval counter-intelligence measures. Mobile floating reserves permit him to exploit rapidly his successes ashore.

b. The attacker also considers the unfavorable characteristics of amphibious operations which are:

- (1) The number and type of vessels to transport his force are limited. This affects the strength, composition, supplies and equipment taken in with the assault.
- (2) While aboard vessels troops are particularly vulnerable to enemy air, sea and shore weapons.
- (3) Suitable landing beaches may be limited and the attacker may have to select unfavorable beaches where obstacles and enemy defenses exist.
- (4) During the initial assault the attacker must depend mainly on naval gunfire and air support.
- (5) The troops land and fight over unfamiliar terrain where information of the enemy defenses is often meager.
- (6) Ships carrying essential troops and cargoes may be lost because of enemy action.
- (7) Unfavorable weather, heavy surf or tides may prevent landing or cause serious delays in the schedule.

- (8) Initially supporting arms and services may be able to function only in a limited manner, increasing the difficulties of control, supply and communication.
- (9) Supply of the landing force in the objective area is limited by the ability to keep sea and air lanes open.

5. Organization. Ground units are organized to make the initial assault, to aid in the debarkation of combat units, to provide maximum fire power until normal artillery support is available, to provide mobility of the initial assault units ashore and to provide the continuous logistical support of landed units. Similarly naval units are organized to embark, convey and debark ground forces and to provide effective naval gunfire support until artillery units are established ashore. Air force units are organized to give adequate air protection, reconnaissance and offensive action during the operation.

6. Phases of Amphibious Operations. An amphibious operation is divided into four general phases. The phases are preparatory, movement, assault and final.

a. Planning Phase. The Planning phase includes all planning, training, rehearsals, mounting, embarkation and such "softening up" action as may be taken in connection with the operation.

b. Movement Phase. The movement phase begins with the completion of embarkation of the amphibious forces and ends with the beginning of the assault.

c. Assault Phase. The assault phase begins when the naval or air components of the joint force are in a position to support the ground assault forces and ends with the establishment of the force beachhead.

d. Consolidation Phase. The final phase of the joint amphibious operation begins with the end of the assault phase. It ends when the normal logistical services of the ground and air forces are established ashore. This phase includes seizure of the objective unless it is included within the beachhead and logistical operations involved in the consolidation of the objective.

7. Patterns of Amphibious Operations. Amphibious operations against defended shores resemble the following patterns:

a. Prelanding Operations.

- (1) Air and naval reconnaissance of the objective area including visual, sonic, photographic, and electronic reconnaissance.
- (2) Preliminary naval and air bombardment of the objective area.
- (3) Mine sweeping and underwater demolition operations in the landing area by naval forces supported by air and naval gunfire.
- (4) Prelanding naval gunfire and air bombardment of the objective area immediately before the landing.

- (5) Seizure of Outlying islands before D-Day for use as logistic, air or seaplane bases, radar warning stations or position areas for supporting artillery where assistance gained by such action will outweigh tactical surprise lost.

b. Landing.

- (1) Arrival of the attack force in the landing area.
- (2) Intense pre-H-hour naval gunfire and air bombardment on the objective area.
- (3) Debarcation of troops from ships into landing craft and landing vehicles, their formation into waves and movement across the line of departure to the beach. Naval and air bombardment of shore targets continues until the last stage of this movement.
- (4) As the leading wave nears the beach, naval gunfire lifts to flanking and inland targets. Air units make final strafing runs on beach defenses and supporting craft take over close supporting fire missions.
- (5) The assault waves land; breach beach obstacles, overrun beach defenses and destroy local enemy forces and installations. Mobile reserves are kept afloat.
- (6) The force ashore is rapidly built up by committing reserves to exploit success where the advance is most rapid.
- (7) The assault companies quickly reorganize, repulse local counter-attacks and seize initial objectives. Close support by air and naval gunfire begins when artillery forward observer parties and tactical air parties land and establish communication.
- (8) The initial equipment and supplies are landed and shore organization begins.
- (9) When the initial assault tasks are accomplished the advance continues to secure the beach from enemy direct and indirect ground observed fires. Shore organization continues.

c. Consolidation.

- (1) Assault battalion beachhead lines are secured, additional troops, supplies and equipment are landed, organized counter-attacks are driven off and battalion beachheads are consolidated.
- (2) Battalion beachheads are expanded to seize regimental objectives and to prevent observed artillery fire from being placed on the beach. Regimental reserves are landed and shore installations are consolidated.
- (3) Regimental beachheads are expanded and division objectives are seized.
- (4) The shore installations are consolidated by the division shore party as more equipment and supplies are landed.
- (5) If continuing land offensive follows, port and beach developments begin. Additional reinforcements arrive, base installations and air fields are established and the land offensive resembles a normal land campaign. Naval gunfire continues throughout and until the land offensive goes beyond their range. Air support continues, initially by long range and carrier based aircraft and later by planes operating from fields prepared in the objective area.

8. General Doctrine

a. Amphibious operations are conducted according to the principles described in NWP-22 and FM 100-5. The following general doctrine is particularly applicable to amphibious operations:

- (1) Unity of command is mandatory.
- (2) Accurate, timely and comprehensive intelligence is the basis for planning amphibious operations.
- (3) Superiority of force, including air and naval superiority, at the time and place of landing is mandatory.
- (4) Each amphibious task force is organized, equipped, trained and rehearsed specifically for the task it is to perform.
- (5) Surprise is continually sought.
- (6) Plans and orders are complete, flexible and detailed.
- (7) Administrative and tactical plans are developed concurrently by all commanders. The overall administrative plan adequately supports the tactical plan.
- (8) All ships in the assault column are combat loaded.
- (9) Effective control and communication are secured and maintained.

9. Operational Principles. The primary purpose of a joint task force in an amphibious operation is to land, support and supply an effective fighting force so that it may accomplish its assigned mission. In this type operation the following basic operational principles apply in attaining maximum results with minimum losses.

- a. Every assault force element is assigned specific missions.
- b. The overall operation is built around assault battalion landing teams.
- c. Landing beaches are chosen after joint consideration of sea approaches, beach gradient, general beach and inland terrain, beach defenses, beach exits, surf and tidal conditions and the future use to which the beaches will be put.
- d. The time of landing is carefully considered.
- e. The assault battalion landing teams are reinforced with adequate supporting weapons, supplies and services to seize initial objectives.
- f. Supporting weapons and units land as early as possible to strengthen the fire power ashore.
- g. Successive assault waves are mutually supporting and are timed to prevent congestion of troops or defeat in detail on the beach.
- h. Each boat team is organized as a small task force with enough combat strength to fight to its objective without regrouping.
- i. Specially equipped and trained units are used to organize and operate the beach support areas.

j. Adequate quantities of ammunition and other supplies are made available to support the landing plan.

k. When the assault landing precedes a major land offensive, plans provide for adequate vehicles, fuel and supplies to exploit initial success.

l. Detailed alternate plans are prepared before sailing.

B. ORGANIZATION

1. Ground Organization for Amphibious Operations.

a. The reinforced infantry division is the basic large army unit which can be especially trained and equipped for amphibious operations. It usually lands as part of a reinforced corps. Attachments to support the infantry division include shore parties, one or more anti-aircraft artillery groups, field artillery groups, combat engineer battalions, amphibious engineer battalions, amphibious tractor battalions, amphibious truck companies.

b. The reinforced division is organized in three regimental combat teams (RCT's) each is supported by part of the reinforced arms and services including a regimental shore party which is attached to or directly supports each RCT.

c. Each RCT is further divided into three battalion landing teams (BLT's). Each is supported by or has attached to it a limited part of the reinforcing arms and service.

2. BLT Organization.

a. The BLT is the basic assault unit of a landing force. It consists of a standard infantry battalion reinforced with elements from regiment and higher echelons. The BLT may be embarked on an assault transport (APA), on landing ships, or on a combination of vessels depending on its composition and mission.

b. The BLT is a small task force that functions independently during the first part of the landing. The ultimate success of any landing operation depends largely on the success of the assault BLT's. The BLT is organized to land, overrun beach defenses and secure terrain objectives.

c. Since initial fire support is primarily obtained from supporting ships and aircraft the BLT must have additional fire support attachments to assist in accomplishing its mission. Not only combat units but also logistical elements are attached to provide essential supplies until normal supply installations are established ashore.

C. INTELLIGENCE PLANNING

1. General

a. In amphibious operations emphasis is placed on the production and use of certain items of intelligence. Many of these items are

not required in other types of operations and often are obtained by special means. The commanding officer of a regiment operating as a part of a larger force normally has no choice as to his time and place of landing, but he needs the intelligence on which these decisions are based.

b. The production of intelligence begins far enough ahead of the operation to provide all lower staff sections and units with the intelligence they need for planning. The intelligence initially available is included in the directive for the operation. Most of the intelligence produced later is procured for regiment by the division headquarters.

2. Intelligence Requirements. Detailed intelligence concerning the following items if needed for the proper planning and execution of an amphibious operation:

a. Enemy: Composition of enemy forces in the objective area (ground, naval, and air); identification of units, strength, equipment, location, nature, and extent of beach and inland defenses.

b. Hydrography: Information on surf and swell conditions, tides, currents, depths of water, water temperature, and nature of bottom reefs, rocks, and shoals.

c. Meteorology: Temperature, precipitation, wind, visibility, frequency and nature of storms, flying conditions, and natural phenomena.

d. Beaches: Exact location, length, width, gradient, physical consistency, exits, and underwater and beach obstacles.

e. Terrain: Configuration of the shoreline, relief, compartmentation, vegetation, critical terrain features, observation and fields of fire, obstacles (natural and artificial), cover and concealment, avenues of approach, landmarks for the identification of the landing beaches from the sea, drop zones for airborne troops, emergency landing sites for aircraft, and areas suitable for command post sites, storage, vehicles parks, and artillery.

f. Ports: Location in relation to the landing beaches, hydrography berthing facilities, storage, and port facilities to include piers and jetties for unloading supplies.

g. Local population: Including density, religion, health, politics, economy, attitude, and suitability for use as militia or guerilla forces.

h. Communication and transportation: Characteristics, construction, capacities, and condition of telephone, telegraph, radio, roads, railroads, airfields, rivers, and canals.

i. Civic development: Location, construction, and characteristics of towns, villages, farms houses, and other buildings.

j. Miscellaneous: Water supply, public utilities, sanitation, dangerous fauna or flora, natural resources of military value, and local construction materials,

3. Sources of Information. Information and intelligence for use in the planning and execution of an amphibious operation may be obtained from:

- a. Joint Army-Navy Intelligence Studies. (Being replaced by National Intelligence Surveys).
- b. Strategic engineering studies.
- c. Coast Pilots (sailing directions) issued by U.S. Coast and Geodetic Survey and U.S. Hydrographic Office.
- d. Files of the National Geographic Society.
- e. Files of business concerns operating in the objective area.
- f. Civilian travelers.
- g. Former residents of the objective area.
- h. Theater terrain studies, guides, and handbooks.
- i. Civil affairs handbooks.
- j. Reports of visual amphibious reconnaissance and photographs.
- k. Reports of visual air reconnaissance and aerial photographs.
- l. Prisoners of war.
- m. Captured documents and material.
- n. Army, Navy, and Air Force intelligence reports.
- o. Travelers, students, and scientists.

4. Agencies.

a. With the agencies organic to it, a regiment operating as a part of a larger unit is seldom able to produce the intelligence it requires for an amphibious operation. The following agencies provide the bulk of the intelligence used during the planning phase of the operation:

- (1) Military Intelligence Division, Department of the Navy.
- (2) Office of Naval Intelligence, Department of the Navy.
- (3) Directorate of Intelligence, Department of the Air Force.
- (4) U.S. Coast and Geodetic Survey.
- (5) Higher headquarters including Theater Headquarters.
- (6) U.S. Naval and Air Forces.
- (7) Amphibious Patrols.
- (8) Secret Agents.

b. After the landing, information is obtained and intelligence produced and used as in any other land operation.

5. Security.

a. The ultimate success of an amphibious operation depends greatly on attaining surprise. Surprise is gained only if we are successful in concealing from the enemy our true plans and intentions. Required security measures include:

- (1) Controlled dissemination. Required intelligence is never withheld from a headquarters, but unnecessary dissemination is prevented.
- (2) Code names. For added security in planning, amphibious operations are given code names. The name used has no relation in itself to anything connected with the operation. The code name of the operation and the actual geographic name of the objective area are not included in the same document. In addition, outstanding terrain features may be given code names.
- (3) Secret planning rooms. All planning work is conducted in designated rooms that are kept under guard at all times. No documents, maps, charts, or material of any kind used in planning are removed from the room, and only authorized personnel are permitted to enter.
- (4) Precautionary measures. These measures are: Establishment of rigid censorship regulations and strict enforcement of them; supervision of all press release, including photographs and materials for broadcasts; counter-reconnaissance and counter-espionage measures; and enforcement of communication security.

b. Personnel already briefed on the plan are not permitted to accompany amphibious patrols or to fly over enemy territory, since they may be exposed to capture. Amphibious reconnaissance patrols are given only the information required for the accomplishment of their mission.

c. In preparing for an amphibious operation it is assumed that the enemy will obtain some information that indicates to him that such an operation is being mounted. Steps may be taken to deceive the enemy concerning our true intentions and plans. The intelligence officer submits recommendations and assists in planning tactical deception measures, including:

- (1) Demonstrations
- (2) Ruses and feints
- (3) Radio and traffic deception

D. OPERATION PLANNING

1. As soon as practicable after commencement of planning, an outline plan covering the operation should be prepared and issued to key subordinates. The detail of this initial plan will depend upon the amount of information available and the degree of development of plans of higher headquarters.

amount of information available and the degree of development of plans of higher headquarters. Some commanders prefer to impart this initial plan by informal briefings. Other Commanders prefer a combination of written plans and informal briefings. In any case, it is desirable that a tentative plan be formulated early to enable subordinate commanders to conduct concurrent planning and carry out objective, realistic, training.

2. The sequence of operational planning for an amphibious operation is characterized by being in reverse order of eventual execution, backward planning. The general plan of attack consists of the scheme of maneuver ashore, the landing plan, and the plan of supporting fires. After a thorough study of the enemy situation, the terrain, the hydrography, and the available units, the scheme of maneuver ashore is prepared to accomplish the assigned mission. In accordance with the restrictions of available shipping and landing craft, a landing plan is then prepared to support the scheme of maneuver ashore. The plans for supporting fires must then support the scheme of maneuver ashore and the landing plan. Actually all of these plans are inter-dependent and require simultaneous consideration since the limitations of one may affect the others. If compromises are required, they are made to insure the tactical success of the scheme of maneuver ashore. The other supporting plans including the detailed plans for the participation of air and naval components are then prepared to support the general plan of attack. Much of the detailed planning, particularly supply, communications, and air support wait on the tactical plan.

3. The division operation plan usually prescribes combat team missions, landing formations for RCTs, the number of BLTs to be used in the assault, exact beaches on which landings are to be made, use of available landing craft, time of initial landing, regimental beachhead line (s), ultimate shore party organization, manner of employment of the RCT reserve, and the details of supporting air and naval gunfire. Similarly, the RCT plan will dictate these details to the BLTs.

4. Planning for the operation is a continuing process. As additional information and decisions are made the initial plan will undergo a series of changes to the point where a firm plan can be published. This final plan then becomes the operation order just prior to embarkation.

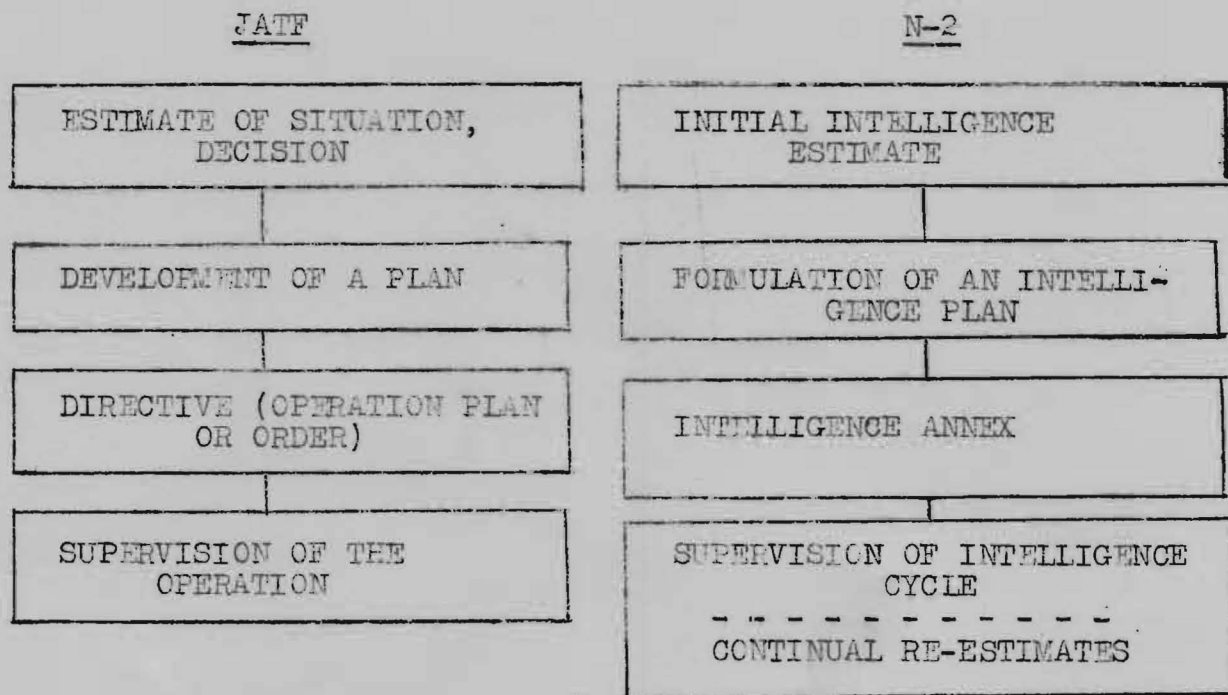
PLANNING AND INTELLIGENCE

In the Basic Intelligence Course I-1 and the Advanced Intelligence Course I-2 the necessity for thorough planning by the Amphibious Intelligence Officer is emphasized. While specializing in Beach Intelligence, it is once again important to review one characteristic of an amphibious landing that calls for good spade work in N-2 as well as the rest of the Commander's Staff:

The objective area is normally separated from the staging area by a considerable distance. This means:

- (1) Use of long range collection agencies such as submarines, strategic air forces, etc.
- (2) Close control of collection agencies by the theater commander (for security reasons).
- (3) Dependence upon the N-2 section, JATF, by the Landing Force for much of its intelligence needs.

As we discuss BEACH INFORMATION, the various means of its COLLECTION, and utilizing it in BEACH STUDY and SELECTION, it is well to keep in mind the following parallel between the Commander's planning work and that of his Intelligence Officer.



FACTORS OF BEACH STUDY - NAVAL CONSIDERATIONS

The landing area comprises the sea, air and land areas required for executing the landing and establishing the beachhead. The selection of the landing area will usually be a compromise between the Landing Force Commander and the Naval Commander because of terrain and hydrographic conditions in the area.

3. As shown on the beach profile diagram the beach area is divided into five sections. Some of the considerations the Amphibious planner must give to each area are:

1. Offshore

- a. Comprises area from 5 fathom curve to unlimited distance seaward.
- b. Is the initial maneuver, anchor and unloading area
- c. desire 100 fathoms of water or more in outer transport area.
- d. Natural features to be found are islands, shoals, reefs, rocks, and kelp.

2. Nearshore

- a. Comprises area from 5 fathom curve to low water line
- b. Is transport area of the landing force
- c. Contains seaward limits of surf zone.
- d. Natural features to be found are about same as in offshore with addition of littoral and rip currents and consideration must be given to gradient.

3. Foreshore

- a. Comprises the area from low water normal rush of water on shore at high tide.
- b. Initial launching area for landing force to the objective.
- c. Gradient and trafficability main considerations.
- d. Natural features are cusps, runnels and kelp.

4. Backshore

- a. Comprise the area from shoreward limits of foreshore to the extreme limits of storm wave action.
- b. Main concern of this area is trafficability and need of stabilization.
- c. routes of exit to hinterland important.
- d. Natural features consist of dunes, scarps, and vegetation.

5. Hinterland

- a. Comprises area from shoreward limits of backshore to about 15 miles inland or first major topographical change such as a river or range of hills.

- b. Largely a troop consideration.
- c. Main considerations are routes of exit, terrain and communications.
- d. Natural features are dunes, marshes, etc.

J. Six hydrographic features that the Naval Amphibious Planner must consider are:

- | | |
|--------------|----------------------|
| (1) Gradient | (4) Tide |
| (2) Surf | (5) Obstacles |
| (3) Currents | (6) Nature of bottom |

In making a beach selection each of these must be given detailed study in order to expedite landing the landing force. The salient points of each feature are set forth below:

1. Gradient

a. Slope of beach or vertical drop to horizontal distance ratio. It is expressed as steep (1:15 or steeper), moderate (1:15-1:30), gentle (1:30-1:60), mild (1:60-1:120) and flat (over 1:120). The degree of steepness will effect the surf and therefore the landing. Visible indications that can be made to determine gradient are:

- (1) steepness
- (2) size of individual beach particles
- (3) width of surf zone

b. Other means of gradient determination are by UDT, Photo Interpretation and by charts.

