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THE ARMORED SCHOOL
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MILITARY MONOGRAPH

TITLE: If You Can't Avoid a Reef.

SCOPE: The origin of an amphibious tractor battalion and its part in the assault of a beach fringed with coral, to include:

1. Training background.
2. Preparation of vehicles.
3. Joint planning and coordination with assault infantry and Navy.
4. The execution of the plan evolved in the assault on Okinawa.

41-61


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At 1400 on 30 March 1944, the companies of the 788th Tank Battalion were on the range at CAMP CAMPBELL, KENTUCKY, completing the last phase of their Army Ground Forces Training Tests. A liaison officer from the battalion headquarters gave the companies the battalion commander's instructions to return to camp without delay and to prepare to turn in their organizational equipment. The battalion had trained with the 83d Infantry Division for one month in the employment of tanks with infantry. Everyone assured himself that the battalion would draw new tanks, somewhere, but the commander had nothing to say except that the battalion would move to FORT ORD, CALIFORNIA, as soon as the turn in had been completed. This was accomplished in record time, as XX Corps, the headquarters to which the battalion was attached, had spoken to post ordnance.

During the second week in April the battalion found itself on the station list at FORT ORD assigned to the 13th Armored Group for preamphibian training and scheduled to be reorganized and redesignated the 788th Amphibious Tractor Battalion. The personnel of the battalion was not enthused with their new weapon, the LVT (Landing Vehicle, Tracked) popularly called, "The Alligator," although they knew it only by name, and were not scheduled to receive it until assigned to the 18th Armored Group.

Preamphibian training consisted of a review and check of POM requirements, biding time until the 18th Armored Group had the facilities available to train another battalion. The morale

of the battalion was shaken, but its interest in the new surroundings, the CALIFORNIA countryside, kept it from toppling. The battalion was still tied to the confidence it had in the tank.

After 5 weeks with the 13th Armored Group the 788th Amphibious Tractor Battalion received its LVT's (Alligators) and was put into the 18th Armored Group's 8 weeks' training cycle, designed to retrain separate tank battalions, armored infantry battalions, and tank destroyer battalions as amphibious tank and tractor battalions. The group's mission was dictated by the needs of the commanders of infantry divisions operating in the PACIFIC THEATER. When planning for the assault upon MAKIN ATOLL¹, during the summer of 1943,

General Ralph C. Smith and some of his staff were convinced that the initial forces to cross the beaches of MAKIN should be carried ashore in LVT's (Alligators), amphibian tractors capable of self-propulsion on water and on land. Each of the 3 landing groups which first approached the 3 separate beaches on BUTARITARI² was to ride in Alligators. To operate the vehicles, personnel was drawn from the Headquarters Company of a tank battalion.

¹Coral islands consisting of a belt of coral reef surrounding a central lagoon.

²The largest island of the Atoll.

A detail of the 193d Tank Battalion began working with the land teams on 15 October to develop the skill needed to operate and maintain Alligators. They had but one LVT on which to practice, and when those for the MAKIN landing were delivered on 30 October, they were of a longer, later type, lacking not only armor but necessary armament. They had to be conditioned for use in great haste while machine-gun mounts were obtained for them by stripping some of the armed vehicles on OAHU. Time for training with the transports was very short indeed¹.

The training period with the 18th Armored Group fitted the LVT to the mental attitude of the members of the battalion and it replaced the tank as the weapon of the battalion. The imbued characteristics of aggressiveness and boldness, essential to a tank crewman, were found to be equally essential to the tractor crewman in accomplishing his primary mission: namely, to transport assault troops, equipment, and supplies to the shore and across the vulnerable beach area and as far inland as the situation permitted. In addition, if beach defenses existed, the tractor crewman was to assist the assault troops in the reduction of these defenses by close fire support from the four machine guns mounted on the tractor. The training program was designed to produce battalions capable of accomplishing this mission. This training also insured the accomplishment of secondary missions that might be assigned the battalion; to

¹Historical Division U. S. War Department, The Capture of Makin, p. 25.

transport troops, supplies, and equipment during a river crossing, to defend beaches and repel counter-landings, and to defend supply points and airfields. The retraining of battalions must be flexible as to time and scope, depending upon its previous training, and the immediate exigencies for this type of battalion. This must be realized in preparing the master training schedule.

