

MONOGRAPH

TANK EMPLOYMENT--MARINE CORPS

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ADVANCED ARMORED OFFICERS

COURSE NO. 1

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TANK EMPLOYMENT--MARINE CORPS

INTRODUCTION.

The tank battalion is an integral part of each Marine division, being a separate battalion operating as an element of the division, it receives its missions from the division commander. The commanding officer of the tank battalion is a member of the division special staff as division tank officer. Normally the tank battalion operates as a unit, but tank companies may be attached to combat teams for special missions. There are no separate tank regiments nor corp tank units in the Marine Corps.

ORGANIZATION.

The latest war-time table of organization, promulgated for the tank battalion, was approved by the Commandant on 1 May 1945. This table provides for a tank battalion consisting of three tank companies and a Headquarters and Service Company comprised of 27 officers and 586 enlisted men.

Each tank company is composed of 18 medium tanks whose main armament is a 75mm or 105mm howitzer and whose secondary armament consists of two 30 and one 50 caliber machine guns. Each tank company has in addition 3 medium tanks whose main armament is the mechanized, high capacity flame thrower POA/cws H-1; the secondary armament of these tanks includes the 75mm gun and the same machine guns mounted in the other 18. In addition 4 of the 18 normal tanks have a small flame thrower interchangeable with the bow machine gun. There is also one tank in battalion headquarters.

Each tank company is normally attached or in direct support of one of the three infantry regiments of the division during an operation.

The chief characteristics of the tank which distinguishes it as a weapon and determines its employment are:

- (1) Mobility.
- (2) Armor-protected fire power.
- (3) Shock action.

These characteristics should be borne constantly in mind as we discuss the actual employment of the tank-infantry team.

Before going farther let me pause to define some military terms, peculiar to tank operations, which I will use in later portions of this discussion.

Assembly Position. The assembly position is an area, normally beyond the range of medium artillery fire, containing the service park. The tank battalion is assembled here, and preparations are made for moving to the attack position.

Attack Position. This position is immediately in the rear of the LD in the last available cover from ground observation where tank and infantry unit commanders make their final contacts and determine final coordination procedures before launching a combined attack. It is imperative that vehicles remain in this position only as long as it is absolutely necessary to facilitate proper coordination.

Service Park. The place where organic and attached maintenance and service elements gather is known as the service park. It is usually set up in the assembly position, but all or part of it may move to subsequent rallying points.

Rallying Point. The area pre-designated by tank unit commanders, usually just in the rear of the objective, where reorganization is effected is known as the rallying point.

TANK INFANTRY OPERATION.

Since the preliminaries have been considered, we will now approach the actual conduct of tank-infantry operation. Let us ask ourselves these questions: First, what can the infantry reasonably expect from supporting tanks? Secondly, what is the tank role in a combined attack?

It has been determined that tanks can:

(1) Closely support, by fire and movement, the advance of infantry and other tanks against known resistance.

(2) Support by fire the advance of infantry and other tanks by neutralizing the objective.

(3) After anti-tank defenses have been neutralized, assault and neutralize known enemy installations providing they are covered by the fire of infantry, by other tanks, or artillery.

(4) Be used to reinforce artillery fire although this is purely a secondary tank role.

(5) Engage enemy tank and armored vehicles.

Now, what do tank units expect of the supporting infantry? For successful tank-infantry operation, the infantry must:

(1) Protect tank and engineers operating with tanks from enemy personnel.

(2) Locate and neutralize enemy anti-tank weapons, obstacles, and mines.

(3) Operate over terrain encountered which is impassable for tanks.

(4) Hold ground taken by combined action.

(5) Assault positions strong in anti-tank defense.

Engineers are usually part of a tank-infantry attack and their functions are:

(1) To coordinate and supervise the marking of-and clearing of-passages through minefields and anti-tank barriers.

(2) To provide for and supervise terrain-obstacle-crossings which are beyond the capabilities of the tank organization.

Any successful tank-infantry operation must be thoroughly coordinated with artillery support. Artillery can insure success by:

(1) Laying fires on known installations to support the advance.

(2) Delivering time fire over tanks (not closely followed by infantry) to protect them from close-in attack by personnel.

(3) Laying smoke to screen the movement of the tanks and supported infantry.