2. Surf

a. This is covered in detail in a later lecture

3. Currents

a. Concerned here by littoral or longshore type only. This type is formed by waters emptying from a river mouth and flowing parallel to the shore line or by ocean waves striking at an angle to the shore-line.

b. Can make boat handling difficult causing breaching.

c. Is an erosion agent changing the beach face.

d. A second type of current is the rip current which is formed by water rushing seaward through a channel in the ocean floor. This type is dangerous to personnel as it may cause drowning.

4. Tide

a. Can be predicted and is important as it could change the time of landing. Normally the landing is timed to go in 2-3 hours ahead of high tide to take advantage of the high water in order to get equipment and personnel as far up on the beach as possible.

5. Obstacles - natural and man-made

- a. If man-made, UDT will destroy.
- b. Go in at low tide if they can not be destroyed so that they will be visible.
- c. Natural obstacles such as sandbars, etc., must be accurately plotted.

6. Nature of the bottom

- a. Best bottom is a sandy type
- b. Mud is poor for good holding ground and retraction qualities.
- c. Rocky bottom will cause damage to boats.

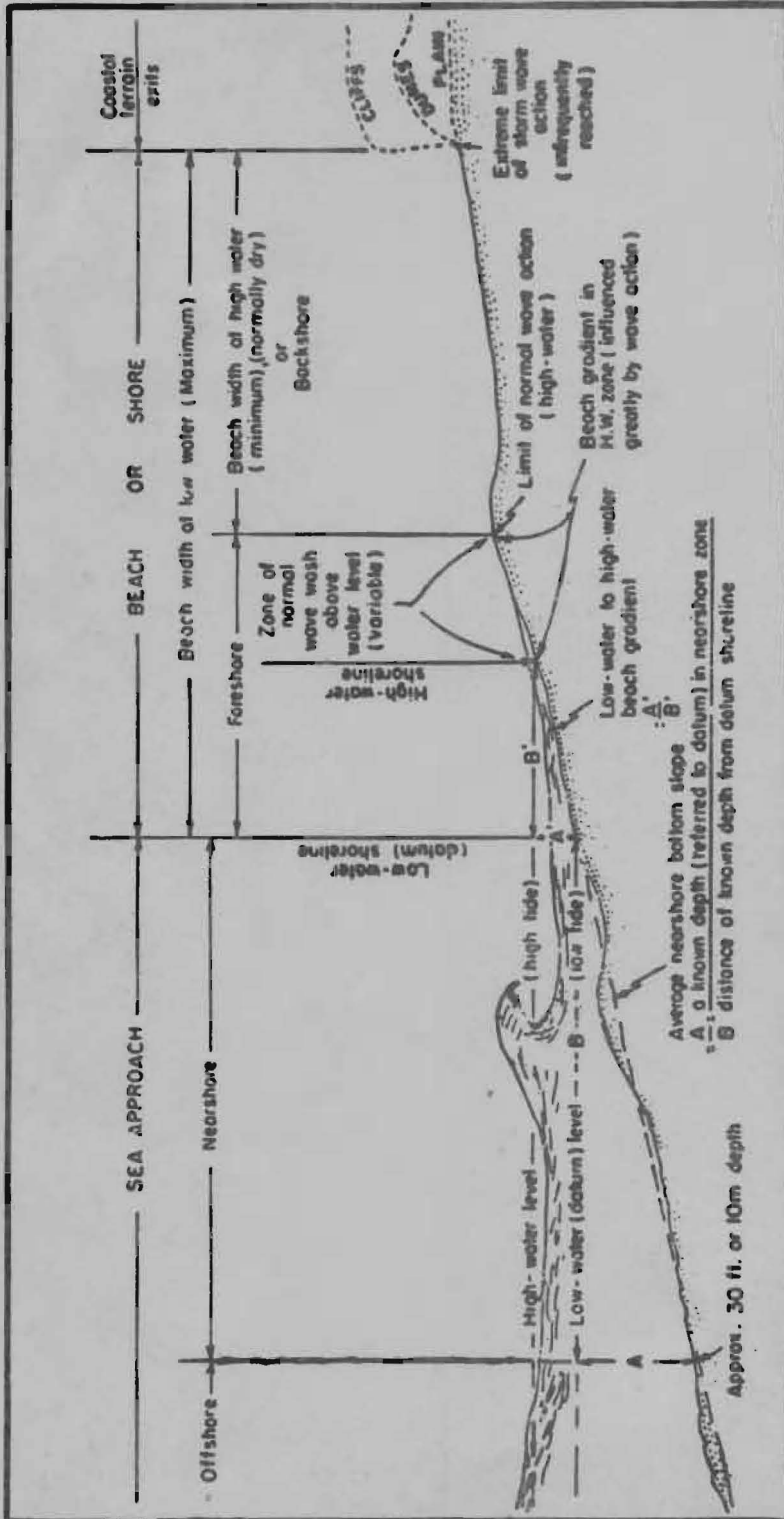


Figure 3-1.—General beach profile diagram.

38 A-14

FACTORS OF A BEACH STUDY
LANDING FORCE CONSIDERATION

- A. Define the landing area as consisting of that part of the objective area within which are included the landing operations of an amphibious force.
1. Landing area includes:
 - a. beach or beaches
 - b. approaches to beach
 - c. transport areas
 - d. fire support areas
 - e. air space for close support
 - f. helicopter landing zones
 - g. terrain to the FBHL
 2. General locality dictated by mission and objection of attack force.
 3. Specific landing area determined after evaluation of naval and landing force considerations and are interdependent.
 4. Basic information is needed before other planning man commence.
- B. Terrain appreciation
1. Is evaluation of the area of military operations to determine the effect of terrain on the lines of action open to opposing forces.
 2. Purely mechanical aspects of ships shore movement are complicated, when under guns of enemy they are crucial.
 3. Transition from 0 to that force required to overcome the enemy requires available space cover and firm ground. Improper evaluation may result in disaster.
- C. Relationship of shorelines to amphibious operations.
1. Types are considered in respect to the size of using unit.
 - a. Convex
 - b. Concave
 - c. Straight
 2. Convex
 - a. Includes outcurving shores and points
 - b. Supporting fires may be placed on flanks & rear of defender, his routes of withdrawal and reinforcement are restricted and

positions are in danger of being cut off.

- c. Defenders fire plan difficult to organize.
- d. If peninsula with narrow neck seized landing force may be contained.
- e. Landing force considerations along favor selection of convex beach.
- f. Naval considerations do not favor convex beach.

3. Concave

- a. Most common type used in past.
- b. Best beaches normally found on this type.
- c. Easiest to defend.
- d. First efforts directed toward neutralization or occupation of promontories.

4. Straight

- a. Possesses no prominent indentation or promontories.
- b. No decisive advantage to either side.

D. Special formation of shorelines.

- 1. Reefs
- 2. Fiords and estuaries
- 3. Atolls
- 4. Offshore islands

E. Tactical considerations in selection of landing area.

1. Ideal terrain conditions.

- a. Flat or gently rising backed by coastal range of sufficient height.
- b. Seldom exists

2. Examine general relief

- a. Coastal plain
- b. Rising ground
- c. Broken ground
- d. Coastal mountains.
- e. Terraces

3. Compartmentation

- a. Allows smaller units to initially limit beach head on defensible terrain.

4. Obstacles

- a. Excellent beach may be unsatisfactory if backed by river, swamp, lakes, etc., Example - Imperial Beach.

- b. Obstacle may be utilized to the advantage of attacker.
- c. Works of man.
- d. Soil trafficability may be serious obstacle.
- e. Vegetation.

F. Enemy situation

1. Current situation is difficult to determine in view of time, space separation, ability of enemy to reinforce, and flexibility necessary in amphibious planning.
2. Information required on following factors:
 - a. Strength
 - b. Equipment
 - c. Location, disposition, and defenses
 - d. Organization and identification.
 - e. Movements and reinforcements
 - f. Personalities of principle commanders.
 - g. Tactical doctrine.
3. From analysis of above factors and natural conditions of objective area CAPABILITIES are drawn.
 - a. Determination of probable order of adoption.
 - b. Analysis of effect on our mission.

G. Political & Economic.

1. Current political situation.
 - a. Probable effect on our mission.
 - b. Example of good political intelligence, North Africa, 1943.
 - c. Example of bad political intelligence, Ukrainian Operations.
2. Economic situation
 - a. Probable effect on our mission.

SECTION B

METEOROLOGY HYDROGRAPHY

Basic Meteorology

Theory of Ocean Waves, Sea and Swell

Shallow Water Waves, Surf and Breakers

Measurement of Waves - Wave Tank

Surf Observation Procedures

BEACH INTELLIGENCE COURSE I-3

WEATHER INFORMATION

I. INTRODUCTION

A. Role of Aerologist

1. Compiles meteorological and hydrographic data

B. Role of Intelligence Officers

1. Compiles Climatology of area

II. DEFINITION

- A. Meteorology - study of the air and changes that take place in the air.

III. NATURE OF ATMOSPHERE

- A. Troposphere - up to about 7 miles
- B. Stratosphere - up to about 20 miles
- C. Ozonosphere
- D. Ionosphere

IV. WEATHER ELEMENTS

- A. Air Temperature
- B. Humidity
- C. Visibility
- D. Clouds and state of sky
- E. Kind and amount of precipitation
- F. Atmospheric pressure
- G. Winds

V. THE WEATHER STATION MODEL (Shore Station)

- A. An abbreviated U.S. Model

ff

C_h

dd

C_m

PPP

TT

N

PPa

VV_{ww}

T_dT_d

C_l

N_h

WR_t

h

RR

1. Speed of wind in Knots - ff
2. Direction from which wind is blowing - dd
3. Type high cloud - Ch
4. Type mid cloud - Cm
5. Sky coverage - N
6. Type low cloud - Cl
7. Height of cloud whose amount is given by N-Nh
8. Height of lowest cloud - h
9. Air temperature - TT
10. Visibility (prevailing) - VV
11. Present Weather - ww
12. Dewpoint temperature - TdTd
13. Sea level pressure - PPP
14. Sign of Barometric change - \pm
15. Amount of Barometric change - PP
16. Tendency of Barometric change - a
17. Past weather - W
18. Amount of Rainfall - RR
19. If raining at time of observation or during hour preceding observation time. Otherwise it is the time ended. -Rt

B. Plotting information

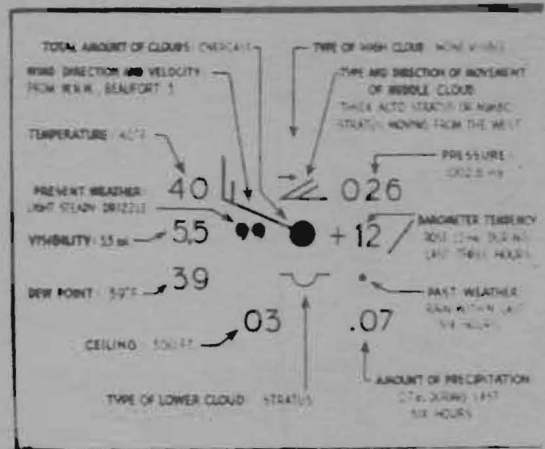
1. Station diagram
2. Isobars - lines of equal pressure
3. Pressure centers
4. Fronts

C. Transmission of information

1. Canned maps

VI. UPPER AIR OBSERVATIONS

- A. Pilot balloon - "PIBAL"
- B. Radiosonde - "RAYSONDE"



**BEAUFORT
SCALE**

BEAUFORT NUMBER	MAP SYMBOL	VELOCITY KNOTS
0		LESS THAN 1
1		1-3
2		4-6
3		7-10
4		11-16
5		17-21
6		22-27
7		28-33
8		34-40
9		41-47
10		48-55
11		56-63
12		ABOVE 63

BEACH INTELLIGENCE COURSE I-3

AEROLOGY IN THE AMPHIBIOUS FORCE

A. DEFINITIONS:

1. Aerology: The science pertaining to the meteorological phenomena of the upper atmosphere.
2. Meteorology: The study of the atmospheric phenomena and the changes that occur in the lower layers of the atmosphere.
3. Aerological Personnel: Those personnel specifically trained to observe, analyze and forecast the fluctuations or changes of weather elements and the state of the atmosphere.

B. ROLE OF AEROLOGIST:

1. Aerological Information

a. Climatology

- (1) Information collected over a period of years
- (2) Analyzed by statistical methods
- (3) Summarized in various ways

- (a.) Graphs
- (b) Tables
- (c) Wind Roses

- (4) Useful for general planning
- (5) Studies require sufficient time to compile
- (6) Sources of climatological information.

- (a) NIS
- (b) FWC
- (c) NWRC, ASHVILLE, S.C.
- (d) OPNAV

b. Synoptic Meteorology

- (1) collection of reports
- (2) widespread network of reporting stations
- (3) regularly reported by rapid means
 - (a) Weather broadcasts
 - (b) Facsimilie Maps
- (4) Used for day to day forecasts

C. WEATHER REPORTING AGENCIES

1. Naval Aerological Units
2. All commissioned Navy ships
3. USAF Air Weather Service
4. U.S. Weather Bureau
5. Foreign Civilian and Military Weather services
6. International Meteorological Organization
7. U.S. Coast Guard Ocean Station Vessels

D. CAPABILITIES OF AN AEROLOGIST

1. Reliable forecasts
 - a. surface and upper air
 - (1) 24 to 36 hours in advance
 - b. Oceanographic
 - (1) 48 to 60 hours in advance
2. Ballistic data
3. Radar Refraction Index data

E. LIMITATIONS

1. Accuracy, completeness and frequency of individual reports
2. Availability of sufficient reports
3. Individuals experience in the areas of interest

BASIC METEOROLOGY

COURSE I-3

INTERNATIONAL CLOUD CLASSIFICATION

HIGH CLOUDS ABOVE 20000 FT	MIDDLE CLOUDS 20000 TO 7000 FT.		LOW CLOUDS BELOW 7000 FT.	VERTICAL DEVELOPMENT CLOUDS. (LOW CLOUDS WITH VERTICAL DEVELOPMENT.)
CIRRUS CIRROSTRATUS CIRROCUMULUS	ALTOSTRATUS ALTOCUMULUS		STRATUS NIMBO STRATUS STRATOCUMULUS	CUMULUS CUMULONIMBUS
COMPARATIVE WIND-VELOCITY TERMINOLOGY				
BEAUFORT FORCE	VELOCITY M.P.H. KNOTS		SEAMAN'S DESCRIPTION OF WIND	U.S. WEATHER BUREAU TERMINOLOGY
0	1	1	CALM	LIGHT
1	1-3	1-3	LIGHT AIR	LIGHT
2	4-7	4-6	LIGHT BREEZE	LIGHT
3	8-12	7-10	GENTLE BREEZE	GENTLE
4	13-18	11-16	MODERATE BREEZE	MODERATE
5	19-24	17-21	FRESH BREEZE	FRESH
6	25-31	22-27	STRONG BREEZE	STRONG
7	32-38	28-33	MODERATE GALE	STRONG
8	39-46	34-40	FRESH GALE	GALE
9	47-54	41-47	STRONG GALE	GALE
10	55-63	48-55	WHOLE GALE	WHOLE GALE
11	64-75	56-65	STORM	WHOLE GALE
12	ABOVE 75	ABOVE 65	HURRICANE	HURRICANE

PRECIPITATION

SHOWERS			STEADY			INTERMITTENT			OTHER
RAIN	SNOW	HAIL	RAIN	SNOW	HAIL	RAIN	SNOW	DRIZZLE	
LIGHT MODERATE	LIGHT MODERATE	LIGHT MODERATE	LIGHT	LIGHT	LIGHT	LIGHT	LIGHT	LIGHT	SLEET
HEAVY	HEAVY	HEAVY	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	FREEZING DRIZZLE
RAIN-SNOW			HEAVY	HEAVY	HEAVY	HEAVY	HEAVY	HEAVY	GLAZE

FOG SYMBOLS

GROUND	LIGHT	MODERATE TO DENSE	SKY DISCERNIBLE	IN PATCHES
INCREASED LAST HOUR	DECREASED LAST HOUR	WITH RAIN	WITH SNOW	WITH DRIZZLE





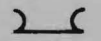

THUNDERSTORM SYMBOLS

MILD	MODERATE	SEVERE	WITH RAIN	WITH SNOW	WITH HAIL

DRIFTING SNOW SYMBOLS

LIGHT AND LOW	HEAVY AND LOW	LIGHT AND HIGH	HEAVY AND HIGH

TYPES OF CLOUDS (HIGH CLOUDS)









NO HIGH CLOUDS	 THIN CIRRUS	 THICK CIRRUS	 CIRRUS OF ANVIL CLOUD
 TUFTED CIRRUS INCREASING	 CIRRUS OR CIRRO STRATUS	 CIRRO STRATUS	 CIRRO-CUMULUS AND CIRRUS

MIDDLE CLOUDS









NO MIDDLE CLOUDS	 THIN ALTO STRATUS	 THICK ALTO STRATUS OR NIMBO STRATUS	 ALTO-CUMULUS
 ALTO-CUMULUS IN SMALL PATCHES	 ALTO-CUMULUS IN BANDS	 ALTO-CUMULUS WITH ALTO STRATUS	 ALTO-CUMULUS IN TUFTS

LOW CLOUDS

NO LOWER CLOUDS	 CUMULUS OR FAIR WEATHER	 SWELLING CUMULUS	 CUMULO NIMBUS
 CUMULUS FLATTENED TO STRATO-CUMULUS	 STRATUS OR STRATO-CUMULUS	 LOW BROKEN CLOUDS OF BAD WEATHER	 ARROW ON ANY CLOUD SYMBOL SHOWS DIRECTION OF MOTION

 NO CLOUDS	 ONE-TENTH	 TWO OR THREE-TENTHS	 FOUR FIVE OR SIX-TENTHS
 SEVEN OR EIGHT-TENTHS	 NINE TENTHS	 COMPLETELY COVERED	 SKY OBSCURED











BAROMETER CHARACTERISTIC

 RISING THEN FALLING	 RISING THEN STEADY	 RISING UNSTEADILY	 RISING STEADILY
 FALLING THEN RISING	 FALLING THEN STEADY	 FALLING UNSTEADILY	 FALLING STEADILY



PAST WEATHER

 RAIN	 SNOW	 DRIZZLE	 SHOWERS
 FOG	 THUNDERSTORM	 SAND OR DUST STORM	 CLOUDY OR OVERCAST

MISCELLANEOUS SYMBOLS

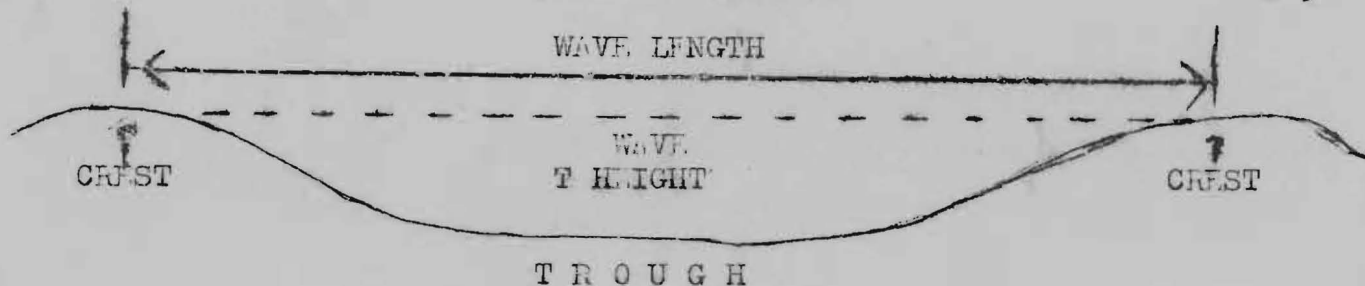
 SQUALLY WEATHER	 HEAVY SQUALLY WEATHER	 THREATENING SKY	 DISTANT LIGHTNING	 SIGNS OF TROPICAL CYCLONE
 WATERSPOUT SEEN	 DUST OR SAND STORM	 DUST DEVILS	 SMOKE	 HAZE

MODIFYING SYMBOLS

 TO RIGHT OF SYMBOLS: OCCURRED DURING LAST HOUR.
 AROUND SYMBOLS: OCCURRED IN SIGHT OF STATION.

WAVE TERMINOLOGY

I-3



<u>TERM</u>	<u>SYMBOL</u>	<u>DEFINITION</u>
Crest		Highest point of wave.
Trough		Low point between two successive crests.
Wave length	L	Distance between two successive crests (feet).
Period	T	Time interval between two successive crests passing a given point (sec).
Velocity	C	Rate of speed of wave travel (knots or feet per second).
Height	H	Vertical distance, wave crest to trough of preceding wave (feet).
Depth	D	Vertical distance, surface to bottom (feet or fathoms).
Steepness	H/L	Ration of height to length, relative steepness.

Subscript - _o refers to values in deep water. Example: L_o = wave length in deep water.

Subscript - _b refers to values at breaking. Example: H_b = wave height at breaking, or breaking height.

$$CT = L$$

$$C^2 = \frac{g L}{2} \left(\text{tanh } 2 \frac{d}{L} \right)$$

$$C_o = 5.12 T$$

$$T = \frac{L}{C}$$

$$C = \frac{L}{T}$$

$$L_o = 5.12 T^2$$

B-9

BEACH INTELLIGENCE COURSE

OCEAN WAVES, SWELL AND SWELL (PRECIS)

PURPOSE: To explain certain aspects of wave theory necessary for an understanding of the fundamental principles used in forecasting wind waves, swell, and surf.