The training received while assigned to the 18th Armored Group was adequate and sound, and prepared the battalion for its combat missions. The main elements of the training were:

1. Land driving.
2. Water driving.
3. Formation driving in water.
4. Platoon line, combat firing, land.
5. Platoon line, combat firing, water.
6. Company landing exercises.
7. Battalion landing exercises.
8. Combined landing exercises.
9. Maintenance.

The battalion was most fortunate in receiving LVT's that had seen considerable service for its training vehicles. These vehicles impressed everyone with the fact that the greatest problem in tractor operation was that of maintenance. Approximately one-third of the training time was devoted to maintenance of the vehicle. The LVT requires the normal maintenance performed on the land tank, and in addition, maintenance to arrest

the corrosive action of salt water on all metal, particularly weapons. And maintenance problems due to the abrasive action of sand usually found on the beach, and track maintenance peculiar to the present LVT track. There are 584 bolts on each track, making a total of 1168 per LVT, that require frequent checking and tightening, making maintenance an everlasting must.

The battalion landing exercises were the battalion's preview to its employment in the assault upon LEYTE, P.I., and OKINAWA. At RED BEACH, FORT ORD, the landing beach was studded with LVT obstacles for a distance of approximately 35 yards inland. Landing and penetrating beyond the beach line was analogous to the individual soldier going through the infiltration course. It impressed upon the tractor crew that their vehicle could breach beach defenses and a deeper penetration could be accomplished if the LVT commander selected his path of advance within his zone. While the LVT's were waterborne, proper formations, an important element in control, were stressed. This helped to eliminate undesirable congestion or defeat in detail upon landing.

During the third week of July the battalion returned its vehicles to the 18th Armored Group, crated its organizational equipment and moved to the POE organized and trained as an amphibious tractor battalion. The morale of the battalion was high. Its training had developed in the men the same confidence that they had in themselves and their organization when they

were equipped with the land tank.

On 9 August, the battalion debarked from a converted liberty ship at HONOLULU, OAHU, greeted by an army band and a convoy of trucks. This was a far cry from the greeting promised by the Travel Bureau; no garlands of flowers were placed around necks by dark skinned natives chanting and swaying to Hawaiian melodies. The Island was teeming with staging area activities, both military and naval, in preparation for scheduled amphibious operations. Upon arrival at the Armored Amphibian Camp at KOKO HEAD, the battalion found its place in the puzzle. It was assigned to the XXIV Corps and attached to the 96th Infantry Division for the "Stalemate" operation, the amphibious seizure of YAP ISLAND. This island was fringed with a coral reef, the type for which the LVT was designed as an assault transport, giving less emphasis to the statement, "Reefs or shoals which limit operations should be avoided in the selection of beach sites."¹

On the tenth, the battalion began its preparations for combat; drawing new vehicles and modifying them, coordinating plans with the 96th Infantry Division for the assault, and reorganizing the battalion to fit the adopted plan. These activities lasted for a period of one month with no time to spare. Planning was concurrent with the preparation of

¹Staff Officers' Field Manual (Draft) 101-10, Chap. 4, p. 30.

vehicles. A total of 110 LVT's were drawn; 26 unarmored and 84 armored. The 110 LVT's seemed more than adequate in light of the planning for the coming operation in spite of the fact that it was 9 LVT's short of the 119 T/O authorization. During this preparatory phase, the greatest problem was that of preparing the new tractors for combat. Each vehicle received a coat of OD paint to obliterate its battleship gray. 500 series radios had to be obtained and mountings provided for their installation. Navy "TCS" radios with which every vehicle was equipped had to be replaced. A false floor had to be built in the forward end of each cargo compartment so that the machine gunners could reach and properly man their guns. Approximately 200 gun shields were made from one-fourth inch armor plate for the forward guns and fixed to the gun cradle. Four LVT's were modified, limited only by the maintenance crews' ingenuity, as maintenance vehicles. Some unarmored alligators were given a tougher skin by the addition of one-fourth inch armor plate salvaged from unserviceable LVT's. This modification was halted due to the lack of armor. Maintenance checks were made and made again until no conditions or failures, which might lead to failure were found. The battalion realized that proper performance of LVT's was essential to landing the assault BLT's (Battalion Landing Teams), the basic unit of an amphibious operation.