(4) Firing direct support call-fire missions by having FO's ride in a tank.

(5) Furnishing fire control and survey data to tanks which are reinforcing artillery fires.

Aviation can contribute to the success of a combined attack by:

(1) Reporting the location of minefields, tank obstacles, installations, and possible routes of advance.

(2) Attacking enemy personnel and installations by performing bombing and strafing missions in direct support of the attack.

Infantry leaders must have full knowledge of tank limitations as well as tank characteristics and capabilities. They must realize in planning or conducting a combined action that:

(1) Tanks cannot successfully operate over terrain obstacles such as: swamps, unfordable streams, streams with steep banks, dense forest, ground covered with numerous large stumps or boulders, high vegetation which limits visibility, or extremely rough ground with steep slopes.

(2) Tanks have very restricted observation and visibility even under ideal conditions.

(3) Tanks are extremely vulnerable to anti-tank weapons and mines.

(4) Tanks are vulnerable to close-in attack by enemy personnel equipped with anti-tank devices.

(5) Tanks can not hold ground without infantry support.

(6) Tanks are highly dependent upon crew efficiency which deteriorates rapidly due to fatigue. This is particularly true of crews operating in the hot climates of the South Pacific area.

(7) Duration of tank employment is dependent upon fuel and ammunition capacity and rate of expenditure.

(8) The tank's operation is entirely dependent upon adequate maintenance which is a highly complex operation.

Now that we know the characteristics and capabilities, as well as the limitations, to tank employment let us consider certain fundamentals particularly applicable to tank-infantry action.

Remember always that a tank is primarily an offensive weapon. It was designed to carry armored fire power into the enemy lines, and to furnish close and continuous fire support to the infantry. It should always be employed to take advantage of the characteristics we mentioned earlier. The fundamental of surprise, mass, cooperation, economy of forces, retention of the initiative, security, coordination, and use against vital objectives apply as well to tanks as other arms.

Mass is particularly important, and tanks must be concentrated at the decisive place at the decisive time. Tanks should be massed on favorable terrain and in support of the main effort. The tank company should be employed as a unit and no unit smaller than a platoon should ever be employed alone.

Surprise is almost as important as mass; but, by the very nature of tanks, it is difficult to obtain. It may be gained by an attack from an unexpected direction at an unexpected time over difficult but not impassable terrain. Surprise in tank attacks is generally effected by the rapidity of concentration and the intensity of the attack, and these are both dependent upon proper adherence to the principle of mass.

Tank units may be attached to infantry units, but it is more desirable to assign them direct support missions for the following reasons: Placing tanks in support:

- (1) Permits allocation of the maximum number of serviceable vehicles to the zone of action where their capabilities can best be exploited.

(2) It prevents depletions in tank strength from working a continual hardship on any one infantry unit during any one phase of the attack.

(3) It provides for better coordination and unity of action in tank led or tank supported attacks along the entire division front.

(4) It eradicates the possibility of sizeable tank units remaining idle in one zone when their service could be used in another.

(5) It facilitates liaison and reconnaissance.

(6) It facilitates maintenance and supply.

(7) It insures better communication performance and security.

(8) It provides for more efficient employment of tank dozers, flame throwers, and other specialized equipment since they may be rapidly shifted from one zone to the other.

NECESSITY OF CLOSE LIAISON.

Efficient operation of the tank-infantry team depends to a large extent upon the establishment and maintenance of close liaison.

Liaison, in this case, embraces joint briefing, joint reconnaissance, and joint tactical decisions as well as all normal liaison functions. In addition certain infantrymen must be trained as tank guides.

Insufficient time allowance for effecting close liaison between components of the tank-infantry team will result in lack of precision and coordination. In the worst eventuality it will lead to disaster.

Reconnaissance is vital and necessary prior to the launching of a tank-infantry attack and continuously thereafter. The supported

unit must furnish all information available from its own element, and at least two infantrymen per rifle platoon should be trained as tank guides. All tank reconnaissance must be coordinated with engineer personnel in order to facilitate the location, marking, and removal of tank obstacles.

There are three means of communication between tanks and infantry, and all members of the infantry tank team must be familiar with them.

(1) Wire. Supported units should run wire from their switchboard to the supporting tank unit CP.