1. WAVE FORMATION.

Wave are caused by anything that disturbs the natural equilibrium or state of rest of the water, chiefly by winds blowing over the water surface. Waves might be termed the visible result of an energy disturbance travelling through the medium of water.

2. TYPES OF WAVES.

(a) Wind Waves are waves which are growing in size by transfer of energy from the winds. White caps are examples of small steep wind waves. Large "seas" or "combers" are examples of large wind waves present in storm areas. Wind waves are comparatively steep. The ratio of height to length (H/L) is large.

(b) Swells are waves no longer gaining in energy but travelling as the result of gravity. As wind waves emerge from a storm area and travel through a region of comparative calm, they lose height, length, and their velocity increases. They become more regular in length, height, and period. The length of the crest will also increase. They lower, shorter, waves die out, and the train of smooth streamlined swells which may travel over very long distance. Swells are practically sinusoidal in shape and are not steep. The ratio of height to length (H/L) is small, sometimes so small that they are not noticed in deep water.

3. PARTICLE MOTION.

(a) Waves are the visible result of movements of water particles. In deep water the particle motion is practically a circular orbit. The particles are at the top of the orbit and are moving in the direction of wave travel when a crest passes. The particles are at the bottom of the orbit and moving in the direction opposite to the direction of wave travel when the trough passes. The diameter of the circular orbit of any particle on the surface is the wave height.

(b) Sometimes the particles do not return exactly to their previous position but make a slight net advance in the direction of wave travel. This amounts to a slow current and is called mass transport.

(c) Underneath the surface, water particles also move in the same manner as the surface particles but in smaller orbits. At a depth of about one-half the wave length, the orbits are so small we consider the motion negligible. Roughly, the size of the orbit decreases by half at depth equal to each one-ninth of the wave length. For example, at a depth equal to $1/3$ of the wave length. ($3/9$), the orbit would be only about $1/8$ the size of the surface orbit.

4. RELATIONSHIPS OF LENGTH, PERIOD, AND VELOCITY.

(a) The theoretical law concerning waves in a frictionless incompressible fluid is shown below. Sea water is almost incompressible and friction is a negligible factor, so the law may be applied to ocean waves:

$$C^2 = \frac{gL}{2\pi} \tanh 2\pi \frac{d}{L} \quad (1)$$

When water is deeper than 1/2 the wave length, the value of,

$$\tanh 2\pi \frac{d}{L}$$

approaches unity or a value of 1.

In this case, the formula reads,

$$C_o^2 = \frac{g}{2\pi} L_o$$

Substituting the constants,

$$C_o^2 = \frac{32.172 L_o}{2(3.1416)}$$

Simplifying $C_o^2 = 5.12 L_o$

Since by definition $L = CT$ we can substitute $C_o T_o$ for L_o

and get $C_o^2 = 5.12 C_o T_o$

Dividing each side of the equation by C_o

$$C_o = 5.12 T_o \quad (2)$$

Since by definition $C = \frac{L}{T}$ we can substitute $\frac{L_o}{T_o}$ for C_o

and get $\frac{L_o}{T_o} = 5.12 T_o$

Multiplying both sides by T_o

$$L_o = 5.12 T_o^2 \quad (3)$$

(b) From this it is obvious that in deep water, if we can determine either the length or period of the waves, we can determine the length, period, and velocity of the waves. It also suggests that a deep water wave of a given period has one and only one possible length, and the longer the wave the faster will be its velocity.

(c) These formulas are considered exact for swells. Steeper wind waves travel a little faster than the formulas indicate.

5. RELATIONSHIP OF WAVE VELOCITY TO WAVE GROUP VELOCITY IN DEEP WATER.

(a)

(a) It has been previously pointed out that waves are the visible result of the transmission of an energy disturbance through the medium of water. The rate of advance of the energy disturbance represented by a group of waves is only half the velocity of the individual waves. But as the individual waves outrun the rest of the group, they lose height and disappear. The group as a whole maintains its identity since new waves form at the rear of the group. An explanation of this phenomenon is given in the following quotation from Technical Report No. 2 of the Beach Erosion Board (1942):

"As the first wave in the group advances one wave length, its form induces corresponding velocities in the previously undisturbed water, and the kinetic energy corresponding to these velocities must be drawn from the energy flowing ahead with the form. If there is equipartition of energy in the wave, half of the potential energy which advanced with the wave must be given over to the kinetic form and the wave loses height. Advancing another wave length another half of the potential energy is used to supply kinetic energy to the undisturbed liquid. The process continues until the first wave is too small to identify. The second, third, and subsequent waves move into water already disturbed and the rate at which they lose height is less than for the first wave. At the rear of the group, the potential energy might be imagined as moving ahead, leaving a flat surface and half of the total energy behind as kinetic energy. But the velocity pattern is such that flow converges toward one section thus developing a crest and diverges from another section forming a trough. Thus the kinetic energy is converted into potential and a wave develops in the rear of the group."

6. PARTICLE VELOCITY VS. WAVE VELOCITY.

It was previously pointed out that a wave is the visible result of movement of small particles of water in circular or nearly circular orbits. Consider a deep water wave with a period of ten seconds, height of six feet.

$$\text{If } T = 10$$

then from formula (2) $C_g = 5.12(10)$

$$C_g = 51.2 \text{ feet per second}$$

and from formula (3) $L_o = 5.12(10)^2$

$$L_o = 512$$

During the ten second period between the passage of two successive crests, small particles of water move in their circular orbits. The path of the particle is the circumference of the orbit. If the wave height is six feet, then the diameter of the circle is six feet.

WE obtain the circumference by multiplying the diameter by

$$6 \times 3.1416 = 18.8496$$

19 feet (approximately)

In ten seconds the wave form travels 512 feet but the particle re-
through a path only 19 feet long.

The rate of the wave is 51.2 feet per second

The rate of the particle is 1.9 feet per second

The velocity of the wave is always greater than the velocity of the
water particles. This is of importance since, if the mass transport
exists, the wind by speeding up the rotation of the water particles,
increase the velocity of the wave to a rate exceeding the wind ve-

Up to certain limits waves will grow in size, both in height and length
depending on the wind velocity, the size of the ocean area over which
the wind blows (the fetch), and the length of time the wind blows.
After leaving the fetch area, waves will lengthen and lose height.
gradually become transformed into long, smooth swells which may travel
thousands of miles before finally on a coast.

BEACH INTELLIGENCE COURSE

SHALLOW WATER WAVES, SURF AND BREAKERS

I. A knowledge of the areas that are effected by shallow water waves, and surf is of paramount importance to the Amphibious planner.

II. Review of Wave Terminology.

- (a) Crest - peak of wave
- (b) Trough - lowest portion of wave
- (c) Wave Length - lineal distance between 2 peaks
- (d) Wave Height - vertical distance from trough to peak
- (e) Wave period - time it takes for 2 successive peaks to pass a given point.
- (f) Wave velocity - speed measured in ft/sec
- (g) Wave steepness - H/L ratio

III. (a) Deep water waves generated in a FETCH AREA and they move out to a area where less energy is being applied (DECAY AREA) the wave becomes smoother and undulating.

(b) Water particles move in orbits - no mass transport of water

IV. (a) Wave upon entering move a shallow area will: (at a depth equal to $\frac{1}{2}$ wave length)

- 1. Shorten in Length
- 2. Increase in height
- 3. Becomes unstable

(b) Theoretically wave becomes so unstable at a depth of 1.3 times the wave height (based on a still water level) and when the steepness ratio is 1:7 that breaking will occur and we have surf.

(c) Gradient affects Surf:

steep gradient	-	1:15 or steeper
Moderate	"	- 1:15 - 1:30
Gentle	"	- 1:30 - 1:60
Mild	"	- 1:60 - 1:120
Flat	"	- over 1:120

(d) When breaking occurs is the first mass transport of water.

V. Types of Breakers.

(a) Spilling - lest dangerous of the 3 types

1. Associated with:

- a. Onshore wind
- b. Irregular bottom
- c. Mild gradients
- d. May be refracted

2. Has surf boarding effect on landing craft.

(b) Plunging.

1. Comes from old stable waves

2. Associated with:
 - a. Offshore wind
 - b. regular bottom
 - c. steep to moderate gradients
3. Will swamp a craft. Safety factor $\frac{1}{2}$ that of Spilling.

- (c) Surging (most dangerous type breaker).
 1. Caused by sudden steepening of gradient near beach
 2. Surges upon beach and can cause extensive damage.

VI. Currents

- (a) Littoral - A long shore current
 1. caused by action from a river mouth
 2. waves breaking at an angle to shore
 3. have broaching effect on small craft
 4. important erosion agent
- (b) Rip current
 1. caused by irregularity in the bottom
 2. Parts - feeder current, neck and head
 3. velocity up to $2\frac{1}{2}$ knots
 4. hazardous to swimmers
 5. erosion agent
 6. found on a beach that may be undergoing change.
- (c) Tidallecurrent
 1. vary with phase of tide and shape of terrain
 2. will change direction every 6 to 12 hours
 3. are predictable.

MEASUREMENT OF WAVES BY WAVE TANK
AND SURF OBSERVATION

I. There are three ways to measure waves:

1. Observation
2. Photographic
3. Mechanical recorders

II. A wave tank may be used to simulate actual conditions and thus studies may be made of wave train, individual wave and water particle factors. The following general observation may be made:

1. Waves are the visible result of movements of water particles. In deep water this particle motion is practically a circular orbit.
2. The theoretical law concerning the relationship between wave velocity, wave length and wave period can be used for ocean waves in this form:

$$C^2 = 5.12L \text{ or } C = \frac{L}{T}$$

3. Wave Tank Procedures

- a. Water in tank is 1 foot deep so if waves are generated that are under two feet in length we have simulated deep water conditions.
- b. Cigarette ashes or debris may be dropped in tank and observe orbital motion as wave tank paddle is operated.
- c. Clock time of 1st stroke of paddle to measure time difference between single wave and wave train velocities. A single wave velocity should be approximately $\frac{1}{2}$ that of a wave train velocity.
- d. Time a given number of strokes of paddle and also estimate the wave length in tank. By use of the following formulas the theoretical and observational comparisons can be made:

Period (T) - $\frac{\text{time for strokes of paddle in seconds}}{\text{number of strokes of paddle}}$

Velocity - $\frac{\text{distance waves were measured}}{\text{Time in seconds}}$

Length - Length of waves as observed in tank

(1) Apply observed period to formula $L = 5.12T^2$

Does computed L = approximately the observed length?

(2) Apply observed velocity to formula $C = 5.12T$

Does computed C = approximately the observed velocity.

III. Surf Observation

A. Essential Factors of an observation:

1. Breaker angle
2. Littoral current
3. Height of breakers
4. period of breakers
5. percentage of breaker types
6. tidal state

B. Order of observational procedures

1. Breaker Angle
Amount of angle breakers make with shoreline as you face seaward. Recorded as so many degrees to the left or right (by this is meant if the breaker approaches from the right as you face seaward it is recorded as from the right and the open end of the angle is to your left.)
 2. Littoral current
Determined by throwing a block of wood or a ball into the surf zone and recording its drift for 4 minutes. 100 feet in one minute equals 1 knot.
 3. Height of breakers
Estimate height from trough to crest. Keep eye level low to get good perspective.
 4. Period of breakers
Total observational time converted to seconds divided by total observations (should take 100)
 5. Percentage of breaker type
To nearest 5% of each type based on 100 breakers.
- C. In making observations use a stop watch and start watch when an incoming breaker reaches its full height just prior to breaking then observe and record all subsequent waves as they break.
1. After observation compute significant breaker height (average of 1/3 highest), maximum breaker height (highest one observed), breaker period and breaker type percentages.

INTELLIGENCE SCHOOL
U. S. NAVAL AMPHIBIOUS TRAINING UNIT
U. S. NAVAL AMPHIBIOUS BASE
CORONADO, SAN DIEGO 55, CALIFORNIA

I-3 TABULATED SURF DATA

Data and information considered to be important to landing craft operators and landing personnel in general is summarized hereunder

1. Breakers seldom appear dangerous when viewed from the sea.
2. The fact that it is a calm day when no local wind does not necessarily indicate a low surf.
3. Because breakers may be formed by a swell arriving from a storm area many miles away, the presence or absence of local wind will not materially affect the height of a breaker. It will, however affect the type of breaker (i.e., plunging or spilling).
4. A long swell approaching a beach from a great distance will normally be almost unnoticeable at sea. However, such a swell may cause a dangerous surf.
5. The period of a wave at sea and the period of the breaker formed from the same wave are the same. It is possible by determining the wave period to compute the most favorable time to enter the breaker line in order to avoid having a wave breaker over a landing craft. Normally a craft enters the surf with the crest of a breaker.
6. An offshore wind does not materially reduce the height of a breaker.
7. A surf which is caused by wind waves, generated locally, dies soon after the wind fails or changes direction. This fact does not apply to surf from swells or waves formed long distances from the beach.
8. Patches of seaweed or grass will reduce surf. LVT's can take advantage of this fact but boats may foul propellers in heavy vegetation.
9. The presence of hail or slush ice in the water, when of sufficient concentration will reduce surf.
10. The use of oil on water will prevent the breaking of waves at sea, when such breaking is caused by local winds in the area, but oil will not affect the formation of breakers on a beach.
1. Waves traveling at an angle to a beach have their inshore ends slowed down. This causes a bending or refraction of the wave in toward the beach.
2. A gradual change in the coastline will not normally offer a lee (protected) shore when waves are traveling at an angle to the beach because such waves will bend around wide, round points.

13. An abrupt change in the coastline will normally offer a lee shore when waves are running at an angle to the beach.
14. A long narrow bay with beaches all along it will usually have a clam head. This fact is not true if the long, narrow bay has steep sides with no beach and the sea heaves into the bay directly. Such conditions seldom occur.
15. An irregular island has more chances of providing a sheltered landing site than an island whose shape approaches a circle.
16. Rip currents, which are local currents returning to seaward the water that was brought in by breakers, may act to quite the surf, however, in many cases they accentuate the confused nature of the surf, particularly if the surf is caused by storm seas.
17. Tidal currents running contrary to the wave direction may cause breaking of waves out at sea or may eliminate breaking entirely.
19. Beaches with gentle slopes usually have many lines of breakers. A beach with a steep slope may have only one line of breakers and it is possible for the waves to break almost directly on the beach proper. Such conditions are particularly dangerous to landing craft.
18. The normal effect of a contrary current is to decrease the length and increase the height of a wave.
20. Plunging breakers are particularly dangerous to landing craft and they are usually formed by long swell that are not easily recognized at sea by virtue of their low rounded crests.

2. B-19

BEACH AND INLAND TERRAIN

NATURAL BEACH FEATURES

SHORELINE PROCESSES

BEACH TRAFFICABILITY

BEACH OBSTACLES

TERRAIN APPRECIATION

NATURAL BEACH FEATURES

1. A study of the Offshore, Nearshore, Foreshore, Backshore and Hinterland must be made to determine if the natural features existing in each area are such as to hinder or assist the landing of troops. The functions performed and the important natural features to be found in each area are set forth below:

a. Offshore

1. Functions performed - Maneuver, anchore and unload area for transports and maneuver and deliver area for fire support ships.
2. Natural features -- Islands, shoals, kelp, nature of bottom,, ice.
3. Man made features - groins, piers, jetties.

b. Nearshore

1. Functions performed - Transport of landing force and maneuver area for smaller gunfire support ships and of landing craft.
2. Natural Features - Islands, shoals, reefs, rocks, kelp, littoral and rip currents, coral reefs, ice.
3. Man made features - Groins, jetties, seawalls, piers.

c. Foreshore

1. Functions performed - Beaching of landing craft and initial launch of landing force assault.
2. Natural features - Runnels, Kelp, Cusps, foreshore composition, ice.
3. Man made features - Groins, jetties, seawalls, piers

d. Backshore

1. Functions performed - initial maneuvering area of assault forces with major consideration to cover, concealment and trafficability.
2. Natural features - Berm scarps, beach ridges, backshore composition, exits.

e. Hinterland

1. Functions performed - Maneuver and offensive operations of troops with consideration to cover and concealment, ease of movement, observation, and routes of communication.
2. Natural features - Dunes, Marshes, Lagoons, Vegetation, Exits

SHORELINE PROCESSES

- .. A study of the geological changes that take place along the shoreline of a landmass are requisite for the Beach Intelligence Officer. While there is not a requirement that each Intelligence Officer be a geologist it is mandatory that he be familiar with certain terms and processes so he may make a more intelligent selection.
3. The changes that need be studied fall into two categories:
 - a. Long Term or geological changes.
 - b. Short term processes caused by wave, wind and surf.
3. Long Term Processes
 1. Principle agents are:
 - (a) Erosion
 - (b) Deposition
 - (c) Diastrophism (counter-balancing process or shifting of earths crust)
 2. Profile of Equilibrium
 - (a) A processes whereby water beating against a land mass will tear it away and as the process continues, part of the energy spent in eroding the land away is used in grinding up the rocks and in transporting the finer materials. Eventually a time will come when the work to do is increased while the power to do it remains essentially the same and an "Equilibrium" is reached.
 3. Terminology
 - (a) Certain terms that are used in describing particular configurations should be part of the Beach Intelligence Officers vocabulary when writing about or describing a certain beach area. A few of the more important ones are listed below:

(1) Tombolo	(5) Recurved spit
(2) Baymouth bar	(6) Cuspate foreland
(3) Bayhead bar	(7) Bay delta
(4) Looped bar	
 4. Types of Coastlines
 - (a) Emergent - land has been uplifted relative to sea level.
 - (b) Submergent - land has been submerged relative to sea level.
 - (c) Neutral - independent of either recent submergence or emergence

- (1) Coral reefs (fringing, barrier and atoll types)
- (2) Delta
- (3) Volcanic

. Short Term Processes

1. Three main agents of short term processes

- (a) Wave action
- (b) Wind
- (c) Currents

2. Wave energy (Two parts)

- (a) Static - due to the elevation of a wave or hydrostatic pressure.
- (b) Kinetic - battering ram, compression, suction and abrasive effects.

3. The amount of energy in a wave depends solely on its shape and size, but the force it may exert on any object depends on the shape and size of the object struck.

4. Changes caused by Waves

- (a) Refraction of waves effects erosion of beach areas
- (b) Longshore bars
- (c) Berms
- (d) Beach ridges
- (e) Cusps

5. Changes caused by Wind

- (a) Formation of sand dunes
- (b) Indirectly responsible for waves

6. Changes caused by Currents

- (a) Tidal currents - Erosion agent and navigational problem.
- (b) Littoral currents - Builds up bars and erode beach faces.
- (c) Rip currents - These are a hazard to personnel, may lesson surf in a restricted area.

BEACH TRAFFICABILITY

1. INTRODUCTION:

One of the most important factors in an amphibious operation is that of getting vehicles from the landing ship or craft across the beach and on to hard terrain.

The beach type is actually a long term result of the kind of waves, winds and currents to which it is subjected, and the supply and type of sediment available, subject to seasonal variations. Bars, cusps, gravel deposits, and minor forms appear and disappear rapidly and frequently. Hence the extreme importance of this transitory effect of the beach in amphibious operations, rather than its long term effects.

2. GENERAL:

Beach Trafficability is defined as the ability of a beach to sustain motion of wheeled and/or tracked vehicles.

The trafficability of any soil, in the ideal case, is dependent on (1) the soil having sufficient Bearing Capacity to support the vehicles, and (2), the soil having sufficient Traction Capacity to develop the resistance between the soil and the tire or track to provide the forward thrust necessary to overcome the Rolling Resistance. Actually, as the Bearing Capacity and Traction Capacity decreases, Rolling Resistance increases. When the Rolling Resistance equals the Thrust developed by traction between the treads and the soil, the vehicle is immobilized.

The trafficability of a beach is primarily related to the steepness of the beach face and to the moisture content of the sand. The flatter the beach face, the better the trafficability, and also, the greater the moisture content, the better the trafficability. Hence from this standpoint, a beach offers the most favorable conditions during a falling tide (using the wetted section) or after a heavy rain (when the normally dry berm has been wetted).

In addition, the trafficability of any given soil is different for practically every vehicle, tire or track pressure, load and driver.

The ability of a soil to develop adequate Bearing and Traction Capacity is primarily a function of the strength or Shearing Resistance of the soil. In considering Bearing Capacity, some of the settlement that occurs may be due to reduction of soil voids, but except in very loose deposits, this will be small. The majority of the settlement that occurs will be due to Plastic Flow, which in turn is preceded by a failure in Shear.

The behavior of a tire or track in obtaining traction off-the-road soil conditions is such that the treads dig into the top layer and tend to "shear" the soil. The ability of a soil to provide traction is directly dependent upon the point at which shearing will occur, in other words, upon the Shearing Resistance. Where a thin layer of very soft, weak soil overlies a hard soil, certain types of tires and tracks are not able to dig into the hard soil, and there is an apparent "lubricating" effect, so that no traction is developed. This condition is called, aptly enough, Slipperiness, and it is also a function of the Shearing Resistance of the weak layer.