On 10 September, the battalion organized to land the 383d RCT (Regimental Combat Team) of the 96th Infantry Division and equipped with 103 LVT's embarked aboard seven LST (Landing Ship, Tank) and sailed for the target.

The assault seizure of YAP ISLAND was planned and rehearsed in an assault landing upon MAUI ISLAND, T.H., but never executed upon YAP. The plan for the XXIV Corps' seizure of YAP was the plan which the Corps used for its initial landing upon LEYTE ISLAND, P.I. The change in target was disseminated to the troops when the LST's carrying the amphibious tractors and tanks were laying at anchor at ENIWETOK ATOLL, five days from YAP, awaiting the transfer to the LST's of the assault boat teams of the 1st and 2nd BLT's of the 383d RCT. The change in target did not change the assault plan at the BLT level, except for changes in objectives and the elimination of the transfer line¹ for the landing of the reserve BLT of the regimental combat team across the coral reef. This target change gives foundation to the statement that plans and orders for amphibious operations must be flexible and that once an amphibious task force has been organized, equipped, trained, and rehearsed, the specific target can be changed without inviting defeat. It must be remembered

¹A line designated between the line of departure and the beach for the purpose of coordinating the transfer of troops or supplies between naval craft and amphibious units; generally marked by control vessels which control traffic to the beach.

that plans and orders are only as flexible as are the minds of those who execute them.

The battalion did not play its intended role, the assault of a hostile shore fringed with coral, until the assault upon OKINAWA, 1 April 1945. For this operation the battalion again found itself attached to the 96th Infantry Division and re-attached to the 383d RCT, with the following missions:

1. To land the troops of the 1st and 3d BLT's on the HAGUSHI BEACHES Brown 3 and 4¹.
2. To assemble in a designated area near the transfer line, after landing the 1st and 3d BLT's prepared to land the reserve elements of the RCT.

During the second week of January, 1945, the battalion began preparing for its mission. The preparation of LVT's was again the major problem. Planning the organization of the battalion for the assault had generally become standard; this standardization paralleled the RCT's (Regimental Combat Team) adoption of a standard boat assignment table which generally set the number of LVT's per wave, the approximate personnel to be included in each wave, and the assignment of personnel to LST's.

The maintenance problem seemed insuperable. Because of the hard duty during the LEYTE campaign and the lack of sufficient repair parts, the majority of the LVT's were in poor condition.

¹Beaches centrally located on the west coast of OKINAWA.

At the end of January, it was believed that a considerable number of new LVT's would be received to replace those in the worst condition and that sufficient repair parts would be received to enable the balance, those not replaced, to be placed in excellent condition. After much talking, liaison, command liaison, and all other activities common and uncommon which are normally result-producing, six LVT's were issued to the battalion. A dire shortage of repair parts continued to exist in comparison with the minimum number needed. Track bolts 1168 per LVT were issued by the handful. Someone in the logistical planning had forgotten the LVT. Tracks were repaired with old and undependable parts salvaged from unserviceable tractors. There was no time for refresher training; maintenance continued to fill the day until embarkation for the rehearsals.

Planning for the assault upon the HAGUSHI BEACHES BROWN 3 and 4 began at the division level. In conferences, division, RCT and attached battalion representatives crystallized the plan for the ship to shore movement of the assault troops. Plans for the specific load for each LVT were accomplished in conferences between the BLP commanders and the LVT company commanders.

The assault beaches were fringed with a coral reef extending approximately 1000 yards seaward, with a submerged shelf, at six to twelve feet below the surface at low tide, extending an additional 100 yards. A slight surf existed at the edge of the fringing reef with rough coral immediately behind the reef's

edge on Brown 4. The beaches were about five to thirty yards in depth of smooth sand backed by a sea wall, six to twelve feet high, made of rough stones cemented together with no man-made or natural exits. Reports of prepared defenses on the beaches did not exist. It appeared that the reef would not constitute an obstacle to the LVT. The submerged reef was below the draft of the tractor, slightly in excess of four feet. The surf and rough coral was its habitat. The LVT's (Alligators) would again repeat the performance they gave on MAKIN.