In addition, each tank has mounted on the right rear a tank-infantry telephone with signal button and approximately 15 feet of line. This phone connects with the tanks intercom system and enables any infantryman to communicate with any tank commander.

(2) Radio. Each tank is equipped with a AN/VRC-3 radio which is capable of netting with the SCR 300's carried by the infantry. This enables tank unit commanders to net with infantry unit command frequencies.

Each tank platoon and company has liaison parties equipped with SCR 509 and/or 510 radio sets. These sets can net, with the SCR 508's and 528's mounted in the tanks, to enable the liaison parties at the infantry CP's to communicate with tank unit commander or individual tanks. The tank battalion has several AN/MRC-7's capable of netting with any tank radio and the tank liaison team radios at any time.

(3) Visual. Infantry and tanks may, when the facilities above are not functioning, communicate by flag, arm and hand signals, and other emergency means. These signals vary throughout the corps, but must be standard within the division.

TANK-INFANTRY COOPERATION.

When tanks are operating in support of infantry, the senior infantry commander involved assumes overall command. When tanks make the main effort supported by infantry, the overall tactical commander will be designated by higher authority.

Tank-infantry operation requires an extremely high degree of cooperation, coordination, and unity. It is, therefore, imperative that both tank and infantry troops be instilled with a mutual respect for and trust in each other. Every opportunity to develop closeness of troop relationship must be utilized, both in training and combat. This closeness is attained by combined training (which should be the rule rather than the exception) with every infantry unit training with every tank unit. It should be borne in mind that if the tank battalion supports the attack of the division it will be practicable, under different tactical situations, for a tank platoon, a company, or even the entire battalion to support the attack of one BIL.

The role of arms, other than tanks and infantry, were outlined earlier in the discussion of capabilities and limitations.

Normally in a combined attack the tank will lead the attack, following very closely the preparatory barrage, destroying targets which survive the preparations, and will cover by fire the objective

and suspected targets. The infantry closely follows the tank designating targets for them, protecting the tanks by fire, completing the destruction of the enemy, occupying the objective and consolidating gains, and organizing the ground. However, tanks cannot successfully lead the infantry unless the following conditions prevail:

- (1) Terrain favorable for tanks.
- (2) Mine fields absent.
- (3) Effective anti-tank obstacles absent.
- (4) Anti-tank defenses weak.
- (5) Adequate supply facilities provided.

Tank-infantry attacks should be in depth (multi-wave) if the number of tanks available will permit.

The tank led attack reached its final development in the last war in what became known as processing. This was in effect a mopping-up operation conducted in front of the lines. Small groups of tanks move out ahead to knock out strongpoints and permit a slow but steady advance by the infantry with lessened casualties. The tanks furnished each other with mutual fire support against AT weapons, but are covered by infantry units as protection against AT personnel. Usually teams from reserve or support units were assigned on the basis of one per tank. The fire team and tank commander were briefed together; and, knowing the mission the fire team could take covered position some distance from the tank and adequately cover the tank advance without sustaining casualties from the heavy mortar and artillery fire put down around the tanks. Another high degree development of the tank-

infantry team was the so called "married" units employed by the Armored forces in which infantry units, squads, platoons, companies, etc., were married to tank units of the same size. This was primarily an armored division tactic however, and required armored personnel carriers for the infantry involved.

When conditions are not favorable for tank employment, the infantry must lead. This will be necessary when:

- (1) Terrain is unfavorable to tanks.
- (2) Mine fields are known or suspected.
- (3) Information of the enemy is vague or lacking.
- (4) The enemy has prepared strong anti-tank obstacles and anti-tank gun defenses.
- (5) Attacking through woods or higher vegetation.

In general, tanks should not be used when no proper or remunerative targets are available, or when the mission at hand can be economically accomplished by infantry operating alone with organic weapons. Limited replacements, spare parts, and maintenance facilities necessitate conservation of armored equipment.

When tanks can not lead or participate actively in the attack they should be held in reserve to reinforce artillery until the infantry has seized favorable terrain, removed mines and anti-tank obstacles, and overcome or neutralized anti-tank weapons. Tanks can also be used to support the attack by direct fire from favorable positions.