When the Bearing Capacity is low, the vehicle settles and it is necessary for the vehicle to push soil out of the way in order to move. This increases the rolling resistance. If the layer through which the vehicle settles is soft, and has very little shearing resistance, it can be pushed away easily, and the vehicle will be able to move. But if it is stiff, it adds considerably to the rolling resistance.

Under certain conditions, some soils are "sticky" and will adhere to the tires and treads, and build up on the track rollers, which again increase the rolling resistance. This increase in rolling resistance is a function of the ability of the soil to adhere to the vehicle, and is called Stickiness. It is believed that the trafficability of a soil is dependent directly on the strength of the soil together with its stickiness characteristics.

The primary factors that determine the trafficability of sand are: Grain Size; Distribution and Roughness; Moisture Content; Compactness and Beach Slope. The latter is of double importance: (1) The normal effect of a grade of traffic, and (2) the fact that for a given type of beach material, the soil type is fairly well correlated with beach steepness (the coarser the sand, the steeper the beach).

Steep Gradient Beaches: Normally composed of coarse sand particles, pea gravel, or gravel.

Moderate Gradient Beaches: Normally composed of moderately fine sand with possibly a gravel berm at extreme high water mark.

Flat Gradient Beaches: Composed of fine sand, although on occasion, a gravel beach may be encountered at mouths of small streams.

3. STABILIZATION:

A great deal of research has been carried on by the U.S. Naval Research and Evaluation Laboratory at Port Hueneme, California concerning beach stabilization. Some of the early

experiments were the Thermitic Process; use of certain chemicals to stabilize mud; compaction of sand by resonant frequencies. The results of these tests were not favorable for one reason or another.

Research continued and finally Dr. Hans Winterkorn designed the aniline furfural method of stabilizing beaches. In this method the chemicals are mixed with beach sand by use of a mixing and spreading machine. A roadway 11 feet wide and 6 inches deep is laid at the rate of 17 feet per minute. The roadway will support light vehicle traffic in 2 hours and heavy traffic in 10 to 14 hours. The big advantage of this method is that careful moisture control is not required; this has been normally one of the stumbling blocks to good soil stabilization.

The following is a comparison of cost data using two types of material:

1. Aniline furfural, additives.
2. Portland Cement, Type III.

At Port Hueneme, various mixtures and different type mixing machines were tested with the following results:

Aniline Furfural	80.1%	80.1%
Pentachlorophenol	18.7%	18.7%
Aluminum Chloride	1%	1%
Curing time	24 hrs.	24 hrs.
Vehicle used	2½T	2½T
No. of trips	7	6
Gross load, tons	13.8	13.8
Road deflection	None	Slight
Road damage	Slight Abrasion	Slight Crack
Machine used	P&H Mixer	Pulvi-Mixer

By changing the mixture the following are the results:

Aniline furfural	73.2%
Pentachlorophenol	18.8%
Aluminum Chloride	1%
Pitch	7%
Curing time	48 hrs.
Type of vehicle	2½T
No. of trips	6
Road deflection & damage	None
Machine	Pulvi-Mixer

The conclusions drawn from the tests are that beaches can be stabilized to enable the continuous passage of vehicles for a considerable period of time before failure of the roadway requires reworking; materials can be varied by addition of pitch without materially affecting results; that more research

is necessary to get a type of mixing machine that will better meet requirements of the Amphibious Forces.

4. INSTRUMENTS:

Several small instruments, namely the Soil Truss and Cone Penetrometer were developed with the idea that they could be used by reconnaissance parties to determine trafficability. To date there has not been enough data collected along these lines to arrive at any definite conclusions.

BEACH INTELLIGENCE COURSE

MAN MADE OBSTACLES

Definition: All varieties of underwater, beach, and land obstruction made by man for the purpose of delaying, canalizing, or destroying enemy assault forces.

I. FUNCTIONS:

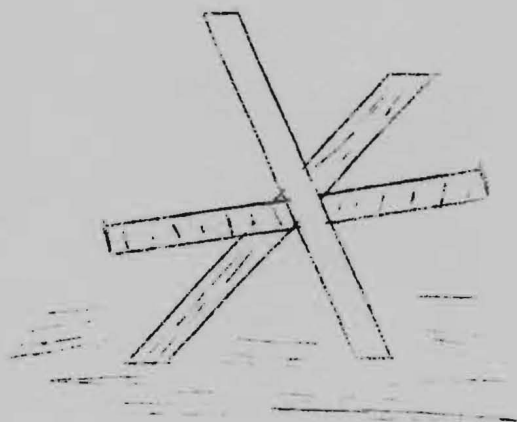
A. Assault Phase

1. Hold or delay attacking force on vulnerable beach areas and approaches to it, allowing defensive weapons to obtain maximum effect.
2. Canalize attacking forces (Landing Craft, Tanks, Personnel) toward strong points, areas of heavy overlapping crossfire and force them to cross mined areas or natural obstacles.
3. Destroy attacking craft and personnel and create confusion.

B. Build-up Phase

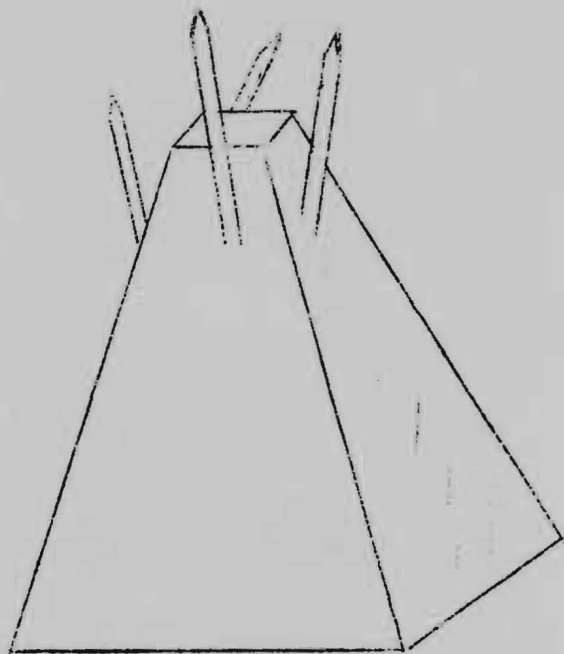
1. Maximum delay in clearing beach area, preventing landing craft from beaching on entire linear length of beach, retarding entire operation.

MAN MADE OBSTACLES



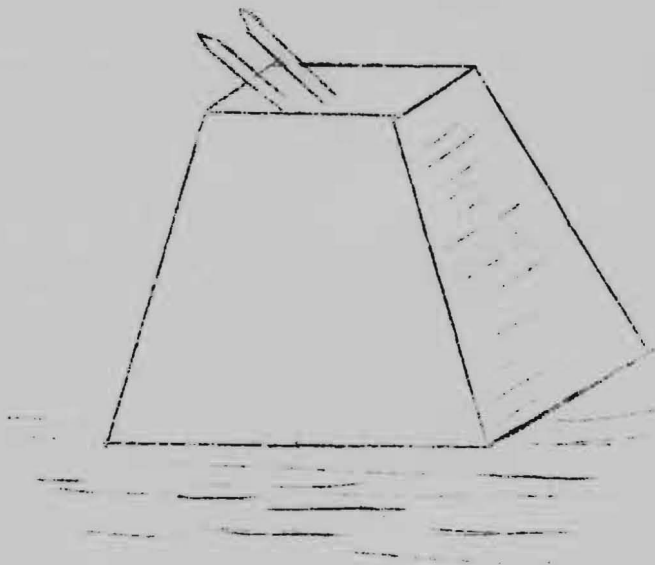
HEDGEHOG

Tidal or beach obstacle
Excellent anti-tank obsta



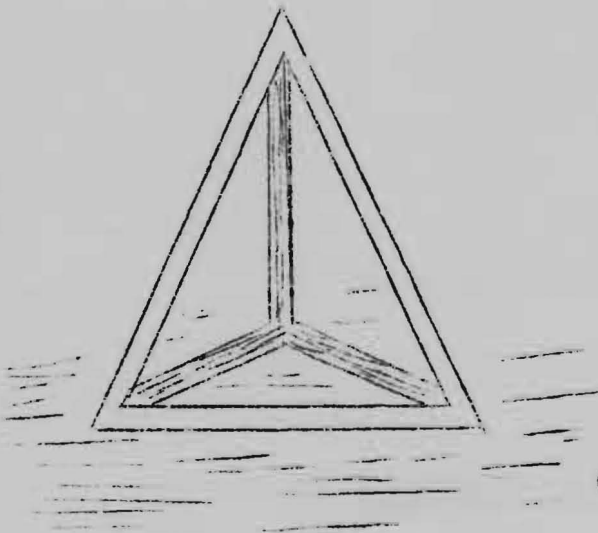
JAPANESE SCULLY

Anti-boat obstacle
offshore and tidal



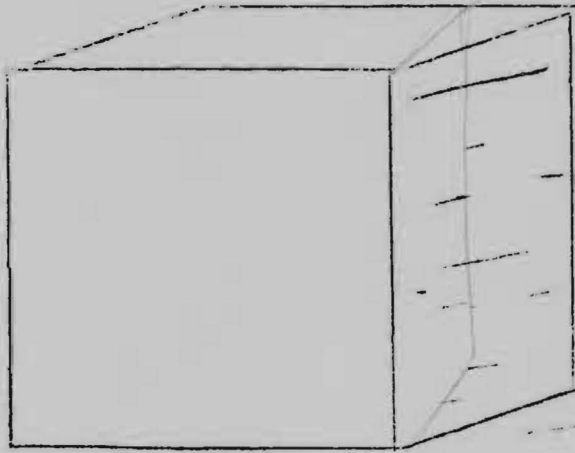
GERMAN SCULLY

Tidal Anti-boat
Anti-vehicle



TETRAHEDRON

Tidal & beach Anti-vehicle
Anti-boat, mined for person



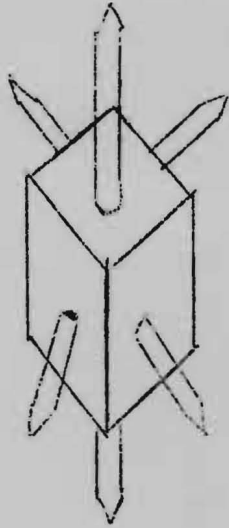
CUBE

Found at HWL
Anti-tanks & vehicle



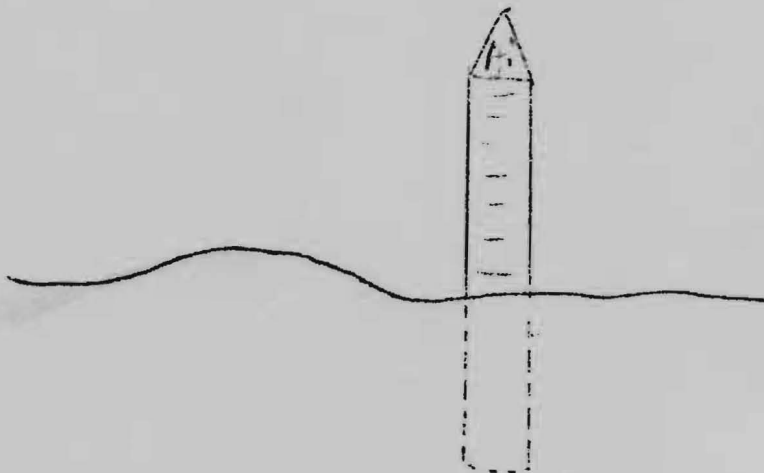
COFFIN

HWL Anti-boat
Anti-vehicle



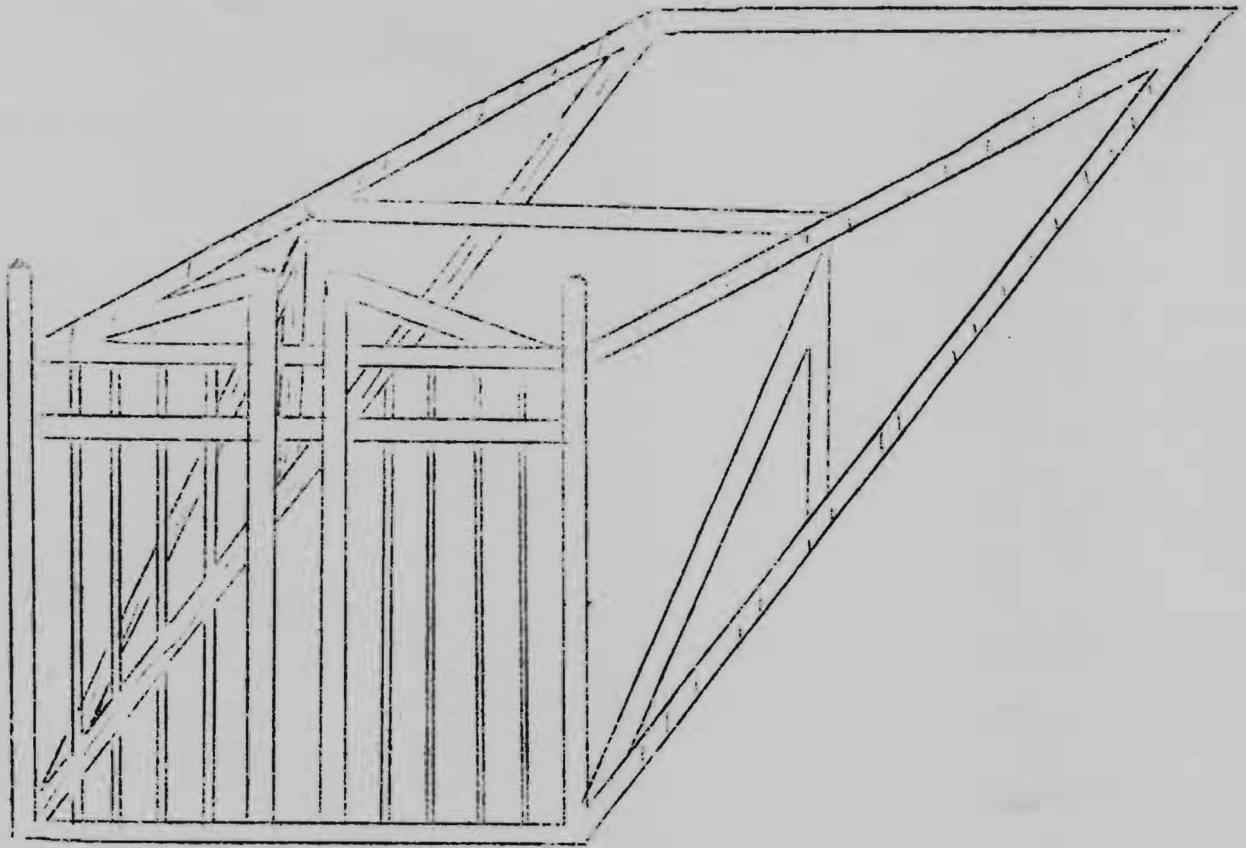
STAR

Beach & Tidal
Anti-boat or vehicle



STAKE

Anti-boat or personnel
Usually mined Tidal or
Offshore



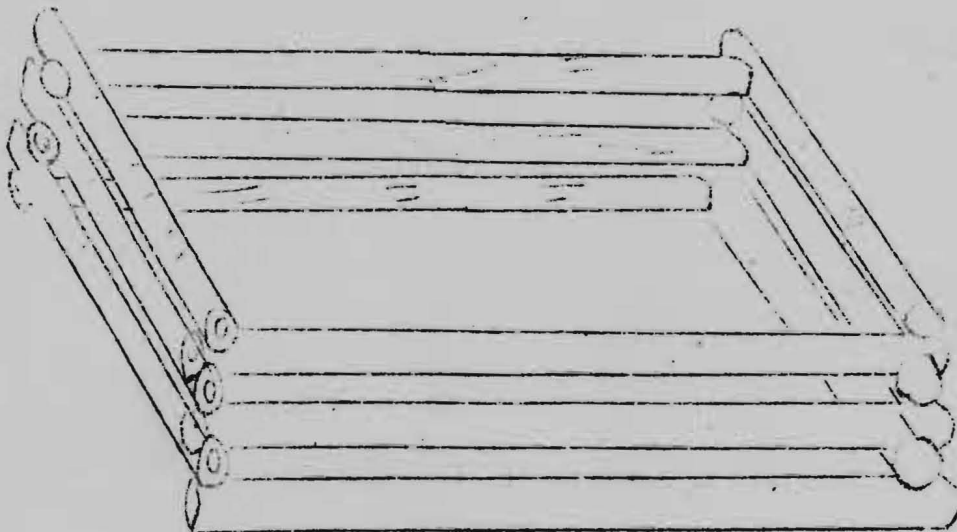
ELEMENT "C"

Belgin Gate, Beach -- Anti-tank



RAMP

Anti-boat Tidal



CRIB

Tidal Anti-boat or
vehicle

TERRAIN APPRECIATION AND ITS APPLICATION TO AMPHIBIOUS OPERATIONS

--Precis--

1- General

- a- The principles of terrain appreciation as deduced for land warfare are applicable to the amphibious assault.
 - 1- These fundamental principles remain unchanged when applied to amphibious warfare, but the degree to which their evaluation is affected by purely amphibious factors requires serious consideration and study.
- b- Terrain will have a definite influence upon choice of landing site, but its place in the scheme of decision comes after several other considerations;
 - 1- Possibility it offers for accomplish of the mission.
 - 2- Ability of naval forces to effect a landing in the vicinity of the objective.
 - 3- Study of enemy defensive situation in order to avoid landing against heavy resistance, if possible.
 - 4- After weighing the above factors, the remaining choice of the landing area will be governed by the configuration.

2- Compartments of Terrain

- a- Every terrain analysis is made on the basis of the following factors:
 - 1- Observation
 - 2- Fields of Fire
 - 3- Cover and Concealment
 - 4- Obstacles
 - 5- Routes of Approach and Communications
- b- Observation forms the natural basis upon which terrain may be divided into groups of features.
- c- Definition of Terrain Compartment: A terrain compartment is an area of more or less open terrain which is enclosed on at least two sides (opposite sides) by terrain features that limit terrestrial observation and hence limit observed fire into that area.
- d- Significance of Terrain Compartments.
 - 1- Although the division of the terrain into units or compartments is based upon observation, the real significance of the compartments is that from points outside of their boundaries, direct or observed fire cannot be brought to bear upon forces within the compartments.
 - a- Therefore, terrain compartments divide fire power into definite groups that cannot be combined.
- e- Terrain Corridors have their long axis parallel to line of attack.
- f- Terrain Cross- Compartments have their long axis perpendicular to line of attack.
- g- Influence of Terrain Compartments in Attack and Defence.
 - 1- All the advantage of terrain is seldom on one side. Defender desires flat, unbroken ground, whereas Attacker seeks a series of corridors which he can utilize to limit the lateral organization of enemy fire and so provide a better chance of defeating the enemy peacefully.

- 2- The general statement may be made that terrain corridors favor the attacker. The attacker therefore seeks and utilized corridors where they exist, and the defender avoids them if he can and utilizes any cross-compartments that are available.
 - 3- A tactical Locality is a terrain feature which affords observation and command over forward portions of the area.
 - 4- A Key Point dominates the entire area and commands the routes of communications. The issue of the battle usually turns upon its possession. It is not necessarily a terrain feature, but may be a city, woods, bridge, etc.
 - 5- The general statement can be made that the cross compartment is a defense feature that favors the defence and handicaps the attacker. However, a great superiority in supporting fire power on the part of the attacker may cause the defender to set up his main line of resistance on rear slopes.
- 3- Influence of Terrain Compartments on the Assignment of Command Areas and Boundaries.
- a- Influence of terrain corridors in Attack.
 - 1- Necessity of placing boundaries between units so that attacking units where possible will not be subjected to observed fire from outside their boundaries.
 - b- Influence of corridors in Defense
 - 1- Defense consists of a series of organized tactical localities, each prepared for an all-round defense. The lateral intervals should be short enough to permit these localities to be mutually supporting.
 - 2- As a general principle from the standpoint of the most advantageous use of the terrain, boundaries in defense should neither follow the edges of terrain corridors, nor the lines of probable approach, but should be situated somewhere between the two.
 - 3- Boundaries in Defense at longer infantry ranges are placed so that defending force where possible will not be subjected to observed fire from outside its boundaries.
 - 4- Boundaries in Rear Area in either attack or defense are influenced largely by the location of roads for the movement of supplies, and movement of troops and equipment.
 - c- Influence of Terrain Cross-Compartments on Boundaries in Attack and Defense.
 - 1- Is of minor importance in attack and defense, other factors, such as enemy dispositions, high points, vegetation, composition of ground, routes of communications, etc., will influence placement of boundaries since there are no terrain features that restrict lateral visibility.
- 4- Influence of Terrain Factors on Amphibious Attack.
- a- Effect of Terrain in Selection of Landing Site.
 - 1- General
 - a- Considerations other than terrain will effect the choice of the landing site, such as meteorology, hydrography, enemy dispositions, and proximity to the landing area of the objective, but in conjunction with these, terrain will play a dominant part.
 - 2- Governing Factors.
 - a- In selecting the landing area best suited to the accomplishment of the force mission, terrain features will generally be considered along the following lines:

- 1- Shoreline: from a terrain viewpoint, most desirable to land "convex", then "straight", and "concave" only if shoulders can be neutralized or occupied.
 - 2- Relief: most desirable ground is flat or gently rising backed by a definite coast range of such altitude and distance from the beach as to form a suitable mask for the landing area and so provide a good FBHL.
 - 3- Beachhead: precarious nature of an amphibious operation makes necessary all the maximum freedom from enemy interference that can be obtained during the landing and assault phase, and a beach with terrain inland which is not adapted to this is generally undesirable.
 - 4- Compartmentation: a beach should be sought which is backed by terrain divided into compartments of the proper size for the unit.
 - 5- Routes of Egress: a landing area must allow the force making the landing, or a subsequent force, to move out of the area generally included within the beachhead.
 - 6- Obstacles: Landing area should be selected to permit rapid movement of the initial waves inland to commanding terrain. Thus, an otherwise satisfactory beach area would be unacceptable if it were backed by any natural terrain obstacle.
 - 7- Vegetation: certain types of inland vegetation may form a serious obstacle; others may provide welcome concealment without impeding the progress of the landing.
- Routes to the Ultimate Objective: if a landing force is assigned a mission which requires its movement overland, subsequent to the landing, to an interior objective, it is obviously necessary that a landing area be selected which will permit an advance unobstructed by terrain, from seacoast to the inland objective.
- b- Effect of Terrain on Selection of Tactical Objectives.
 - 1- Three major considerations for selection of Beachhead:
 - a- Sufficient space.
 - b- Freedom from enemy small arms fire and ground observed artillery fire.
 - c- Defensibility.
 - 2- Requires selection of Force Beachhead Land, Objectives Short of FBHL, and Control Lines.
 - c- Terrain as an Obstacle.
 - 1- Because detailed knowledge of the terrain in a landing operation is much more limited than in ordinary land warfare, especially as concerns the smaller units, particular attention must be given to the natural obstacles which may be encountered,
 - a- Soft ground
 - b- Dense vegetation
 - c- Water obstacles
 - d- Relief
 - e- Cultivated areas
 - f- Towns and villages.
 - 2- The above natural obstacles must either be utilized to the advantage of the attacker, modified in their natural form, or avoided.
 - d- Effect of Terrain on the Employment of Supporting Arms.
 - 1- Naval Gunfire.