About 100 yards offshore, the amphibians came over the coral reef. No barbed wire, mines, or other military obstacles impeded them. At 0825, as their tracks began to touch the rocks, like clumsy, bizarre reptiles, they scraped their way forward, somehow lumbered up the shoulders of the beach, and perched on boulders which held them high in the air.¹

The organization of the battalion, two tractor companies and one headquarters, headquarters and service company, dovetailed into the RCT's assault plan for landing with the 1st and 3d BLT's abreast on BEACHES BROWN 3 and 4, respectively, at H hour (0830), to be followed by the landing of the reserve BLT on BEACH BROWN 4, the right flank beach for the landing force. The assault BLT's of the RCT were allotted six LST's for transportation to the target. A transfer line 2000 yards off the beaches

¹Historical Division U. S. War Department, The Capture of MAKIN, p. 39.

was to be established where the reserve BLT boated in LCVP's (Landing Craft, Vehicle, Personnel) would transfer to LVT's for movement across the reef. It was also planned that this line would be marked by the Navy.

The battalion plan assigned Company A the mission of landing 1st BLT and Company B the mission of landing 3d BLT, in accordance with the wave formation plan evolved from the conferences at division. Each battalion landing team was boated in 38 Alligators organized into five waves; each wave containing eight Alligators except the second and third waves which contained seven each. LVT company commanders were designated to land the BLT commanders to insure maximum control through the communication channels of both units. Two LVT's were designated as naval reconnaissance vehicles to be used in the search of the reef for channels to allow the passage of craft, after the assault. Two additional tractors were designated as infantry free vehicles to be used for unforeseen needs and four were attached to division artillery to insure a supply of ammunition across the reef to the artillery ashore. The LVT's in the assault waves were instructed to proceed as far as the seawall and to place the bow of the tractor against it, allowing the infantry to use the bow as a step in scaling the wall. Each Alligator carried two ten-foot ladders lashed to its bow to be used in any contingent difficulty.

The landing of the reserve BLT on BEACH BROWN 4 was planned to be accomplished by a composite company of 40 LVT's under the control of the Company A commander. This composite formation of 24 LVT's from Company A and 16 from Company B was adopted to insure that the plan would be possible when ordered executed. It was probable that some of the 39 LVT's assigned each company in the initial landing would be disabled and that no one LVT company would be able to approximate the requirement. To organize the 40 LVT's into five waves of eight LVT's each and to clear the beaches for succeeding waves, all tractors were instructed to return individually from the beach to the transfer line and rally by company between BEACHES BROWN 3 and 4 with the exception that the 16 tractors from Company B would rally south of BROWN 4, prepared to land the first and second waves, and the 24 tractors from Company A would rally just behind the transfer line between the two beaches, prepared to land the third, fourth, and fifth waves. The company commander, Company A, was instructed to maintain these stations until ordered to circle his waves on the transfer line. Number one on the right and number five on the left prepared to effect the transfer of personnel from the LCVP's (Landing Craft, Vehicle, Personnel). Those Alligators not involved in landing the BLT were placed under the command of the company commander of Company B.

After meeting the requirements for the assault landing of troops, eight of the 94 LVT's to be embarked remained to be assigned to the command and service sections within the battalion. These vehicles were allotted as follows:

Battalion Headquarters, two

Battalion Maintenance, three

Battalion Medical Detachment, one

Company Maintenance, two
(One to each tractor company)

One of the two LVT's in battalion headquarters was made available to the battalion commander so that he could supervise the part played by the battalion in the assault. The second vehicle was designated a free tractor for the headquarters. Service sections were ordered to follow the initial assault on to the reef and to remain in that position, rendering assistance where needed, until the ship to shore movement of troops was completed.