We shall not discuss penetration, pursuit, or raids as limited command facilities, maintenance and servicing equipment, and inadequate personnel practically precludes the possibility of Marine Corps tank battalions engaging in armored force attack as such. Lack of facilities for moving large infantry units to the close support of an armored attack further precludes this possibility. Except in emergencies, therefore, tank units should not be assigned missions in advance of the effective supporting range of the infantry.

Though essentially an offensive weapon, the tank may be used successfully in the defensive when the terrain and the situation permit. Their defensive employment requires the same reconnaissance, planning, briefing, and use of supporting weapons as when the tanks are attacking. In the defensive employment a carefully conceived counterattack makes the best use of the offensive power of the tanks. Here again joint reconnaissance, joint planning, and joint briefing are essential.

SPECIAL EQUIPMENT.

The tank battalion has some specialized equipment; namely, the flame thrower and tank dozers which it might be well to discuss here.

The flame thrower (the main armament of the flame thrower tank) has a fuel capacity of 300 gallons and a range of 100 yards under ideal conditions. It is particularly suited to the following missions:

(1) To assault enemy positions upon which fires from other weapons cannot be brought to bear.

(2) To burn off brush, jungle growth, or rubble concealing enemy personnel or weapons.

(3) To destroy enemy buildings or other structures concealing or suspected to conceal enemy installations.

(4) To penetrate embrasures and gun ports or cause same to be closed.

The limitations of flame thrower tanks are the same as those of standard tanks. However, flame thrower tanks must be close to within relatively short range of enemy installations in order to bring the flame thrower to bear; and, therefore, requires even closer support than do standard tanks. Normally, organic flame thrower tanks should not be used independently, but should be supported by other tanks. The flame thrower tank is a highly specialized weapon intended for specialized employment, and its capabilities should not be dissipated on targets which may be eliminated by other weapons. This flame thrower weapon proved to be one of the most effective weapons in Pacific Warfare.

Similarly, the dozer tank is intended for special employment. It is not an engineer vehicle, but actually a fighting tank equipped to aid the tank units in crossing rough terrain or artificial obstacles. It should not be used for clearing mine fields, fighting fires, or digging revertments.

SPECIAL OPERATIONS.

Tanks employed in towns. When employed in towns tanks require closer than normal infantry support. Maneuverability, vision, and fields of fire are greatly impaired, tank action is canalized considerably by roads, streets, and alleys. Coordination and control

becomes difficult. The fighting tends to become clashes between small groups at close range. These disadvantages, however, should not cause hesitation in the use of tanks in town fighting for the effect of its armor-protected fire power renders it a valuable weapon, if properly handled and protected by the infantry. An excellent method for the tanks to be employed in town fighting is by supporting the attack by fire and by enveloping the town to cut off any enemy withdrawal. It must be remembered that when employed in towns, infantry should accompany tanks closely to prevent enemy tank hunters from destroying them. Specific individuals should be charged with protection of the tanks and should remain in close proximity to them throughout the operation. Tanks should not advance ahead of the infantry into sectors that have not been cleared of the enemy.

Attacking in jungles. When attacking in jungles, tanks are deprived of their normal visibility as well as their maneuverability. At such times they are especially dependent upon the infantry for close-in protection, designation of targets, and maintenance of direction. The danger of anti-tank fire and ambushes by tank hunting parties is great, and tanks must be closely protected by riflemen. The riflemen must point out suspected enemy installations and suitable tank targets for tanks to fire on. This may be done by means of tracer ammunition, smoke grenades, rocket launchers, or other pre-arranged signals. Close coordination between tank and infantry leaders is essential. Frequently direct communication is maintained by external tank interphone between the infantry leader advancing immediately behind a tank and the tank commander inside the tank.

The tank flamethrower is a very effective weapon in jungle fighting. It can be used to burn underbrush when such underbrush is believed to conceal the enemy or enemy positions; and, by so doing, the enemy is exposed and immediately brought under the fire by the tank or infantry weapons. The flame thrower also has a tremendous demoralizing effect on the enemy.

Although not a recommended procedure, tanks have effectively been used to push through dense jungle growth, ahead of the infantry, to facilitate a more rapid advance of the infantry. When this method is used the tanks are dependent on the infantry to maintain the proper direction. Infantry must be constantly alert to keep tank hunters and suicide squads from rushing the tanks and disabling or knocking them out.