- a- In general, naval gunfire will prove most effective against well defined targets, or on rising ground with readily recognized preference points.
 - 1- Flat trajectories of naval gunfire will to a degree restrict firing over the heads of advancing infantry.. On beaches backed by an extensive flat plain, ships will have to fire from flanks, or at targets at considerable distance inland.
 - 2- Successive cross-Compartments generally parallel to the coastline and front of the attack greatly restrict naval gunfire support.
- 2- Close Air Support
 - a- A series of ridges running more less perpendicular to direction of attack permits maximum utilization of air support capabilities whereas parallel trending ridges restrict these capabilities.
- 3-
 - b- Air Support generally supplements NGF, but in case of successive crosscompartments parallel to line of advance, it will be more effective and thus more extensively utilized if available.
- 2- Field Artillery.
 - a- Direct support artillery should be landed as soon as possible in order to take advantage of its superior effectiveness, and relieve naval and air forces from the entire burden of fire support.
 - b- Commander must decide which of available beaches are best suited for landing of artillery, and how well the terrain inland lends itself to the efficient employment of field artillery.
- 4- Tank Support.
 - a- Terrain is a major limiting factor.
 - b- Good landing beaches backed by fairly open terrain characterized by gently rolling or gently rising ground, should present no difficulties to the employment of tanks. Such a situation offers unlimited possibilities for the effective employment of tanks in mass and should be exploited to the utmost.
 - 1- Extensive swampy, sandy, or boggy areas, and areas with thick vegetation hindering the observation and movement greatly restrict utility of tanks.
- c- Effect of Terrain on Logistical Support
 - 1- Logistical viewpoint desires terrain that is gently rising, relatively clear, and possessing firm ground with adequate drainage.
 - 2- A good network of roads running both axially and laterally is a prerequisite to the proper logistical support of a rapid tactical advance.
- 5- Influence of Terrain Factors in Defense Against Amphibious attack.
 - a- General
 - 1- Limited number of defensive troops which are usually available will generally preclude manning all possible landing sites in sufficient strength to prevent a landing.
 - a- A careful terrain study is necessary to determine the most probable landing sites, landing sites whose possession is vital to the defense, and landing sites whose loss would result in the most serious consequences.
 - 2- Probable landing sites are indicated by knowledge of the character of the vital areas, nature of probable enemy objectives, careful analysis of geographical and topographical features.

- b. Reconnaissance
 - 1. Defensive phase may follow immediately after offensive seizure, however, the defense practically always has the advantage of greater opportunities for reconnaissance.
 - 2. Study of the theater indicates ~~total~~ areas or probable objectives of enemy forces.
 - a. Detailed terrain study indicates possible and most likely landing sites.
 - b. Direction of attack and scheme of maneuver as influenced by the terrain will be indicated.
 - c. Study of terrain in vicinity of probable landing sites will determine number and types and dispositions of defensive troops, and installations which can properly and profitably be employed there.
 - d. Having predicted probable objective points, landing places, and directions of attack reconnaissance should then determine the beachhead and primary objective of the landing force.
 - 3. The more uncertain the military situation, the greater the dependence upon reserves in the defense plan.
- c. Hydrographical and Meteorological Features and Obstacles.
 - 1. Surf and tidal conditions operating on beach and offshore gradient and adverse wind and weather conditions can be a definite hindrance to a landing operation and may preclude landing in certain places.
- d. Effects of Configuration of the Coast Line.
 - 1. Facility with which coastlines can be attacked will depend upon their configuration, extent, vulnerability, and shape of the area they enclose or border.
 - 2. The coastlines of a country will generally be found irregular in outline, clearly defined by salients and re-entrants.
- e. Beaches.
 - 1. If defender of a coastline is able to estimate enemy's objective he can make definite arrangements for those beaches located most adjacent to the objective. This is particularly true if objective is near the coast. If objective is inland, defender should concentrate on securing and protecting lines of communications to objective from the shoreline.
- f. Terrain Inland.
 - 1. Topographical nature of the ground immediately overlooking the beaches and further inland will greatly influence the choice of landing places and will also modify the methods and effectiveness of the shore defense.
 - 2. Ground immediately inland from beach that is little raised above sea level is best, as it greatly lessens the effectiveness of naval gunfire while still permitting organization of defensive fires. However, a lack of observation.
 - 3. Unless shoreline to be defended is very short with a very few useable landing sites, the defensive situation will usually require an extremely flexible and mobile defense.
 - a. Defense forces disposed in depth with proportionately large organized reserves held centrally located with reference to vital areas.

Summary:

In order to summarize it might be well to state here what would constitute an ideal landing beach, and one which the defender would feel incumbent upon himself to defend under any circumstances. Such a beach would have adequate water in front to permit beaching the boats close in to the shore line and thereby obviating the necessity of wading ashore; it would furnish shelter against sea and surf; good anchorage for transports should be available off shore, with deep water close in allowing the transports to stand-in, thereby decreasing the time the troops are exposed in small boats while moving to the shore; the strand itself should be firm, thus facilitating the forward movement of artillery and wheeled transport; it should be devoid of natural cover for the defense and sufficiently extensive to permit the rapid deployment of the landing waves, and the clearing of the beach by troops as they land in successive echelons; its configuration should be such as to allow the employment of overhead and flanking fire, preferably the latter, by supporting ships. It is readily appreciated that few beaches will possess all these requisites; and even if all of the above conditions are not present, the defender will not fail to use special measures to guard a locality so tempting to the attacker and dangerous to the defender.

SECTION D

COLLECTION AND DISSEMINATION OF BEACH INFORMATION

Tide and Current

Amphibious Reconnaissance Patrols

Submarine Reconnaissance

Underwater Demolition Team Reconnaissance

Sources of Intelligence

Beach Interpretation, Photographic

Aerial Photo Interpretation

Beach Reconnaissance Exercise

BEACH INTELLIGENCE I-3

Tides & Currents

I. DEFINITIONS:

- A. Tide - vertical rise and fall
 - 1. High water
 - 2. Low water
 - 3. Stand - point of no vertical change
- B. Current - horizontal movement
 - 1. Flood - toward shore
 - 2. Ebb - away from shore
 - 3. Slack - no movement
 - 4. Set - direction
 - 5. Drift - velocity

II. CAUSE OF TIDES:

- A. Moon
 - 1. Attraction on water of earth
 - 2. Greatest tide producing force
- B. Sun
 - 1. Effects similar to moon
 - 2. $\frac{2}{5}$ effect of moon's force

III. TYPES OF TIDES:

- A. Semi-diurnal - two highs and two lows daily
- B. Diurnal - One high and one low daily
- C. Mixed - combination of one and two
- D. Sun and moon combination produces:
 - 1. Spring tides

2. Neap tides
3. Perigee tide
4. Apogee tides

IV. MEASUREMENTS:

- A. Personal observation
- B. Mechanical recorders
 1. Portable automatic gage
 2. Automatic gage for long period observations

V. PREDICTION:

- A. Tide predicting machine
 1. Possible to predict times and heights of tides for any port and any year.

VI. CURRENTS:

- A. Tidal - follows generally types of tides
 1. Reversign - i.e., flow in channel
 2. Rotary - i.e., offshore
- B. Non-tidal
 1. Permanent
 - a. Gulf stream
 - b. Equatorial current
 - c. Japan current
 - d. River current due to discharge of water
 2. Temporary
 - a. Caused by meteorological changes

VII. MEASUREMENT:

- A. Log line and pole

B. Mechanical Meters

1. Price Current Meter
2. Roberts Radio Current Meter

VIII. TIDE TABLES - Published annually

- A. Table 1 - Reference Stations, daily predictions
- B. Table 2 - Subordinate Stations
- C. Table 3 - Interpolation table for height of tide at a particular time.
 1. Duration of rise and fall
 2. Range or height difference
 3. Time difference between desired time and nearest high or low tide.

IX. CURRENT TABLES - Published annually

- A. Table 1 - Reference Stations, daily predictions
- B. Table 2 - Subordinate Stations
- C. Table 3 - Interpolation table for obtaining velocity at a particular time
 1. Interval between slack and desired time
 2. Interval between slack and maximum or minimum current

Amphibious Reconnaissance Patrols

- A. To familiarize students with missions, capabilities, and limitations of Amphibious Reconnaissance Patrols.
- B. References:
 - 1. NWP 22 - Amphibious Operations
 - 2. LFM 15 - Amphibious Reconnaissance
- C. Types of patrol actions
 - 1. Combat
 - 2. Reconnaissance
- D. Amphibious Reconnaissance CO, FORCE TRCOPS, FMF
 - 1. Organization, Hq and 4 Recon. Plats.
- E. Operational Employment
 - 1. Information collected
 - a. Hydrographic
 - (1) Depth
 - (2) Nature of bottom
 - (3) Surf
 - (4) Current
 - (5) Tide
 - b. Offshore obstacles
 - (1) Reefs
 - (2) Sandbars
 - (3) Rocks and shoals
 - (4) Seaweed
 - (5) Man made obstacles
 - c. Beach description
 - (1) Geographic location
 - (2) Extent
 - (3) Composition and consistency
 - (4) Gradient
 - (5) Natural obstacles
 - (6) Routes of egress
 - (7) Dispersal and storage areas
 - (8) Inland limit of beach

d. Description of terrain inland of
and adjacent to beach

- (1) Critical terrain features
- (2) Landmarks visible from seaward
- (3) Natural obstacles

e. Enemy defenses

- (1) Along beach
- (2) Inland defenses

3. Miscellaneous Missions

- a. Capturing enemy personal
- b. Contacting informants
- c. Special operations

- (1) Raids
- (2) Sabatage
- (3) Minor demonstrations
- (4) Marking beaches
- (5) Path finder

F. Embarkation by special means

1. Submarine ASSP
2. APD
3. Aircraft

G. Debarkation

1. Rubber boat
2. Swimmers

H. Reports

1. Immediate
2. Follow up

SUBMARINE RECONNAISSANCE

1. Features of submarines, favoring reconnaissance missions.
 - a. Ability to submerge and therefore approach hostile territory undetected.
 - b. Seakeeping qualities, can ride out severe storms.
 - c. Extremely long cruising range.
2. Submarine Reconnaissance Missions.
 - a. Visual Reconnaissance
 - (1) Observation through periscope.
 - (2) Comments of observer are recorded.
 - b. Photographic Reconnaissance
 - (1) Still or movie shots.
 - c. Reconnaissance by landing party
 - (1) Landing and withdrawal of patrol.
 - (2) Land or pick up agents.
 - (3) Recover or rescue personnel.
 - d. Minefield Reconnaissance
 - (1) Detection, of mines and minefields by Sonar.
 - e. Radar Reconnaissance
 - (1) Detection, interception, location of enemy radar.
 - f. Weather Reconnaissance
 - (1) With meteorological personnel and equipment, subs can obtain meteorological data from critical points in enemy water.
 - g. Hydrographic Reconnaissance
 - (1) Locate and describe aids to navigation.
 - (2) Determine current and tide conditions.
 - (3) Discover errors in hydrographic charts.
 - (4) Determine thermal gradients offshore.
 - (5) Investigate and locate underwater obstacles (when UDT personnel accompany missions).
 - h. Scouting
 - (1) To detect and trail enemy fleet movements.

D-6

COMPHIBTROUPEX - USS ELDORADO

URGENT

302115Z/87

2252KC-SECRET

FROM: USS SPEARFISH
TO: CTF 51

DRIL X THIS IS TOP SECRET X REPORT OF RECONNAISSANCE NORTHWEST HARBOR
SAN CLEMENTE ISLAND PAREN POSITION THIRTY THREE DASH FOUR NORTH ONE
HUNDRED EIGHTEEN DASH THIRTY SEVEN WEST PAREN X SWELL FROM WEST X
HEIGHT EIGHTEEN INCHES X WAVE LENGTH SEVEN HUNDRED FEET X PERIOD TWELVE
SECONDS X WIND WESTERLY X FORCE THREE X NO MINES OR MAN MADE OBSTACLES
OBSERVED X APPROACH AREA CLEAR X LOW FLAT ISLET RIGHT FLANK BEACH X
EXTENSIVE KELP HAZARIOUS TO JEEP DRAFT VESSELS TO TWELVE FATHOM LINE
X BOTTOM SANDY X GOOD HOLDING GROUND X BEACH FLANK MARKED BY ROCK CLIFFS
X ROCK SCARP EXTENDS ACROSS BEACH X TWO BREAKS IN CENTER X PHOTOGRAPHS TO
BE FORWARDED X DRILL X

TOR: 1134Z/26 AUG 45

302115Z/87

ACTION: INTELLIGENCE

UNDERWATER DEMOLITION TEAM RECONNAISSANCE

I. Objective: To show the coordination which must exist between UDT and Staff Intelligence in the obtaining and dissemination of intelligence pertaining to the approaches of a landing beach.

II. Planning:

1. Information required from staff intelligence sections.

- a. Photographic coverage.
- b. Charts and maps
- c. Known intelligence

Above information should be delivered to UDT as soon as possible to allow for planning.

2. UDT operation plan and/or Annex.

- a. Reconnaissance time schedule - Must be rigid & inflexible
- b. Supporting arms must be closely controlled.
- c. Base charts - Location of landmarks, grid charts, etc.

III. Reconnaissance

1. Types:

a. Combat reconnaissance

- (1) Swimmers estimate method
- (2) Line controlled reconnaissance method.

b. Administrative reconnaissance

- (1) Similiar to line controlled method, however, is conducted from beach.

2. Purpose:

- a. Selection of landing beach
- b. Diversionary reconnaissance - UDT or BJU may be used.

IV. Interrogation of swimmers

1. Boat officer

- a. Swimmer Reconnaissance questionnaire given to swimmers.
- b. Makes preliminary interrogation.

2. Team Intelligence Officer.
 - a. Correlation of information.
 - b. Compilation of all questionnaires.
 - c. Detailed interrogation.

V. Reports

1. Summary despatch - General statement of feasibility of landing.
2. Written - Complete beach report.
3. Charts - Hydrographic chart of entire beach.
4. Oral reports - Surf observations, chart interpretation.

VI. Dissemination of reports

1. UDT to Advance Force Commander - if under Advance Force operational control.
2. A.T.F. staff intelligence section.
 - a. To all Force and Unit Commanders concerned.

VII. Capabilities of one (1) UDT - 100 men & 20 Officers.

1. Hydrographic reconnaissance.
2. Assist in landing raiders & agents.
3. Penetration of bays, rivers, etc.
 - a. Surface
 - b. With SCUBA
 - (1) Net cutting, demolition, etc.
 - (2) Limpeteer operations
4. Breaching of minefields
5. Inland reconnaissance & demolition
6. Destruction of port facilities
7. Surf reports.

VIII. Limitations - One Team (20 officers & 100 men)

1. Explosives difficult to carry in water
2. Preparation time & fatigue
3. Temperature of water
4. Communications
5. Darkness
6. Radio active water

UDT RECONNAISSANCE QUESTIONNAIRE

BEACH _____ SWIMMER PAIR NUMBER _____ DATE _____

Time entered water _____ Left Water _____ Names _____

1. Condition of sea from drop point to surf line: Calm (less than 1 ft.) _____ smooth (1-2ft) _____ Slight (2-3ft) _____

Moderate (3-5ft) _____ Rough (5-fill in)

2. Current outside breaker line: Direction _____ Velocity _____
Knots _____

3. Distance from 1st breaker line to HWM: _____ yds.

4. Type of breakers: Spilling _____ Plunging _____ Mixed _____
None _____

5. Average height of breakers _____ ft.

6. Maximum height of breakers _____ ft.

7. Period in minutes between series of high breakers: _____

8. Number of lines of breakers: _____

9. Distance from HWM to breaker lines: 1 _____ 2 _____ 3 _____ 4 _____

10. Time interval between breakers: _____ sec.

11. Breaker angle with respect to beach: Quartering _____
Parallel _____

12. Current inside breaker line: Direction _____ Velocity _____
Knots _____

13. Type bottom at one fathom curve: _____

14. Rip Tides Present? Yes _____ No. _____

15. Is there a sandbar: Yes _____ No _____

16. Composition of beach:

A. Sand _____ Shells _____ Pebbles _____ Lava _____ Rocks _____

B. Very fine _____ Fine _____ Medium _____ Large _____

RESTRICTED

17. Shape of beach: Straight_____Curved_____Cusped_____

Other_____ (This applies to your swimmer land only)

18. What kind of vehicles will it support: Tracked_____

Wheeled_____

19. Obstacles, underwater (describe number, type, size, location, depth of water over and estimate of explosives required to remove.):

a. Natural

b. Man-made

INTELLIGENCE SOURCES OF INFORMATION

I. INTRODUCTION.

- A. Collecting agencies are the means employed to gather information. Collecting agencies may be individuals, instrumentalities, or units that gather information by research, observation or survey, or by interrogation of a source.
- B. The source is the actual origin from which the information is obtained. The source may be an agency, person, thing, or action from which information is received.
- C. Collection can best be carried on in time of peace. During a war the number of available sources are greatly reduced. In general, the following is a breakdown of information coverage:
 - 75% of information is obtained from overt sources.
 - 15% is obtained from clandestine methods, and
 - 5% by deduction.
 - 95% is as complete as possible. The last
 - 5% exists in the mind of the leaders.

II. AMPHIBIOUS INTELLIGENCE IS OBTAINED FROM THREE TYPES OF SOURCES:

A. Departmental--various established naval, military, and government agencies.

- 1. Central Intelligence Agency - established to coordinate the governmental intelligence effort.
- 2. Liaison with friendly powers.
- 3. Governmental departments (other than Defense, i.e., State, Justice, Commerce, etc.)
- 4. Mapping services.
- 5. Foreign press and radio.
- 6. American press (New York Times, Christian Science Monitor, National Geographic Magazine, etc.)
- 7. American commercial firms (banks, insurance, oil, etc.)
- 8. Former residents of foreign countries.
- 9. Operating Forces.
- 10. Various special missions (i.e., ECA, Military missions, UN commissions, etc.)
- 11. Clandestine agencies.
- 12. Department of Defense.

B. Reconnaissance--physical sources.

- 1. Aircraft - visual or photographic, for hydrography and terrain information.

2. Surface and subsurface vessels - visual and photographic, for hydrography, meteorology, general shore and off-shore conditions.
 3. Underwater demolitions teams - hydrography and beach information.
 4. Amphibious reconnaissance patrols - terrain information, enemy strength, defense installations.
- C. Non - reconnaissance sources--sources of opportunity.
1. Prisoners of war.
 2. Captured documents and material--e.g., order of battle, etc.
 3. Civilian and refugee groups--corroboratory information.
 4. Communications intelligence units--analyze volume of traffic, codes.
 5. Coast watchers--ship and air traffic, enemy movements.
 6. Agents--all types of information, behind enemy lines.
 7. Technical teams and specialists--mine experts, engineers.
 8. Theater meteorological units--air, surface, subsurface.
 9. Hostile or neutral press and/or radio--must be corroborated by or in corroboration of other sources.
 10. YOU - "intelligence consciousness" of overt collection.

III. USES OF INTELLIGENCE.

A. Peace

1. Planning foreign policy on national levels.
2. Basis for military policy as an instrument of foreign policy in measures short of war.
3. Planning and preparing for possible war.
4. Building up backlog of available information for military forces in event of war,

B. War

1. Strategic-planning conduct of war, and international policy at high levels.
2. Operational - basic background information for planning.