The battalion's plan provided for liaison with the RCT headquarters and the colored beach control vessel.¹ The battalion S-3 was designated as the liaison officer with RCT headquarters and the Ex O established liaison with the control vessel. After the battalion plan had been formulated and the troops embarked for the target, any changes would emanate at either the RCT headquarters or the control vessel; thus it was

¹ Vessel from which landing craft or vehicles are dispatched at the line of departure or control line (transfer line) to the beach.

the logical assignment for these two staff officers. The battalion commander felt that his presence among the troops in the assault was of more importance than acting as an advisor to the headquarters to which the battalion was attached or the installation that controlled the battalion's dispatch in the assault.

During the first week of March, the naval officer responsible for the landing of the division briefed, in detail, all amphibious tank and tractor officers and vehicle commanders on the assault ship to shore movement plan for the division. Wooden models were used to represent each landing and guide craft or vehicle. They were moved as the craft or vehicle which they represented would move in the actual assault on OKINAWA on L-Day (1 April 1945). The amphibian operators saw a preview of the landing in miniature. The time and space factors for the ship to shore movement and the position of control and guide vessels were verified. The six LST's, upon which the LVT's and the two assault BLT's were embarked, would form column of two's 1300 yards behind the LD (Line of Departure)¹ between BEACHES BROWN 3 and 4 and launch the assault waves. Naval guide officers in LCVP's, one on each flank of a wave, would guide the wave to its position in the formation behind the LD and accompany it as far as the coral reef. When the wave number flag was raised on the control

¹A coordinating line at sea suitably marked by control vessels to assist the various waves to land on designated beaches at the proper time.

vessel PC¹ 1081), the wave would move up to the LD and when the flag was lowered, it would take off for the beach. The number of each guide vessel and its position relative to the LD and transfer line was stated, giving most essential information to the execution of the plan. The transfer line (control line) would not be marked until after the assault waves had been dispatched, at that time SC² 1374 and 1248 would move forward from their positions marking the LD on the left flank of BEACHES BROWN 3 and 4, respectively, and mark the transfer line, each vessel stationed 2000 yards off the center of its beach.

After the naval briefing the battalion prepared to embark for the RCT's rehearsals, two landing exercises, "dry runs," to ensure joint understanding of the landing plan by all naval and army personnel. The battalion executed the plan without mishap or difficulty, except during the second exercise. The LVT commanders did not find the location of the transfer line (control line) until informed by the Navy that it was not marked as stated in the briefing. The control vessel for BEACH BROWN 4 was not present, and the one present for 3 was a substitute. After some searching by LVT company commanders the line was determined and the transfers affected.

Upon completion of the second landing exercise, the battalion remained ashore to perform maintenance. Seven LVT's

¹Submarine chaser (1731)

²Submarine chaser (1101)

did not reembark after the first exercise because of major maintenance trouble and 28 of the 87 reembarked were in need of second echelon maintenance. The battalion hastily prepared them for the landing at the target, 13 days away. Embarkation day was only two days away.

On 21 and 22 March the battalion embarked aboard six LST's in wave groups with boat teams, and on 25 March at 1215, it sailed from LEYTE GULF for OKINAWA to meet L-Day (1 April).

On the night of L minus one, a destroyer slithered alongside the transport carrying the RCT headquarters and transferred an army officer to the transport. The liaison officer from the RCT to the Navy's underwater demolitions team was returning from the assault beaches with a sketch of the reef and the latest water level panoramic photos of the beaches and seawall. The photos clearly showed an embrasure in the wall to the left of the landing beaches covering the beaches. Company A, the left company of the 1st BLT, beated in the left half of wave one and two, was ordered to land on BEACH BROWN 1, approximately 300 yards to the left of BROWN 3. The plan for parallel communications was used, the order being transmitted over LVT radio nets and RCT radio nets.

Just prior to daybreak on Easter Sunday, the LST's in column of two's, slipped slowly forward toward the beaches. The captains wanted to be certain that they were in the correct area

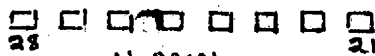
in relation to the LD and the beaches before launching their LVT's. The bow doors were open and the ends of the ramps were held high above the water. Boat teams were on the tank deck mounted and ready to go. The end of the ramps dropped into the water and the LVT's poured out and moved in column, guided by LCVP's, toward the LD. Six mortar boats were already in position just ahead of it for BROWN 3 and six gun boats for BROWN 4. They would lead the first wave of amphibious tanks and the following five waves of tractors to the reef, expending their ammunition load as they moved, then falling out to the flanks as they neared the reef allowing the tanks and tractors to pass between them and hit the beach.