Amphibious operations. As far as amphibious operations are concerned, once the landing has been effected, the employment of tanks with infantry is the same as in any normal ground attack. The greatest difference of an amphibious operation, as compared to any other, is the preponderance of planning and preparation.

For a tank unit the cessation of training, contrary to popular opinion of other units, means increased work. Preparation for embarkation must commence immediately. One of the greatest factors governing the planning and preparation will be the type of shipping available to carry tanks, personnel, and equipment. In a particular area it may be impossible, due to commitments by the Navy to other units,

to secure the type of shipping desired. Normally, a division commander after consulting the tank battalion commander will request a specific type of shipping. If available, and the Naval Commander feels that hydrographic conditions will permit the use of the desired shipping to transport and land tanks, the request will be approved.

Landing Ship Tanks (LST's) are not desirable where reefs, sand bars, underwater obstacles, hazardous hydrographic conditions, or stubborn enemy opposition to the landing is anticipated. The landing ship tank is the largest ocean-going ship that is designed to beach and land tanks over a bow ramp. The LST is capable of transporting the medium tank company, but is not recommended to be used on an amphibious operation where the early landing of tanks is anticipated as they are difficult to beach properly and retract quickly. It also presents a large and lucrative target when beached during the initial assault. Shipping space will always be at a premium and it is not practicable to land tanks from a landing ship tank, retract, and return that same LST later to unload wheeled vehicles, equipment, or cargo loaded on the top deck. It would be hazardous to attempt to land wheeled vehicles and supplies on the beach as soon after the initial assault as infantry tanks must be landed.

The Landing Ship Medium (LSM) was used with outstanding success by the Fourth and Fifth Tank Battalions of the Fourth and Fifth Marine Division in the assault on Iwo Jima. They were used successfully in the Okinawa operation and in the Occupation of the Japanese Empire

by various Army and Marine Corps units. The LSM, although it can't transport as many tanks as the LST, seems to be the better method of transporting and landing tanks. When approaching a hostile beach it presents a much smaller target than an LST, and therefore is less likely to be hit by enemy fire. It has much less draft than the LST and as a result it is able to get much closer to the beach.

The Landing Craft Tank (LCT) in its latest version is a shallow draft craft capable of transporting tanks for a relatively short distance. They are not capable of sustained sea voyage because of their limited troop space, billeting and messing facilities, small size, inability to ride out sustained high seas, and necessity of frequent refueling.

The Landing Ship Dock (LSD), although not primarily designed as a tank transporter, is an excellent ship for this purpose. It is capable of carrying a company of M4 series medium tanks loaded in LCM's or tanks loaded into three LCT's. The LSD is capable of maintaining speed and station with APA and AKA convoys. It is realized, however, that our present day medium tanks cannot be transported in LCM's; and, the LCT only being able to contain three such tanks and in turn the LSD only being able to hold three LCTs, is not the most economical way of transporting tanks. Probably the answer would be to design an LCM or similar craft capable of transporting the M26 tank; therefore, increasing the transporting ability of the LSD from nine medium tanks to a number considerably higher.

Early in the preparation stage along with boxing, crating, and marking of equipment great emphasis must be placed on the proper waterproofing of vehicles. This procedure must be very closely supervised by unit commanders. It cannot be emphasized too strongly that despite excellent hydrographic information that tanks seldom are landed without going through varying depths of water for distances which in some instances have exceeded one thousand yards. There is no assurance that tank units will not have to ford to get ashore. The electrical system of the tank must be thoroughly and completely waterproofed. Of the fourteen medium tanks which attempted to land on Betio Island, Tarawa Atoll, all tanks were either lost in holes in the reef, or salt water rendered inoperative the communication system, gyrostabilizers, and power traverses. In the landing in the Marshall Islands forty per cent of the tank casualties were due to improper waterproofing. At Saipan, of two Marine tank battalions landing simultaneously under similar hydrographic conditions, the battalion lost no tanks due to poor waterproofing and was able to salvage two-thirds of its tanks lost in holes in the reef because of proper waterproofing. The other battalion, landing over the same and adjacent reef areas and beaches, lost five tanks initially as a result of poor waterproofing, and nine tanks of this battalion later became casualties because of wet electrical systems. Of the 56 tanks of the Third Marine Division, landing on Guam and having to negotiate approximately 200 yards of reef through water ranging from 2 to 6 feet, all tanks reached the beach in fighting condition. The only difficulty encountered due to landing,

was failure of some of the communication facilities which was readily repaired. Waterproofing must be continuously inspected from the time it is applied until the tanks are ready to debark from the landing craft to detect any discrepancies that may arise.