IV. PRODUCTS USEFUL IN AMPHIBIOUS INTELLIGENCE.

A. Primary.

1. National Intelligence Surveys.
2. Coast and Landing Beach Reports.
3. Strategic Engineering Studies
4. Port Studies.
5. Terrain Studies.
6. Theater Studies.
7. Handbook of Enemy Armed Forces.
8. Intelligence Periodicals.
9. Objective Folder Programs.

B. Secondary.

1. Monographs.
2. Maps.
3. Climatological Files.
4. Hydrographic Publications, such as:
 - a. Charts.
 - b. Sailing Directions.
 - c. Tide and Current tables.
 - d. Nautical almanacs.
 - e. Oceanographic Studies.
5. Atlases and gazeteers.
6. Photographs.
7. Special studies of all types.

AERIAL PHOTOGRAPHY

I. Introduction

A. As a source of intelligence aerial photography is one of the best available to the Amphibious planner.

II. History

A. First aerial photography was taken in France from a ballon in 1858.

B. The Union Army during the Civil War utilized aerial photography from balloons.

C. During World War I aerial photography obtained by hand held cameras was used but little operational use was made of it.

D. Aerial photography came into its own during World War II and accounted for over 80% of all operational intelligence. The Photographic Interpretation Center at Washington D. C. was established in 1942 and has graduated hundreds of trained personnel for duty to the fleet in this very important intelligence source.

E. The Korean War brought about an acute need for trained aerial photographic interpreters and PIC trained large numbers of personnel for intelligence duty. Nearly 90% of all operational intelligence was obtained from aerial photographs.

III. Basic types of Aerial Photographs.

A. Vertical - has less than 3° tilt.

B. Low Oblique - tilted from the vertical and does not show the horizon.

C. High Oblique - tilted from the vertical and shows the horizon.

IV. Special types of Aerial Photography.

A. Sonne - a continuous strip method used for low altitude beach reconnaissance.

B. Stereo Pair - merely two verticals that have been taken with overlap and shows similar detail (60% is a preferred overlap).

- C. Color - has limited use due to cost, storage, exposure and reproduction qualities.
- D. Camouflage Detection Film - sensitive to certain colors to show up artificial camouflage.
- E. Radar Scope - has limited use - is photograph of a radar scope.
- F. Tri-Metragon - two high obliques and a vertical arranged so the obliques overlap the vertical to show horizon to horizon coverage.
- G. Night Photography - camera rigged to a light bomb to show night maneuvers and other activity.

V. Use of Aerial Photographs

- A. Used to construct new maps and correct old ones.
- B. Used to make mosaics (controlled and uncontrolled).
- C. Make studies of enemy potential, industry, forces in the field, beach studies.
- D. Civilian uses:
 1. Lay out new townsites
 2. Proposed roadways
 3. general city planning
 4. Map making

VI. Advantages of photo over a map.

- A. Great detail
- B. Ease of procuring
- C. Up to date
- D. Accurate

VII. Advantages of map over a photo.

- A. Important features may be obscured by detail
- B. Relative relief is not readily apparent on a single photo.
- C. Distortion of a photograph due to tilt, paper and changes in elevation.
- D. Lack of marginal data and lack of contrast

VIII. Identification of Objects.

- A. Due to being used to seeing objects from a horizontal perspective objects viewed vertically are sometimes hard to identify. In a stereo pair due to parallax and magnification of the stereoscopes objects will appear slightly distorted in size. This difficulty will disappear with experience.
- B. Methods of identifying objects on aerial photographs are: shape and pattern, Relationship to surrounding objects, shadow, size, relative tone, and comparative coverage.

METHODS OF DETERMINING SCALES OF AERIAL PHOTOGRAPHS

There are three important and simplified methods of determining scales of aerial photographs to be used successfully in photographic interpretation.

Many things such as lens distortion, unknown, variations in altitude of the aircraft, tip and tilt of the aircraft, and dull poorly processed prints add to the difficulties in determining the scale of the photographs. However, these difficulties can be successfully overcome by simple methods which give accurate enough results in this work.

Method Number 1

The relation between the altitude of the aircraft and the focal length of the camera gives a ratio of the legs of similar triangles to determine a photographic scale.

Assuming the aircraft is flying at an accurately determined altitude and parallel to the earth's surface taking pictures with a camera of known focal length, a relation can be set up as follows:

Scale of the Photo $\frac{\text{Focal length of the camera in inches}}{\text{Altitude of the aircraft in feet} \times 12}$

$\frac{\text{Focal length of the camera in inches}}{\text{Altitude of the aircraft in inches}}$

$\frac{12''}{21000 \times 12}$

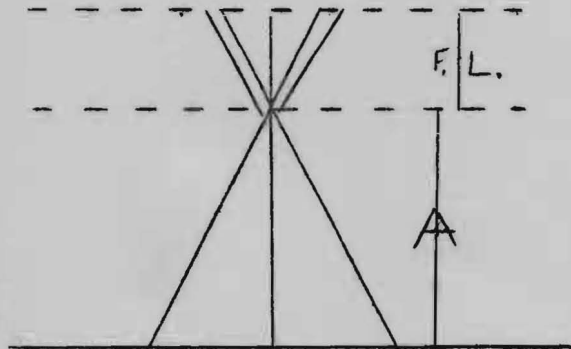
Note: Now divide the numerator and the denominator by (12'') to reduce the fraction to a ratio of simplest proportion.

Scale of the Photo: $= \frac{1}{21,000}$

Formula: $S = \frac{F \cdot L}{A \times 12}$

Explanation of Scale:

1/21,000 means one unit of measurement on the photograph, map or chart is equal to 21,000 units of measurement on the ground



Method Number 2

The second method is to use objects of known dimensions for a comparative method in determining the scale of photograph.

Such objects as football fields, baseball diamonds, tennis courts, railroad tracks, etc., can be used when their exact measurements are known. Following is a partial list which may be of assistance.

Football field (Collegiate)	360'	from goal to goal
(Professional)	300'	from goal to goal
Baseball diamond	90'	between bases
	62'	from pitcher's mound to plate.
Tennis Court.....	78'	from base to base
	36'	wide (doubles)
Railroad tracks (American)...	4' 8"	
Cocconut trees.....	Usually 10 meters	between trees (390" or 32.5')

Example:

Take a baseball diamond as an object of known dimensions. From ground information we know that the distance between bases is 90' and that the distance from the pitcher's mound to home plate is 62'.

$$\text{Scale of the Photo} = \frac{\text{Photo Distances}}{\text{Ground Distance}}$$

On the photo the distance between the mound and the plate is approximately .003'. By dividing 62 by 3 we arrive at a value for .001' of 20,666'. By converting .001 to unity (1) we arrive at a scale of 1/20,666.

Whenever possible, however, it is advisable to use as long an object as possible (said object to appear on a single photo) as the accuracy of this method is limited by the accuracy with the scale can be read in making a measurement.

Method Number 3

The third method and probably the most accurate, if you have a reliable map of the area, is the comparison of distances on the map to corresponding distances on the photograph.

Example:

Use the photograph and chart furnished you. Using the following formula, compute the scale of the photo.

$$\text{Scale of photo} = \frac{\text{Distance on photo} \times \text{Scale of map}}{\text{Distance on map}}$$

I. Method #1 ($S = F.L./A \times 12$)

A. Advantages

1. Speed in determination where measurement need not be to accurate.
2. Simple to compute.

B. Disadvantages

1. Variation in height of aircraft during flight.
 - (a) The aircraft may vary as much as several hundred feet and the entire sortie will be recorded as one continuous altitude.
2. Tip and tilt of the aircraft during a flight causes distortion.
 - (a) Tip is the variation of the long axis of the fuselage of the aircraft with the horizontal.
 - (b) Tilt is the variation of the short axis of the fuselage of the aircraft with the horizontal.

II. Method #2 (Ratio of Photo Distance to Ground Distance)

A. Advantages:

1. Useful when no other information is available to determine scale; and to check method #1.

B. Disadvantages:

1. Distortion of the photographic causes inaccuracy in measurement. The nearer the center the object is, the more accurate the measurement will be.

III. Method #3. (Computing scale by ratio of a measured distance on a reliable chart to a measured distance on the Photo)

A. Advantages:

1. Very accurate method where the map or chart that is used is reliable and fairly recent.

B. Disadvantages:

1. Maps or charts of the same area on the photograph must be available.
2. Maps and charts of the area should be recent and accurate as possible.
3. Shorelines change with time and man made features are not permanent.

DISTORTION CAUSED BY HEIGHT OF AIRCRAFT
TILT, AND MECHANICAL DIFFICULTIES

I. Variation of Heights

Maps and charts show the positions of objects as projected vertically upon a know datum, usually mean sea level.

A photograph shows the positions projected through a single point, namely, the lens. Since it rarely happens that perfectly level ground is encountered, it is evident that the effect of prospective will be present in aerial photographs due to ground relief. Thus elevations above a datum plane will be photographed on a larger scale and displaced radically away from the center.

II. Tilt

Tilt must be kept to an absolute minimum, especially in photographs of rough areas. There is a means of correcting for tilt that is used in aerial surveying and mapping work. This process is quite tedious and requires a WILD (pronounced VIILT) machine or a multiplex projector type mechanism in determining accurate scales, distance, heights, and in contouring topography in tilted photographs.

Not only is this process tedious, but it is very expensive and the instruments are too large and bulky to be moved successfully from place to place.

Tilt of photographs can be kept to a minimum by the pilot, not to exceed 3 or 4 degrees. Therefore, in aerial photographic interpretation with no more degree of error than this, satisfactory results can be obtained for interpretation purpose.

III. Photographic and Mechanical Errors.

The errors caused by motion in the lens system and the irregular distortion of film and paper and minute and can be ignored in ordinary photographic interpretation work.

PHOTO INTERPRETATION

TABLE OF PHOTOGRAPHIC SCALES FOR USE IN PLANNING RECONNAISSANCE MISSION

SUBJECT	BREAKDOWN	MIN. SCALE FOR DETAIL INTERPRETATION	MIN SCALE FOR IDENTIFICATION
Mapping	Units above 200'	1/10,000	1/20,000
	Units less 200'	1/5,000	1/15,000
Mapping facilities	Harbors and Ports	1/10,000	1/60,000
	Shipbuilding	1/10,000	1/30,000
Electronics	Radar	1/5,000	1/10,000
	Direction Finders	1/5,000	1/15,000
Sensors	Coastal Defense	1/5,000	1/20,000
	Heavy Anti-Aircraft	1/5,000	1/20,000
	Light Anti-Aircraft	1/5,000	1/10,000
Observations	Strong Points	1/5,000	1/10,000
		Obstacles	1/2,000
	Barbed Wire	1/5,000	1/10,000
		Low obliques	
	Trenches	1/10,000	1/15,000
		Pill Boxes	1/5,000
Low obliques			
Station	Type of Vegetation		1/20,000
Terrain	Type of Beach	1/10,000	
	Terrain behind beach	1/15,000	
	Type of Roads	1/5,000	

3. Identification of camouflaged or concealed installations ordinarily requires scales in excess of those given above. In such cases low oblique photography is recommended. Additional information may be obtained by consulting the Interim PHOTOGRAPHIC INTERPRETATION HANDBOOK (VAER 10-35-500).

TILTING AERIAL RECONNAISSANCE, MAPPING AND CHARTING PHOTOGRAPHY

Sample:	Negative No.	Service	Squadron and Detach.	Sorte and Run No.	Date	Focal Length	Altitude	Camera Position and Angle	Geog. Coord.	Kind of Photo	Time	Descrip. Title	Classif.
100	USN	VC-61(CV-45)		256/2	10 Nov 51	12"	20,000	V 75°	300 W	R	1300	BAH	RESTRICTED

scrip. Data

- REMARKS: (1) Camera Position and Angle.- The position of the camera making the exposures shall be identified as follows: V-Vertical; VR-Vertical Right, VL-Vertical Left for Split Vertical Installation. OR-Right Oblique; OL-Left Oblique; ON-Nose Oblique; OT-Tail Oblique.
2. Kind of photography will be indicated only when other than conventional black and white or color film is used. (R-Infrared; N-Night; M-Mirror; NR-Night Infrared; CD-Camouflage Detection).
3. Time.- Greenwich Civil Time.
4. Descrip. Title.- Designation area symbol not to exceed three letters (BAH) indicating the Bahama project.

The above titling data is required on the first and last exposure of each roll or run. The first seven items are required on intermediate exposures.

D-23

GROUND PHOTOGRAPHY

I. PLANNING THE PHOTOGRAPHY:

A. General:

In planning a photographic itinerary, it is helpful to know in advance what subjects you may encounter. Determine the features to be photographed and shoot them as you see them. Try to keep the field of view unobstructed. If you cannot get the best view, get the next best. Concentrate primarily upon getting a good, clear photograph. Detail you are unable to observe will stand out sharply for the interpreter.

There are two important steps in planning photography:

a. Analyze the subject of the photography: What is it? Where is it? How big is it? How many exposures will be required? What kind of view will reveal the most information? From what point should each view be taken?

b. Record the map location of each camera position by means of an overlay of your itinerary.

B. Analyzing the Subject:

Pin-point the subject. Each series of exposures should include a known geographic feature, a cultural monument, or a recognizable part of a town or port area. If the subject is not adjacent to a landmark, use panorama. Frame the landmark and sweep the camera through successive, overlapping exposures, until the subject is framed. Often a panorama through 360° is very useful, in that the photographic interpreter can lay out the panorama, make a location template, and correlate bearings or position to aerial coverage or chart compilations.

C. The Map Overlay or Itinerary:

Do not put the camera away after photographing the major activity. Cover other subjects and mark camera position and exposure number as shown on the accompanying overlay. Choose the scale of map best suited to show the itinerary. In a city or highly developed area, use 1: 10,000 to 1: 50,000. For an extended trip, use 1: 100,000 to 1: 5,000,000.

Keep the overlay simple. It will eliminate any doubt concerning location or geographic coordinates, unless the map information is sketchy or inaccurate. Be sure to give complete titling information of the map used for reference.

D. Notes on Taking the Picture:

In photographing the subject, additional difficulties may arise. It may be restricted, inaccessible, too distant and therefore too small, or too near and therefore too large, for the camera's field of view. If handicapped by one of these factors, climb to a point of observation with an unobstructed view, focus at infinity, and take several, carefully exposed, overlapping views. Let the interpreter worry about the detail, or provide it by means of additional views. Medium views and close-ups are desirable, if they can be taken; but the general location and appearance as shown in panorama and distant views are virtually a necessity.

Panoramic views are a series of overlapping photographs which may be attached end-to-end or mosaicked together to provide a composite view of a large area.

Sweep panoramas are those views in which the photographer stands at one point and rotates the camera with each succeeding photograph so that the area in the viewfinder overlaps that covered in the previous exposure. A 360° panorama is a sweep panorama for the full 360°. After assembling, it becomes possible to take relative bearings from such photography.

II. BEACH PHOTOGRAPHY:

A. Photography and Observation of Beaches.

The "coastal zone," that zone of water, beach, and hinterland so important to amphibious operations, is also the zone (in most areas of the world) on which the least detailed information exists. In the past war it was necessary to rely almost completely on aerial photography. Had only a few of the American tourists and official visitors who visited Europe and the Pacific Islands before the war spent some time taking documentary beach photographs, our preparation for invasion would have been easier and more complete.

The principal beach features to be photographed for informational purposes are as follows:

- a. Offshore area--photographs from high point or shipboard to show beach approaches and location of exposed rocks.
- b. Beach--close-ups showing beach composition, trafficability, and gradient, and long views showing shape and extent.
- c. Beach flanks--photographs to show location and character.
- d. Exits--appropriate photography to show location, character, and size of each exit.
- e. Hinterland--photographs to show terrain, trafficability, and vegetation behind beach. In addition, be sure to photograph special landing places and related features.

In most cases a complete report should combine examples of ground photography and notes of observations made on the spot.

Plan the photography as described above. Plot the location of the beach on a chart and anticipate, as far as possible, the desirable camera positions for recording landmarks and vital information.

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Use a Data Sheet to jot down field notes and camera data. As the on-the-spot observer, you must judge how much photography is essential, but in all cases cover the minimum requirements.

B. Suggestions for Taking the Beach Photography:

1. Offshore Approaches:

Take distant or medium views from, and showing, the offshore area, general appearance, landmarks, aids or hazards to landing, etc. Use either single shots or panorama, depending upon how much of the area your camera covers in each shot. Approaches might also be photographed from an elevated point of observation, such as a promontory.

2. Shape and Orientation of Beach.

High points frequently occur at the flanks of beaches where promontories or headlands may jut out into the water. These points are excellent sites for panoramas. Hills behind the beach may also be used for panoramas or long views. Such photographs will serve to locate the beach with reference to adjacent terrain, coastal features, or inland landmarks, and should be effective in pinpointing offshore obstructions and major beach features

These views can later be annotated to show the position of shots on the beach itself.

In the absence of high points, similar coverage can be provided. From positions at the flanks of the beach, standing at the water's edge and facing down the length of the beach, take sweep panoramas of two or three overlapping views, beginning offshore and sweeping inshore. Show the horizon the nearshore approaches, reefs, water lines, the full length of the beaches, and gradients. Include the area in back of the beach: ridges, escarpments, vegetation, etc. Measure and record beach length and width when practicable.

3. Beach Material.

On the beach, photograph characteristic beach material; e.g. sand, gravel, pebbles, etc. Include also views of extraneous material such as seaweed deposits, rock outcrops, etc. Many of these shots must be close-ups, 3 to 6 feet away. Remember to include a ruler, cigarette pack, or other item from which scale can be obtained. Photograph a handful or pile of beach material in a close-up to show texture.

4. Trafficability:

Photographs of wheel tracks or heel marks are fair trafficability indicators. In the case of wheel tracks, show the vehicle that makes the tracks. Be sure to include a measurable object to show scale.

5. Limiting Features.

Take medium views or close-ups of any feature that may limit the usefulness of the beach landing area. Hazards to approach, poor trafficability, and barriers to egress should be given complete photographic coverage. Remember that photography can provide a substitute for much of the written report.

6. Beach Flanks.

Take pictures from the beach to show the character of beach flanks.

7. Beach Exits.

Take medium views and close-ups emphasizing location, surrounding features, access, and trafficability. Sometimes these views can best be photographed looking inland from the water line; in other cases, it is necessary to go inland to the first high ground and shoot seaward. It is necessary to know width, gradient, and surface character of beach exits.

8. Hinterland.

Terrain immediately behind the beach and extending inland is very

important. In an amphibious operation, this area is not only moved across but is used also for supply dumps, borrow pits, medical stations, etc. Take photographs of the hinterland to show soil and rock types; any indications of trafficability, such as wheel tracks, swamp areas, etc.; and the principal vegetation types. Stereo photographs are excellent for identifying trees and other vegetation.

9. Beach Gradient.

On nearly all beach profiles, two important gradients should be determined:

- a. The gradient of the high-water zone, which is the steepest part of the beach cross-section, just above the high-tide line, and
- b. The gradient of a representative section of the foreshore, below the calm high-water level.

10. Beach Gradient Photography.

Take one or more "gradient" photographs. Show the slope characteristic of the beach; if it varies markedly, several determinations may be required.

- a. Lay out a mark on the beach perpendicular to the water's edge. The mark may be a log, a stick, a narrow trench scooped out with the heel of a shoe, a length of rope, or a row of stones. The mark should be at least 5 feet long, and must be well-defined in the camera's field of view.
- b. Sight the camera at right angles to the mark (parallel to the water's edge).
- c. Photograph from a distance not greater than 15 to 30 feet, including both the mark and the horizon in as true a geometric relationship as possible.

11. Alternate Photographic Method.

For rapid, inconspicuous photo-determination of beach

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gradients, the following procedure enables analysis at the U.S. Naval Photographic Interpretation Center to determine the gradients mathematically.

a. Know your camera's focal length, Standardize two ground-to-camera heights for exposures (such as from standing and from kneeling or squatting position).

b. Stand above high-water line, slightly to landward of the steepest rise, where the entire foreshore, including the high-water zone, can be included in the exposure. Take a photograph from each of your standardized camera heights, heading directly seaward. The view must show both the beach area for which gradient is to be determined and the sea-horizon.

c. Forward film, and Data Sheets showing time and place of exposure, standardized camera heights, and focal length of camera.

Annotate pertinent observations.

12. Non-Photographic Methods of Gradient Determination.

Gradient can be measured most accurately and simply where surveying equipment, such as transit, hand-level, or stadia rod, may be used. However, a review of the problem of determining gradient shows that an experienced observer, who has made a ground study of about twenty beaches on which the gradient is known, can determine by inspection the gradients of other beaches, with reasonable accuracy. This applies only to beaches of slope steeper than 1:25.

13. Depth and Underwater Gradient.

To determine depth in the shallow water near shore, get into it. Swim, dive, wade. Make some mental notes. If the bottom is irregular, make several determinations. Report under-water obstructions, bars, reefs, and composition of bottom, e.g., sand, mud, or rock.

While the nature of the bottom (including the size of holes,

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the size of rocks, and the kind of material) does not affect the over-all gradient, it is very important if troops must wade ashore. It should be reported.

Make a simple sketch and annotate your observations.

14. Correcting the Overlay.

You may not take the photography exactly as planned. Therefore, correct the overlay to show the actual camera positions. The overlay eliminates the need for describing camera position and, in addition, it pinpoints all photography.