The control vessel was the clock. When the number one flag was lowered, 0800, the first wave moved off the LD and headed for the beaches 4000 yards away. At H minus six minutes, the number six flag was lowered and the last assault wave followed the only path, the one leading to the beach.

The RCT commander declared the beaches clear at 0914, 44 minutes after H hour. The LVT battalion completed its mission of landing the RCT at 1045, without personnel or vehicular casualties. The beaches were undefended. The LVT's had defeated another reef and would have assisted in defeating the enemy if he had dared to resist on our beaches.

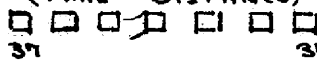
Beach - BROWN 3

First WAVE



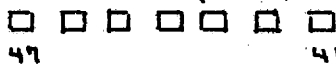
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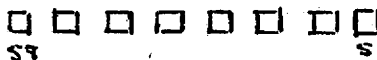


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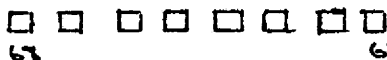
930 yds



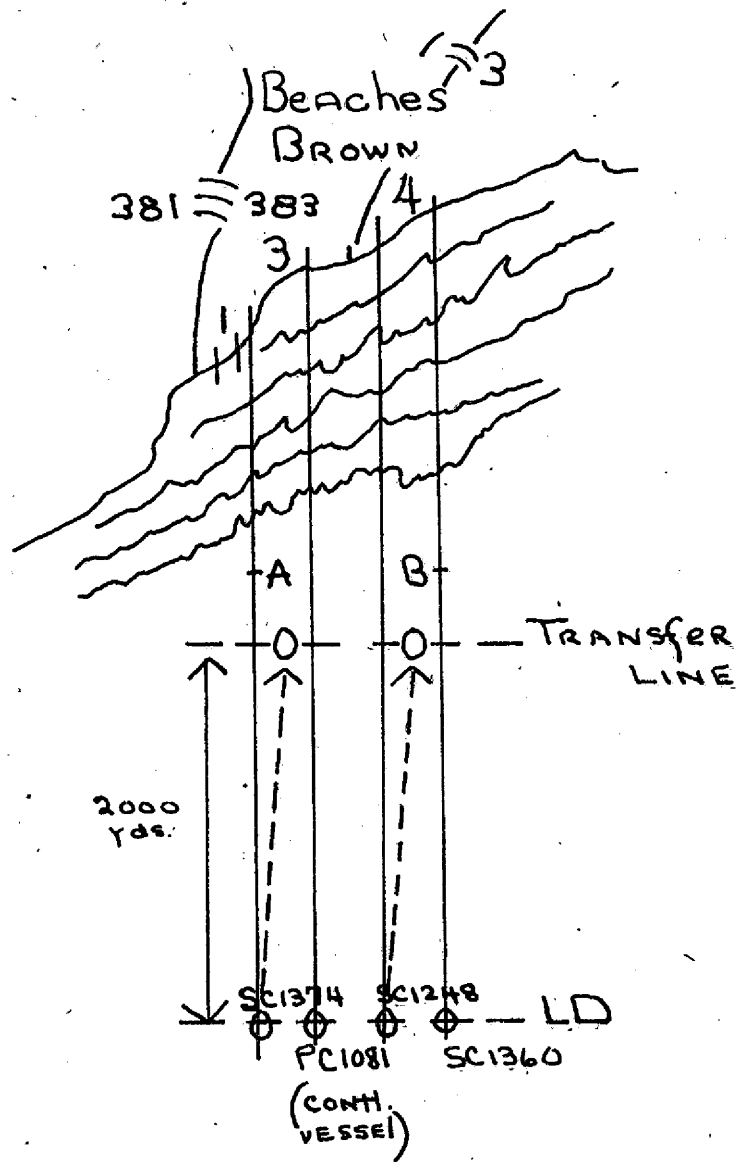
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6 MIN



Boat Landing Diagram Co, A
Identical for Company B



Ship To Shore Control Diagram
Hagushi Beaches - OKINAWA

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