A rehearsal is normally held either in an area in close proximity to the embarkation point or in an area on the route to the target area which is held by our forces, and is suitable for rehearsal with minimum of vehicular and personnel casualties. Contrary to popular belief, the rehearsal is not primarily to test the feasibility of the landing plan for the assault troops or to test the plan for employment of troops ashore. A rehearsal of an amphibious landing is designed to familiarize or review debarkation procedure of the landing troops; to test ship to shore communications and lateral troop communications; to check distances and intervals between rendezvous areas, line of departure, guide boats, control vessels, and landing elements; and to acquaint the various landing force personalities, who will be working together in the actual landing, with one another. This is accomplished by issuing an operation order exactly the same as that issued for the actual assault landing except for the difference in geographic location. The size of the landing area, the disposition of troops, and the communication and supply plan is exactly the same. Naval gunfire is simulated in accordance with the naval gunfire plan for the actual landing and supporting aircraft is present to dry run all preplanned air strikes.

The tank battalion will participate in the rehearsal by being embarked and following its actual landing plan; however, the tanks may or may not be actually landed. A decision must be made as to whether or not the actual landing would warrant the possibility of losing some tanks and inflicting considerable damage to their waterproofing. The tank liaison parties with the infantry regiments will be landed and will carry out the missions assigned to them for the actual landing. They must test communications with their companies and with the tank battalion. The battalion liaison party will also test its communications and missions. The rehearsal is of no value to the tank company other than that benefit which is derived by the liaison party and unit commander. It gives the unit commander time to become familiar with communications and his functions of command liaison with the naval forces responsible for landing his unit.

Immediately upon embarking aboard ship for the voyage to the target area, all hands should be informed of the proper ship's decorum, conservation of water, hours for use of washrooms and showers, and care and maintenance of equipment should be stressed.

For security reasons, information pertaining to the operation and target area is not disseminated to individuals below the company commander. Therefore, as soon as the ships leave the staging area all hands should be thoroughly briefed and informed in detail of the coming operation. Maps, aerial photographs, and other subject matter will be available for this purpose. A relief map of the target area

is an excellent aid for this schooling. This schooling should contain information covering geography and history of target area; strength and composition of enemy forces, to include enemy capabilities of counter-attack by air and amphibious forces; strength and composition of our own forces, to include air and naval units; and the identity of commanders of expeditionary force elements; general plan of attack for the first phase; surface and air support for amphibious assault; and the mission of the unit being oriented. Warning regarding trigger happiness, indiscriminate anti-aircraft firing, pilfering, disposition of captured property and equipment, countersigns, daily maintenance and care of equipment, and priority of roads should be included.

Briefing must be thorough. It must start at the highest level and proceed down to every individual private in each unit involved. The unit commander must be cognizant of this fact and keep it uppermost in his mind at all times. It has been found that men are particularly anxious to gain all information possible from these briefings. However, ingenious methods and all resources should be exploited to prevent these briefings from becoming monotonous.

Briefing should be continued throughout the entire voyage and should be coordinated with daily periods of maintenance, shipboard drills, weapons inspection, classes in first aid and field sanitation, identification of enemy armor and aircraft, and items of intelligence information which may be received from time to time.

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Organizing for amphibious combat. There are two ways of organizing the tanks for amphibious combat, depending on the scheme of maneuver of the division and the type of control desired. All of the tanks can be grouped under the control of the senior tank officer, or the tank companies may be attached to infantry combat teams.

The tank companies are assigned initially in direct support of assault regiments, but the tank battalion assumes responsibility for control and supply of all companies. This gives a centralized control, which is important in countering initial losses and meeting changes in the tank requirements.

Normally tank companies are attached to combat teams for the initial landing. This is most effective in a landing where combat on the beach is expected. The attacking tank units should revert to division control as soon as possible after the completion of the landing phase.