15. Landing Places other than Beaches.

Be sure to photograph other available landing places, as well as beaches.

VOLUNTEER BEACH INTELLIGENCE

It is easily understood that the ideal method of collecting beach intelligence is a reconnaissance by trained personnel of the area under consideration. It is realized, however, that due to limited training and equipment available, and the widely separated areas involved, it is often impractical or impossible to make a reconnaissance of this type. The information must therefore be obtained from other sources. The following is intended to assist those with only limited training in beach intelligence as well as suggest other sources from which coastal information can be derived.

Study the beach profile diagram in the front of the book and compare it with these definitions.

OFFSHORE: The areas of land and sea which lie to seaward of the five fathom line.

NEARSHORE: Extends from the five fathom line to the low water line.

FORESHORE: Extends from the mean low water line to the landward limit of normal wave action.

BACKSHORE: Extends from the landward limit of the beach to the point where the terrain experiences a marked change in physiographic form, or the extreme limit of storm wave action.

HINTERLAND: The terrain inland of the Backshore area.

Gradient; (Or slope) The bottom of the LST slopes $6\frac{1}{2}$ feet ($9\frac{1}{2}$ -3) from bow to stern, or in 328 feet. Thus it has a slope of $6\frac{1}{2}$ feet in 328 feet or expressed as a ratio 1/50. Thus, in amphibious work when we undertake a beach reconnaissance we must consider not only what is technically the foreshore and its gradient but the offshore area nearshore, the backshore and the hinterland.

A. Beach Reconnaissance by Untrained Personnel

1. General - Before beginning the study of the beach area proper, several items should be carefully noted if possible:
 - a. Date, time, and zone.
 - b. Location of beach (latitude & longitude if possible).
 - c. Condition of sky.
 - d. Condition of sea.

- e. Wind direction.
 - f. Visibility.
 - g. Temperature.
 - h. Record your weight and height with and without clothing.
 - i. Use of beach and description (concave, convex and straight).
 - j. Land marks back of beach that would make visual location easy from some distance at sea.
 - k. Type of camera and focal length of lens.
2. Sea approaches.
- a. Study of local craft. (Draw a diagram if possible try to obtain information of distance from beach they travel and how they are used)
 - b. Conversation with local fishermen or yachtsmen will usually produce valuable information. (A remark concerning the nearshore dangers has been found to induce the fisherman or yachtsman to enlarge on their skill in avoiding them).
 - c. Swimming at the time of low water may give useful information about the sea bottom for some distance out.
 - d. Indicate types of vegetation and marine life present. (Saltmarsh grass between high and low waterline indicates mud. Oyster beds indicate clay, etc. Other samples if possible).
3. Photography (Providing camera available and use not restricted).
- a. General - One of the best ways to get information on a beach is take a picture of the beach: Ask yourself, (and arrange your composition to supply these answers) of what material is the beach composed, how does it slope, what affect has tide on its width, how is the beach backed, and what depth of water and wave conditions does it offer. Include swimmer and boats if any in scene. Follow rules listed below to best of your ability.
 - b. Attempt to include an object of known size in all photographs, i.e. a person, hat, glove, boat, etc.
 - c. Always locate camera, direction of view, and time.
 - d. Always caption print with location and what you have attempted to show.
 - e. Take long shots or panoramic views from each headland and any intermediate high points.
 - f. From points along or near the waterline take views looking inland along all roads and natural exits.

- g. Include close-up photograph of a handful of beach material.
- h. Photograph fresh wheel tracks (including vehicle that made them) and footprints.
- i. Photograph all vegetative types in area, indicating areas occupied by each type.

4. Beach Gradient, Bottom and Hydrography:

- a. A very accurate method for determining the beach gradient is by photographing the slope of the beach as compared to the horizon. Make a line on the beach perpendicular to the waterline and which can be seen from the position from which the picture will be taken. A board or log laid perpendicular to the waterline will serve the same purpose. Take the picture paralleling the waterline from a distance sufficiently back from the mark so that it includes a portion of the horizon. By comparing the slope of the mark on the beach to the horizon the angle of slope and the beach gradient can be determined.
- b. If swimming is permitted, a series of swims at various tide levels can furnish information for the determination of a fairly accurate beach gradient. In each case pace into the water until the water is the same depth, i.e., waist deep. The depth of the water in feet will closely approximate the gradient. Measurements at high, middle, and low tides should be included. A fishing line and a small weight will make a lead line. The distance between arms out-stretched equals approximately one fathom. (See Appendix I).
- c. Anchor a string at the back of the beach and place a stick vertical at the low waterline. Take the free end of the string to the position of the stick and level the string as nearly as possible by eye. The distance up the stick from the beach to where the string meets it, over the length of the string from the anchor point to the stick is the beach gradient. (The accuracy of this method depends on the accuracy with which the string is leveled).
- d. In the absence of string, the height on the stick can be obtained by the line of sight method and the distance to the stick can be paced off. A method similar to the above can then be used in computing the gradient.
- e. If two persons are available this method is very good. Each person should know his exact height and also the height of his eye in a sitting position. One person

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U.S. NAVAL AMPHIBIOUS SCHOOL
CORONADO, SAN DIEGO 55, CALIFORNIA

Landing Site Selection Problem (INT 613)

I. Requirements

- a. Locate and identify all possible beaches.
- b. Recommend preferred and alternate landing sites.
- c. Complete a Landing Beach Report on all beaches within recommended sites as far as information is available.
- d. Prepare beach outlines on all beaches not included in the recommended sites.
- e. Be prepared to present briefing solutions to the problem. This should properly include sketches and briefing aids as well as a rehearsal.

sits on the beach as shown in Figure I, and the other walks toward the water's edge. At the instant the top of the head of the person walking comes level with the horizon, the person sitting calls out and the other stops, turns about, counts his steps back to his partner. The distance thus paced, expressed in the same linear units as H and h in Fig. 2 is designated L.

The beach gradient average the distance paced is therefore, $\frac{H-h}{L}$ where H is full height of the person walking, h is the

height of eye above ground of the person sitting and L is the paced distances between the two person. The expressed fraction becomes an expression of gradient when the numerator becomes $\frac{1}{L}$.

Caution: be sure H, h & L are in the same units, inches, feet or yards.

- f. If none of the above methods are practical, the gradients must be judged by eye the accuracy of which will depend on the familiarization one has with beaches or slopes of known gradient.

5. Surface and Trafficability

- a. By walking down the beach to the low waterline a general idea of the surface can be obtained. Sand can be described as soft if the heel of shoe sinks in over one inch.
- b. Describe the size of pebbles, rocks, or boulders by comparison to known objects such as peas, marbles, eggs, baseballs, footballs, etc.
- c. Indicate whether or not the sand dries quickly and if the surface blows about easily.
- d. Build a sand castle and indicate if the sand sticks together when wet and remains firm when dry. In so doing dig down 6" to 12" and note the sub-surface.
- e. Note the general configuration.
- f. Note bathers and whether or not they wear protection on their feet.
- g. If boats are hauled up, especially at low water, note the depth to which the keel sinks into the sand and the type soil it uncovers.
- h. If carts or autos use the beach try to estimate their weight, width of wheels, and depth of tracks.
- i. Be attentive for local talk on tides, sand bars, or false beaches.
- j. If possible compare the beach with some known beach in U.S.

6. Exits.

- a. Indicate the presence of sea walls, or marshes behind the beach.

- b. Locate and describe exits and indicate their ability to accommodate large tanks, loaded vehicles, and the limiting tactical infantry formation.
- c. Indicate presence of houses or bungalows behind beach.
- d. Indicate nature, if any, of road net backing beach.
- e. If one area lacks facilities examine entire length of beach for other possible exits.
- f. Leave beach by exit and note to where it leads and the difficulty that would be encountered in reaching firm ground.

B. Beach Information Other Than Reconnaissance.

1. Locally published books and magazines. (Geographic, scientific, engineering, yearbooks, guide books, travel agency brochures, etc. Books are sometimes written from only one angle, i.e. political, religious, etc., and are therefore likely to be biased. Guide and travel books are produced to advertise and therefore tend to exaggerate. The primary usefulness of this type information is to augment information obtained from other sources).
2. Maps, charts, pilots, etc. (Hydrographic, topographic, geological soil, air, etc., in a variety of scales are required in the preparation of a coastal study. Attempt to determine their source of information and reliability. Original surveys are probably the most useful. Commercial firms, especially foreign, sometimes redate maps which are merely reprints of an earlier edition. Photographic reproductions of maps are apt to distort making it impossible to obtain any accurate measurement).
3. Photographs - ground and aerial. (Vertical photographs having a scale of 1:5,000, and obliques of 1:2,500 are most desirable. Verticals with 60% overlap and 40% sidelap allow for stereo vision. In the hands of a competent interpreter, good aerial photography can furnish much of the essential information needed in beach intelligence. Interpretation of good ground photos will furnish information on beach gradients, type of beach material and firmness obstacles, width, surf and swell conditions, terrain on flanks and in rear of beach, and beach exits.
4. Collated reports. (During the war there were a number of studies published containing rather hastily gathered information which today serves as an excellent base for further research. British books of reference (BR's) and our own strategic engineering studies (SES) are typical examples).
5. Personal interview. (Persons possessing special knowledge such as travelers, merchant mariners, former residents, etc., can help clarify doubtful points and perhaps fill in gaps in the over-all intelligence plan. A file should be maintained on persons of this type indicating the particular area with which they are familiar as well as where they can be located.

APPENDIX I

In gathering information on a beach for intelligence purposes it is often possible to get on the beach but impossible to carry measuring equipment. This being the case here are a few standard measurements you always have with you which you will find to be very handy.

The width of your index finger is roughly .8 inch.

The width of your hand across the palm is roughly 4 inches or one hand.

The width of your hand extended as if you were striking an octave on the piano is roughly nine inches or one span. (from tip of thumb to tip of little finger.)

The distance from the elbow joint to the tip of the middle finger extended is roughly 16 inches or one cubit.

The distance between your arms outstretched is roughly six feet or one fathom.

Average pace is roughly 2.5 feet. If extended for measurement becomes 3.3 feet or one-fifth rod. (one rod is 16 feet).

The circumference of your neck is roughly your necksize in inches.

Twice the circumference of your wrist is roughly the circumference of your neck.

Add one inch to your inseam measurement and you have the distance from the ground to your crotch if you are bare foot. Add an inch and a half if you have shoes on.

If you wear size 7 shoe (navy last) it measures roughly 11 inches from tip of toe to edge of heel, size nine measures roughly 12 inches, and size 12 measures roughly 15 inches.

Record your weight height and weight, with and without clothing.

If possible get a picture of yourself on the beach with your arms at your sides and fingers extended. If sun is shining get picture with shadow.

You can determine direction by watch and sun - (1) North Temperate Zone - An ordinary watch in good running condition is held with the HOUR hand pointed at the sun. A line midway between the hour hand and 12 o'clock points due SOUTH, with NORTH in the opposite direction. The watch should be set on standard or sun time; if it is an hour ahead (as on daylight saving time) the line pointing South lies midway between the hour hand and 1 o'clock.

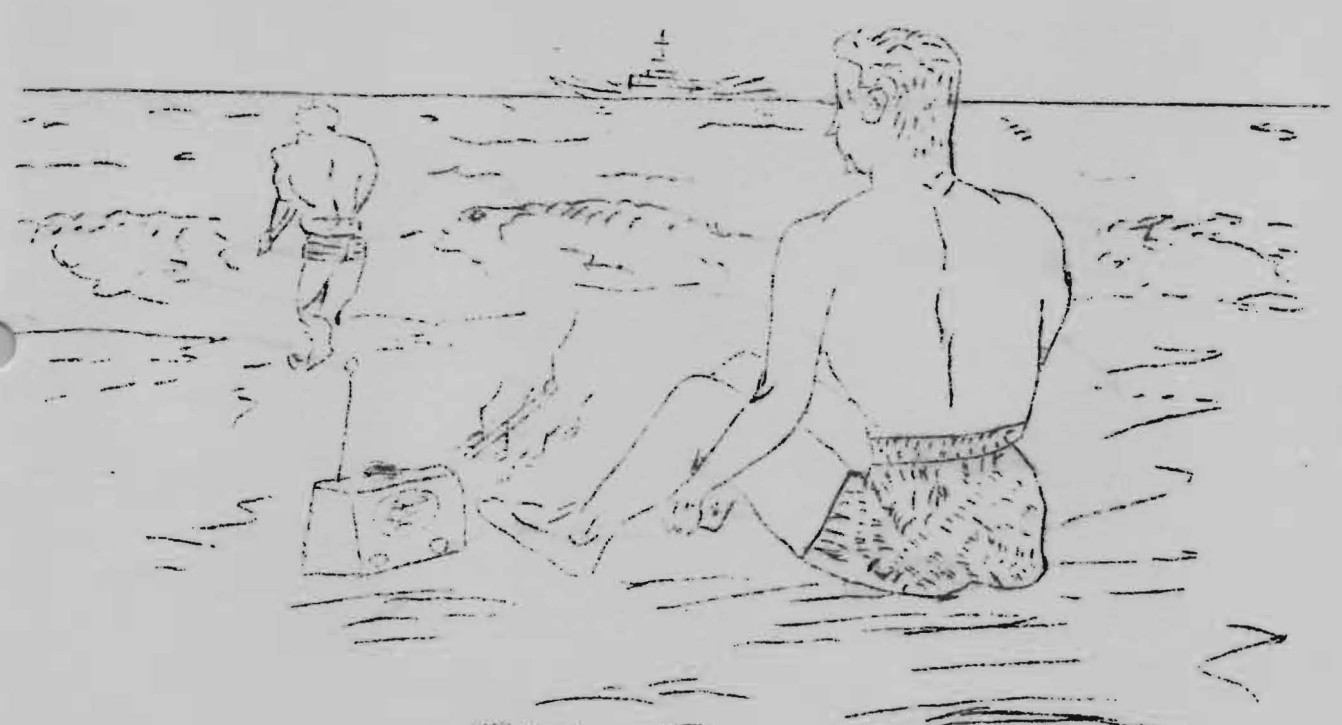


FIG 1

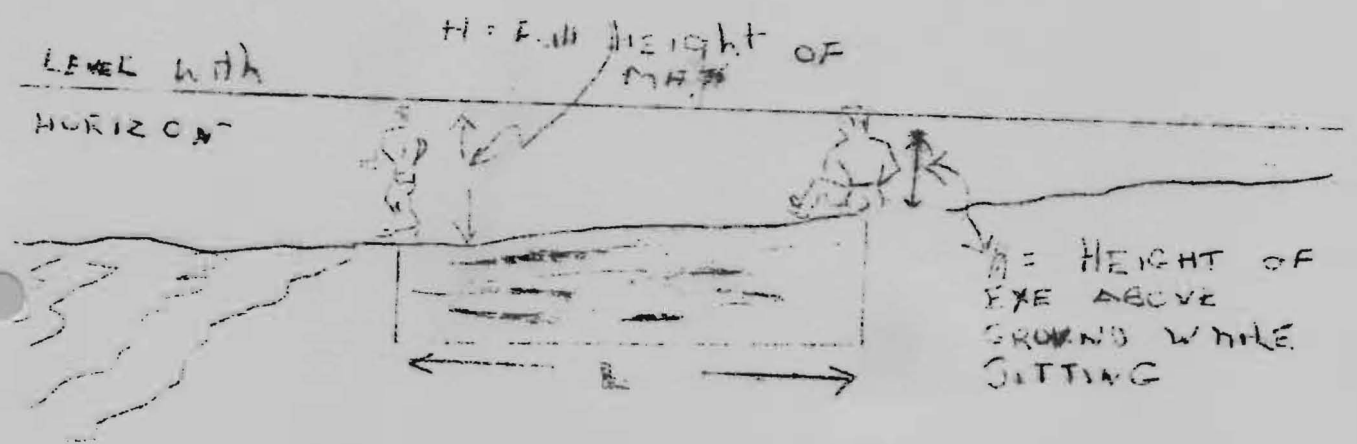


FIG 2

$$\frac{H-h}{L} = \text{GRADIENT FRACTION}$$

SECTION E

THE AMPHIBIOUS SKETCH

DETAILED BEACH PROBLEM

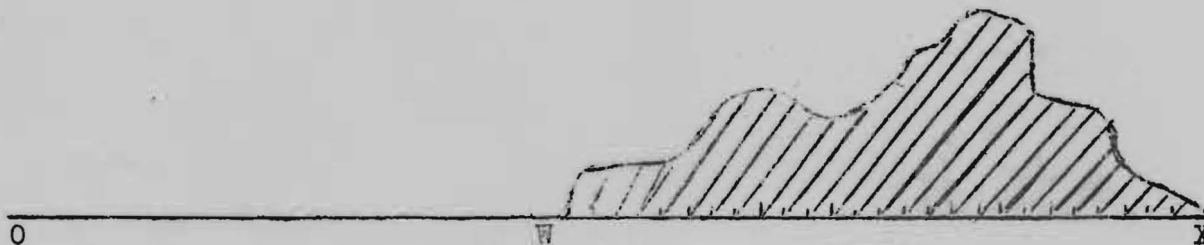
LANDING AREA SELECTION PROBLEM (SANTA ROSA)

AMPHIBIOUS SKETCHING

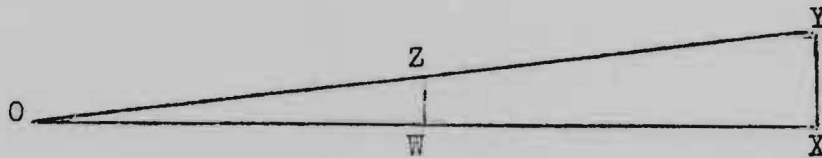
PANORAMIC WATER-LEVEL SKETCH

Constructing The Perspective Wedge:

- Normally a different wedge must be computed for each beach area sketched.
- Values which must be known or assumed for computation purposes:
 - a. Position of "line of departure". For computation purposes a distance offshore for the observer must be assumed. This is usually at or near the line of departure as set forth in the operation plan. This will normally be between 2,000 and 5,000 yards offshore.
 - b. Distance inshore to be covered in the sketch. Remember that terrain more than a mile or two inland will probably be obscured by smoke and dust during an assault landing.
 - c. Elevation of highest terrain in the area covered.
- A sample computation follows:
 - a. Assume: $OW =$ distance from observer to waterline $=$ 2000 yards or 6000 ft.
 - $WX =$ distance from waterline to inland limit of sketch $=$ 2,000 yds
6,000 ft.
 - $WZ =$ elevation to clear highest hill $=$ 300 ft.



b. Compute Values.



By similar Triangles:

$$\frac{WZ}{OW} = \frac{XY}{OX}$$

$$XY = \frac{(OX)(WZ)}{OW} = \frac{1,200 \times 300}{6,000} = 600 \text{ ft.}$$

- assuming a chart, scale of 1/6000, values must be reduced to this scale.

$$WX = 6,000 \text{ ft on ground} = 6000 \times \frac{1}{6000} = 1 \text{ ft on chart}$$

$$WZ = 300 \text{ ft on ground} = 300 \times \frac{1}{6000} = 0.05 \text{ ft on chart}$$

$$XY = 600 \text{ ft on ground} = 600 \times \frac{1}{6000} = 0.10 \text{ ft on chart.}$$

4. Lay out the Wedge.

- Using the computed values, draft the wedge WXYZ on a piece of drawing paper. Do not lay out the complete triangle; the trapezoid will be sufficient.
- Divide the line WZ into an appropriate number of parts in accordance with the contour interval. For instance, with a 300 ft maximum elevation (assuming a 20 foot contour interval), the division of WZ into 10 parts would provide a satisfactory grid at 30 feet elevation per division.
- Draw a grid of lines parallel to the base WX from these points marked off on line WZ. These are "Actual Elevation" lines.
- Similarly, divide XY into 10 parts. Connect each point on XY with its respective point on WZ. These are your "apparent elevation" lines.