The tanks normally land behind the assault infantry battalions so they can perform their mission of supporting the advance inland. A secured beachhead is desirable for landing the tanks because of the time required for dewaterproofing and reorganization, and because even the smaller tank landing craft provide large targets for enemy fire. The time for landing the tanks is usually contingent upon beach conditions as determined from advance intelligence. The methods for landing are: (1) on order, (2) according to a predetermined time schedule, and (3) on order of the tank group commander.

Landing tanks on order is the most flexible method of getting them ashore. When beach conditions develop unexpected complications, this method prevents landing the tanks too early.

Landing on a time schedule which has been set in advance permits little adaption to a changing situation. A rigid time schedule makes it difficult to change the designated landing beaches or make any other major variations in the plan.

With this method an advance reconnaissance party from the tank units land with the early assault waves and reports to the tank commander on reef and beach conditions. The group commander then decides when the tanks should go ashore.

Reconnaissance of reef and beach areas may be made prior to landing the assault troops. When amphibious patrols go in on such missions, tank personnel should be included to obtain needed information for the tanks. Other reconnaissance-liaison personnel from tank units will land with the assault infantry waves in advance of the tanks. These personnel have the mission of meeting the tanks of their unit on the beach and guiding them inland by suitable routes to the infantry units they are to support. In selecting routes inland, the reconnaissance personnel must be especially watchful for land mines.

The method of controlling the tanks during the landing will have been determined during the planning phase. They proceed ashore either as a tank group under control of the senior tank officer, or with each tank company attached to a combat team.

The tanks should come ashore as soon as possible for their mission of supporting the advance inland. The plan for the landing determines when the tank will land, or at least what method will be used to decide on the time. If the plan includes a predetermined time schedule for tank landing, they come ashore in accordance with that schedule. If tanks are to land on order of the tank group commander, the situation on the beach and the beach and reef conditions are major factors in the decision as to when the tanks reach the beach. Sufficient beachhead is desired for the tanks to have time to dewater-proof and reorganize before being committed.

Once in the rendezvous area, the tank unit commanders are responsible for landing at the proper time in accordance with method in the landing plan. If on a time schedule, they must have their tanks at the line of departure on time. If on order, they must be in constant communication with higher echelon. No matter which method is being employed much of their movement in the water is directed by Navy control boats. The tank unit commanders are required to have a complete understanding of the visual signals displayed by these craft in controlling the movement to the beach.

The tanks should be guided to the beach in order to avoid pot-holes, bomb craters, and underwater obstacles, especially when a reef is present. Methods of guiding the tanks in to shore include assigning LVT's as guides or using designated tank personnel to precede the tanks through the shallow water on foot. If time permits, channels to the beach may be marked by buoys or other markers. All of this is

in addition to the guiding of the tanks through land minefields and obstacles which is done by reconnaissance personnel already ashore.

If the landing is to be made over a table reef with a seaward fringe similar to those found throughout the Gilbert, Marshalls, and Mariana Islands group, the tanks will be forced to ford from the edge of the reef to the beach. It may even be necessary, if tanks are landed from LCMs for LVTs to act as anchors by attaching a cable from the bow of the LCM to the stern of the LVT to hold the Landing Craft against the reefs to keep them from kicking back and losing the tanks, when the tanks are being discharged.

Under normal conditions a tank company requires approximately half an hour in an assembly area on the beach before moving inland. This time is needed for dewaterproofing and reorganization after the landing.

MAINTENANCE AND SUPPLY.

Tanks require considerable maintenance, which consumes much time. Reservicing of tanks after a day's combat requires an average of three hours. It is not feasible to accomplish reservicing after dark. These factors must be considered by infantry commanders in making plans for joint action.

Tank battalion logistics and supply are handled by organic units and constitute a large problem. This is another reason why tank units should not be attached, whereby their supply problems are added to those of the infantry unit.

CONCLUSION.

In conclusion, we must above all guard against complacency nurtured by our consistent success of the past War. It is historically fatal for victorious military organizations to adopt the frame of mind that it has learned enough in winning any particular war to win the next one. We must rather always realize that we do not know enough now to win again! We have much to learn and we must constantly strive to improve and perfect our doctrines, techniques, and equipment.

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