5. Your perspective wedge is now ready for use.

DETAILED BEACH PROBLEM

- I. This problem is designed to give the student practical exercise in the preparation and presentation of a detailed beach study that would be a Beach Intelligence Report for the Intelligence Annex. It consist of preparing a report using aerial photographs, UDT charts and reports, tide and current tables, HO Charts and AMS Maps of the area.
- II. The report form used here is a composite report prepared from photo interpretation, UDT Surveys and other sources. It is most important that the Beach Intelligence Officer be able to present his information in a form suitable for distribution to interested personnel and this form is a suggested guide.
- III. Three Basic methods of presenting beach intelligence.
 - a. Verbally
 - b. Written
 - c. Graphic (sketch or overlay)
- IV. The Written Report
 - A. General - The order of presentation and degree of detail will depend upon the requirements of the operation; but keep in mind the persons using the report will not have your background, so describe every point lucidly and accurately.
 - B. Heading - precedes main body of report - several formats can be used but the following should be included:
 1. Report title
 2. Name of reporting unit
 3. References
 - C. Introduction -
 1. Orientation - to permit a quick location of area.
 2. Shape and type - straight, convex, concave, etc.
 3. Landmarks - very important
 4. Flanks - terminal points of beach as viewed from seaward.
 5. Overall length - usually in yards - measured along the high waterline.
 6. Unusable length - portions of beach unsuitable for landing or use.
 7. Useable length - difference between items 5 & 6.
 8. Local use - swimming, fishing, etc.
 - D. Offshore Approach - 5 fathom line to seaward.
 1. Headings and restrictions
 2. Obstructions - locate accurately and fully describe
 3. Offshore isobaths - give 10,20,30,40,50, etc. fathom curves
 4. Nature of bottom - indicate changes by term - "grading to"

5. Anchorage - describe holding ground and protection from sea swell .
 6. Currents
- E. Nearshore - 5 fathoms line to mean low water line.
1. Gradient and isobaths - include 1,2,3 fathom curves
 2. Obstructions - describe and locate.
 3. Bottom.
- F. Wind, Surf, Tide & Currents
1. Give prevailing Wind direction and intensity.
 2. Give prevailing swell direction and average heights if obtainable
 3. Indicate mean Tidal range and diurnal and maximum range.
 4. Describe current direction and velocity.
- G. Foreshore - MLLW to normal limits of tidal wash.
1. Length
 2. Width
 3. Gradient - flanked and center
 4. Obstructions
 5. Material, firmness and trafficability
- H. Backshore - limits of foreshore to extreme storm wave action inland.
1. Width
 2. Gradient
 3. Obstructions
 4. Material, firmness and trafficability
 5. Exits
- I. Hinterland - backshore limits to 15 miles inland or first major change in the terrain.
1. Terrain description - include relief, drainage, vegetation, etc.
 2. Observation - list any vantage points for OP or CP's.
 3. Cover and concealment
 4. Routes
 5. Hinterland trafficability
 6. Defences
- J. Conclusions
1. Brief discussion of beach features which would have most effect on the operation. Describe important advantages as well as disadvantages. Mention source and accuracy of the data from which the report as compiled.
- K. Summary of written report
1. Summarize the salient points using a logical sequence from seaward to the beach, keeping it concise and understandable language.

L. Graphic Report:

1. A graphic report should be prepared as it gives a visual presentation that is far more adequate than a written description. The old proverb "A picture is worth 10,000 words" is very true.
2. No set format has been established, however, the overlay should contain the following:
 - a. Beach name
 - b. Agency preparing report and date of report
 - c. Scale (graphic, bar)
 - d. Base for overlay - date and scale of original photography from which mosaic was made.
 - e. Military Grid - UTM
 - f. Legend (if using other than standard symbols)
 - g. Mean high water line
 - h. Mean low water line
 - i. Main roads
 - j. Declination diagram
 - k. Obstructions
 - l. Beach Flanks
 - m. Railroads
 - n. Airfields and facilities
 - o. Exits from beach and area
 - p. North Arrow
 - q. Any natural features that might effect the operations such as sand dunes, marshes, etc.
3. Make the graphic as understandable, consise and inclusive as possible.

PRACTICAL EXERCISE IN THE SELECTION OF A
LANDING AREA.

GENERAL SITUATION

United States and Aggressor are at war. Six months previous to this date Aggressor, achieving complete strategic surprise by not declaring war, launched an amphibious operation against the Southern California coastline, from Santa Barbara south to the United States-Mexican Border. Pursuing a limited objective of destruction of the Los Angeles industrial area, at present Aggressor holds a strong defensive position based on the mountainous area extending generally eastward from Santa Barbara to San Bernadino, thence generally southward along the mountains from Banning to Julian and thence to the Mexican border near Campo. In addition, Aggressor has established radar, communications, and meteorological stations on all the Channel Islands.

The Joint Chiefs of Staff have directed that a large scale amphibious operation be undertaken on Dog Day to recapture the Southern California territory now held by Aggressor, and to destroy the Aggressor occupation forces. During a period of from sixty to thirty days prior to the main landings on the California coast, Commander Sixth Army has directed that amphibious operations be conducted against the Aggressor forces occupying the Channel Islands in order to seize, occupy, and defend these islands, destroy the Aggressor Forces and facilities, and wherever possible establish U. S. air and naval bases, radar and meteorological facilities. It is anticipated that U. S. forces engaged in these operations will constitute the Sixth Army Reserve for the mainland operation and will be available to the Sixth Army after Dog Day when there is no further need for the defense of the Channel Islands. U. S. Forces will have air and naval superiority in all these operations.

SPECIAL SITUATION

It is now Love Day minus 60. You are the Beach Intelligence Officer on the JATF. On Love Day the Joint Amphibious Task Force will land and support the Landing Force composed of the 105th Regimental Combat Team, U. S. Army, on Santa Rosa Island. Santa Cruz Island will have been seized by other forces by Love Day.

Based on material furnished, you are to:

- 1) Select all possible landing sites giving a brief description of the hydrographic, beach, and inland terrain characteristics of each.
- 2) Recommend the landing sites selected outlining your reasons.
- 3) Based upon the possible Beachheads designated by the Amphibious Troop Commander, recommend a landing area outlining your reasons.

E-6 70 10

26 NOV 57

FORCES ASSIGNEDJATF (Attack Force Organization
Only)

TransDiv 113 (Attack Force Commander)
 (Includes)
 3 APA
 2 AKA
 2 LSD
 LST Div 16 (5 LST)
 DesRon 76 (9 DD)
 DesRon 79 (9 DP)
 1 CA
 1 CVE

LANDING FORCE

105thRCT USA
 (Includes)
 1 Artillery Bn
 1 Tank Co
 Detachment Engr Spec Brig.

AGGRESSOR DEFENDING FORCE

Aggressor's meteorological, radar, and communications facilities are established on the highest ground in the center of the island, in the vicinity of the road junction near the 1589 elevation (vertical control point). The defending force is reliably estimated at one infantry battalion reinforced with an artillery battery of four 120mm howitzers, and a mortar battery of nine 120mm mortars. This battalion consists of three infantry companies (186-6), one headquarters company, one anti-tank company (4-75mm AT guns), and one mortar battery (6-81 mm mortars). Detailed information on the exact location of defensive installations is not known at this time. However, it is estimated that due to the numerous possible landing sites, fairly rugged inland terrain, and the necessity of protecting the Aggressor facilities located on inland high ground, Aggressor's most probable defensive capability will be to very lightly defend the main beaches or simply keep them under observation and artillery and mortar fire, and to establish a strong defense of the high ground in the center of the island and the approaches thereto.

Pages 84 and 85 of United States Coast
Pilot Pacific Coast

SANTA ROSA ISLAND

(Charts 5116, 5115)

Santa Rosa Island lies about 5 miles westward of Santa Cruz Island. The two islands are separated by Santa Cruz Channel, described on page 81. The island is about 15 miles long in an easterly direction, with a greatest width of nearly 10 miles. The highest point, near the middle of the island, is 1,561 feet high and is visible over 40 miles. Water is plentiful, and the island is partially covered with vegetation, but there are no large trees. The shores are bold, high, and rocky, and kelp surrounds the greater part of the island. The depths, in approaching, shoal more abruptly from southward than from northward, where the 100-fathom curve is over 5 miles and the 20-fathom curve about 2 miles from the beach.

There are no harbors, but anchorage may be made in Bechers Bay and Johnsons Lee; there are several good boat landings.

SANTA ROSA ISLAND, WESTERN PART

(Chart 5116)

Brockway Point is high, bold, and rounding, and situated about midway of the northern shore of the island.

Rodes Reef, marked by kelp, is a patch of three sunken rocks lying 1.2 miles 73° from Brockway Point, and about 0.8 mile offshore. It breaks in nearly all weather.

Sandy Point, the western extremity of the island, is moderately bold and rocky, with a detached rock lying close inshore, and sand dunes 400 feet high extending inland. These white sand dunes are prominent when approaching from southward or westward. Shallow water extends off the point. During the general northwesterly weather, swells form at a considerable distance from the shore. The swell also reaches the point from a southwesterly direction.

Sandy Point Anchorage, on the southern side of the point, affords shelter to small vessels of 20 to 30 tons, from northerly and northwesterly winds, but local knowledge is necessary to avoid outlying rocks.

San Miguel Passage, separating Santa Rosa and San Miguel Islands, is described on page 80.

Talcott Shoal, with $1\frac{3}{4}$ fathoms over it, lies on the edge of the kelp, about 1.5 miles 26° from Sandy Point. The soundings in the vicinity of the shoal range from $4\frac{1}{2}$ to 12 fathoms. The shoal breaks only in heavy weather. In calm weather there is very little indication of the shoal as

the kelp is light and there is very little lumping of the water. A detached kelp patch lies 1 mile northward of the shoal.

Bee Rock lies 0.8 mile off the southern shore of the island, about 3.6 miles southeastward of Sandy Point. It is 5 feet about MHW, not easily seen and is surrounded by kelp which stretches from South Point to Sandy Point. A smaller rock, 10 feet about MHW, is about 100 yards southeastward of Bee Rock. A rock, with 2 fathoms over it, lies 650 yards 298° from Bee Rock. In average weather there is a lumping of the water with an occasional break at this point. Several other rocks and shoals exist inside the kelp, which should not be entered.

SANTA ROSA ISLAND, EASTERN PART

(Chart 5115)

South Point, the southern point of the island, terminates in a rocky bluff, 100 feet high, and rises rapidly to a height of 460 feet. Cliffs, several hundred feet high and about $\frac{1}{2}$ mile in extent, comprise the southwestern face of the point. It is marked by South Point Light shown from a small white house; the light is 530 feet above water and is visible 19 miles. The light is obscured from 270° to 115°.

Johnsons Lee is an open roadstead immediately eastward of South Point. It affords fair shelter from westerly and northwesterly winds but is dangerous in southerly weather. The anchorage is in the kelp in 5 to 9 fathoms, sandy bottom. No dangers have been discovered in the kelp. The bottom west of Slay Rock about 0.75 mile, 36° from the eastern end of South Point, is rocky and dangerous to ground tackle. The Coast Guard maintains a boat landing along a vertical-faced rock, from which supplies are landed for South Point Light.

East Point, the eastern extremity of the island, is moderately high, sharp, and bold. A rock, with 2- $\frac{3}{4}$ fathoms over it, lies in the kelp 0.65 mile 16° from East Point and a shoal with 3 $\frac{1}{2}$ fathoms over it, lies about 2 miles northward of the point.

Skunk Point, about 2.5 miles northward of East Point, is a low sandy point; it is formed by drifting sand, with sand beaches westward and southward; the sand dunes behind it are 250 feet high. Care should be taken so that the sand spit off Skunk Point is avoided. The current is heavy and Skunk Point is difficult to see on dark nights. In bad weather the sea breaks heavily on the spit.

Bechers Bay is a broad, semicircular bight on the northeastern shore of the island, and is about 4.5 miles long by 1.5 miles wide, lying between Skunk and Carrington Points. Northwest Anchorage is in the western part of the bight about 1.5 miles from Carrington Point; it affords fair shelter in northwesterly weather. A wharf has been built with 16 feet at its outer end. The best anchorage is in 6 to 7 fathoms off the end of the wharf. Southeast Anchorage is about 1.3 miles westward of Skunk Point, and affords

protection in southeasterly weather in about 6 fathoms, sandy bottom.
(4901) California - Santa Rosa Island - Bechers Bay - Mooring buoy established.
Bechers Bay Mooring Buoy A, a white second-class nun, has been established
in about 30 feet of water, 400 yards 80° from the end of the dock at Bechers
Bay. Approximate position: 34° 00' 32"N., 120° 02' 31"W.

Carrington Point, the northern point of the island, has a seaward face
0.8 mile in length. It is bold and rocky, and rises rapidly to an elevation
of 440 feet.

Foul ground extends about 0.35 mile northward of Carrington Point,
terminating in Beacon Reef, with a least depth of 2½ fathoms. The reef
rarely breaks and there is no safe passage inside of it.

LANDING BEACH REPORT

CLASSIFICATION _____

DATE: _____

REPORT NO. _____

PLACE OR BEACH NAME _____

LOCATION:

Beach Center - Lat: _____

Long: _____

Grid Coordinates,
Center

REFERENCES:

Aerial Photo Coverage:

<u>Mission</u>	<u>Date</u>	<u>Print No</u>	<u>Focal</u>	<u>Alt</u>	<u>Approx.</u>	<u>Type</u>
<u>Number</u>			<u>Length</u>		<u>Scale</u>	<u>Coverage</u>

Chart Reference:

Map Reference:

Other References: (Include UDT Surveys with dates and times, Tide and Current Books, etc.)

A. INTRODUCTION

1. Orientation (location and direction beach faces)

2. Shape (Convex, concave, straight, etc)

3. Landmarks

4. a. What is the right flank bound or identified by

b. What is the left flank bound or identified by

5. Overall length

6. Unusable length

7. Usable length

8. Local use

B. OFFSHORE APPROACH (From seaward to 5 fathom curve)

1. Headings and Restrictions (list any obstructions to the approach from seaward such as islands, shoals, etc.)

2. Appearance from Offshore (description of terrain along coastline)

3. Offshore Isobaths (List distances from beach center of 100, 50, 40, 30, 20, 10, and 5 fathom curves)

4. Currents in Offshore

5. Anchorage (a general description of degree of protection afforded from wind, swell and current)

6. Anchorage Room and Holding Ground (depths of water and extent and nature of bottom for holding)

C. NEARSHORE (five fathoms curve to MLLW line)

1. Gradient (flanks and center plus any unusual gradients)

2. Isobaths (distances from MLLW to the 4,3,2, and 1 fathom curves)

3. Obstructions (man-made or natural)

4. Bottom

D. WIND, SURF, TIDE & CURRENTS

1. Wind (prevailing winds and force)

2. Swell and Surf (average heights and type)

3. Tide (mean tidal range and diurnal range)

4. Currents (Set and drift)

E. FORESHORE (MLW line to limit of normal wave action at high water)

1. Length

2. Width

3. Gradient (flanks and center)

4. Obstructions

5. Composition & Trafficability

6. Exits

- F. BACKSHORE (limit of normal wave action at HW to extreme storm wave action)
1. Width
 2. Gradient (flank and center)
 3. Composition & Trafficability
 4. Obstructions (man-made or natural)
 5. Exits (man-made or natural)
- G. HINTERLAND (limits of backshore to first major terrain change or about 15 miles inland)
1. Critical terrain features (any feature of terrain, the seizure or retention of which would afford a marked advantage to either combatant)
 2. Observation and Fields of fire

3. Cover and concealment

4. Obstacles

5. Avenues of Approach

H. DEFENSES

1. Location and type

2. Minefields and contaminated areas

3. Observation, Command, and Supporting Installations

I. CONCLUSIONS

1. Favorable Factors

2. Unfavorable Factors

SECTION F

BRIEFING TECHNIQUES
MISCELLANEOUS NOTES

BRIEFING

I. INTRODUCTION, BRIEFING IS A CONCISE ORDERLY PRESENTATION OF INTELLIGENCE (or information), Briefing is the responsibility of the Intelligence Officer. In order to properly perform this duty it is essential that he be thoroughly familiar with the ways and means by which he can most effectively present his material. The quality and quantity of his material provides the criteria of the officer. Constantly he must be on the look out and continually collect up-to-date information in order to be prepared at any time to give a briefing. It has been found by experience that an Intelligence Officer is asked many questions inside and also a way to left field of his speciality. Therefore he must be familiar with all available source material, and insofar as his ingenuity and initiative permit he must become a reliable, even through self-styled, authority.

II. TYPES OF BRIEFS Briefs vary as to slant, amount, amount of detail, and sometimes as to methods of presentation according to the purpose of the brief and the audience for which it is intended. In general, the types of briefs can be grouped within one of the following headings.

a. CURRENT EVENTS: This would usually include small amounts of information on widely varied topics. If a single topic is used over several briefing and to the same audience then the brief usually presumes previous knowledge of some of the facts and presents only the latest information. Examples of those would be the daily or weekly CNO or Admiral briefings.

b. NATIONAL BACKGROUND: This is usually presented only once to an audience, covers several topics (as economic, transportation, people etc, and is based on research with plenty of time to prepare, Examples would include high level strategic briefing, and also lower level passing the word by the ship offer prior to the ship entering an uncommon foreign port.

c. TRAINING. Self explanatory.

d. Strategic: The difference in these two being only in the level and scope of the subject matter. For example the Enemy forces to CNO would be in terms of armies, and

e. Tactical: to an Attack Force Commander perhaps in terms of regiments.

f. Operational: This would usually be limited to a single mission and, if to a small enough unit, be in great detail.

g. Interrogation or De-Briefing. This heading should also be listed since many of the same techniques are present in this situation. Careful preparation and organization of questions are necessary in order to fulfill the purpose of the debriefing and to obtain all possible information. Many of the same type graphics and visual aids may be used.

III. GENERAL RULES. Usually a brief is oral. Always it is concise. It is tailored to the audience both in choice of words and in degree of detail. The purpose of the brief must be clearly understood by the briefer and so indicated in his presentation. If possible the brief should be illustrated. Charts: maps: transparencies, opaques, strip and motion picture films used with projector may all be used according to the time and material available. If handouts are to be employed they should be issued prior to or during the briefing. This allows for questions to be answered when they occur in the minds of the audience. The audience must all be cleared for the full material. Your responsibility as an intelligence officer also includes security duties. If certain material is too highly classified for the whole group, and therefore not needed by the entire audience, either use that material in a separate briefing, or divide your audience and include the material in only one brief.

IV. PREPARATION. The preparation may be hasty or it may involve much research. In either case though and care must be exercised in the organization of the material. Since the spoken word is fleeting, it does not allow the mind of the listener to retrace what has been said and organize for itself. This means that the officer who presents the material should lead his audience step by step toward the point being developed. An example would be in briefing on the radar sites in Korea. It might be presented by giving an overall location chart followed by smaller sections and then individual sites. Another way would be to start by describing a single site and building up to the whole picture. In neither case is it desirable to shuffle your information or references.

The amount of notes to be used varies with the detail and exactness of the information, the familiarity of the briefer (and sometimes with the desires or order of the audience). The use of notes is usually allowable and several techniques can be employed as aids to the briefer. 3 X 5 cards are good for key words and statistical information. Posters, charts, graphics can in themselves provide the key words or outline to be used in the presentation.

Visual aids should be used whenever possible to provide another means by which the audience can receive the information. Visual presentation often shows relationships much clearer than words could ever do. Visual aids speeds understanding and makes for more lasting retention of the material. If well done, it also helps to keep your audience awake.

Whenever possible it is most important to have a Dry Run rehearsal

V. PRESENTATION. The first rule is to BE NATURAL, and therefore to be at ease. Greet the audience, be as informal and friendly as circumstances will permit. Introduce yourself to the group if necessary. Introduce your subject and explain the purpose of the briefing. Prepare the audience for what is to follow. Define any special terms and establish a frame of reference. Gain the attention of the group and their willingness to follow throughout the presentation.

The subject matter of the brief should contain the important points in a logical manner. Again, it is well to point out that the choice of words, amount of detail, and the slant of the brief is tailored to fit the audience. Restatement of the most important facts is desirable throughout the brief. A summary and/or conclusions is necessary.

Personal qualities of a good briefer, besides that of being (or appearing to) be natural and at ease are some of the following. He must be sincere in what he is saying. Humor may be used, but moderately and within the personality range of the speaker. He must always speak with authority and have control of the situation. This does not mean that he is to affirm anything he does not know. Questions may be asked to which he does not have the answer. If he is fortunate he will have an assistant in the room who has the correct answer, or a helper auditing from behind the scenes who can make a quick check. Unfortunately, most of us find ourselves without either help and can only reply that we do not know but will check. This is a good time for an intelligence officer to show forethought by stating what action has been taken to obtain the information. The use of illustrations, anecdotes, and references to the familiar all aid repetition and restatement.

A little should be mentioned about distractions, but less than what is usually said about them. The briefer is not a paid lecturer and is most desirous of getting his information across to his listeners he would normally run a check to prevent unnecessary distractions. Outside avoidable noises, too warm a room, and vivid graphics on display but not in use are some of the more obvious annoyances. Some personal mannerisms might be watched. Walking about the room during a briefing is usually permissible, but pacing is unwise. Juggling coins in a pocket or tossing chalk in the air usually causes the audience to be more interested in how much money is in the pocket or just which time the chalk will be dropped. If the briefer really is at ease he will seldom employ such nervous mannerisms.

A few pointers in using graphics should be followed. If possible, display the graphic only when it is being used during the brief. This also applies when using the blackboard. Material should be erased after it has served its purpose. Check to be sure that all in the audience have a clear view. When indicating a point on the graphic use a pointer rather than the hand, and hold the pointer in the hand nearest the reference. Face the audience and talk to the audience, not the graphic.

A brief does not have to be boring to the briefer or the audience. At times, especially when daily briefs are given, as with the order of battle, a little ingenuity is both permissible and needed. On one staff in Korea the N-2 as the enemy enacted scenes showing what information the enemy had on its own and our forces. N-3 countered with brief-skits of our interpretation of the facts. Each presented the required information but in a novel way. By all reports they certainly competed to outdo each other every day and enlivened the briefings.

VI, SUMMARY. Briefing is the concise orderly presentation of intelligence (or information). It is tailored to the audience both in choice of words and in degree of detail. The purpose of the brief must be clearly understood by the briefer and so indicated in his presentation. Though care must be exercised in the organization of the material in order to lead the audience step by step in the development of the point. Visual aids speed understanding and make for more lasting retention of the material. Whenever possible rehearse the brief. Be natural in presenting the brief. Greet the audience, introduce yourself, define special terms. Be sincere in presenting the material, and restate important points. Answer questions as they occur. Always make a summary. Prevent avoidable distractions. Use ingenuity to allow both briefer and audience to enjoy the brief.