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AUTHORITY

OAG, D/A ltr, 29 Apr 1980

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DEPARTMENT OF THE ARMY
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IN REPLY REFER TO

AGDA (M) (29 Sep 70) FOR OT UT 702156 5 October 1970

SUBJECT: Operational Report - Lessons Learned, Headquarters, 84th Engineer Battalion, for Period Ending 30 April 1970

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2. Information contained in this report is provided to insure appropriate benefits in the future from lessons learned during current operations and may be adapted for use in developing training material.

BY ORDER OF THE SECRETARY OF THE ARMY:

Kenneth G. Wickham

KENNETH G. WICKHAM
Major General, USA
The Adjutant General

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DEPARTMENT OF THE ARMY
HEADQUARTERS, 84TH ENGINEER BATTALION (CONSTRUCTION)
APO SAN FRANCISCO 96238

EGCC-OP 30 April 1970

SUBJECT: Operational Report - Lessons Learned, 84th Engineer Battalion (Construction), for the period ending 30 April 1970 RCS CSFOR-65 (R2)

THRU: Commanding Officer
937th Engineer Group (Combat)
APO 96226

Commanding General
18th Engineer Brigade
ATTN: AVBC-C
APO 96377

Commanding General
United States Army, Vietnam
ATTN: AVHGC-DST
APO 96375

Commander in Chief
United States Army, Pacific
ATTN: GPOP-DT
APO 96558

TO: Assistant Chief of Staff for Force Developement
Department of the Army (ACSFOR-DA)
Washington, D.C. 20310

FOR OT UT
702156

(1)

Inclosure

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EGCC-OP
SUBJECT: Operational Report - Lessons Learned, 84th Engineer Battalion (Construction), for the period ending 30 April 1970 RCS CSFOR-65

1. Operations

a. Command: Assigned and attached units are listed in Inclosure 1.

b. Unit Operations:

(1) Bong Son Bridge:

This project, one of the most ambitious projects the 84th Engr Bn (Const) has undertaken in Vietnam, consists of the construction of a 1634.5 ft long bridge. During this quarter, the flow of water in the main channel of the Song Lai Giang River was diverted and a construction causeway was completed. 245 piles were driven to resistance for a total of 248 driven to date. A total of 312 piles are required for construction of the bridge. Fourteen of the 26 reinforced concrete pile caps required were cast in place. One abutment was completed and three spans of stringers were set in place.

(2) LOC Restoration of QL-1, Tuy An to Tuy Hoa: This 25 KM section of QL-1 was completed on 4 April 1970 after approximately a year of construction which began on 10 March 1969. During the last quarter, 1,400 CY of laterite were moved to complete 1.7 KM of sub-base; 17,522 CY of 3" (-) base rock were placed to complete basecourse on 2.1 KM of road; and 18,004 tons of asphaltic concrete were used to complete pavement on 16.3 KM of road. The completed 25 KM section was accepted and transferred to the Vietnamese Director General of Highways on 31 March. This project was supported by quarry and crusher complex operated at Chop Chai Mountain by the 84th Engineer Battalion.

(3) MACV, An Tuc This project was initiated on 23 Feb 1970 and completed on 22 April 1970. during this brief time period one construction platoon completed 15 rooms for living quarters, a dining room, a kitchen, an administration room, a tower with tank, a latrine with three water closets, three shower heads and three lavatories, a septic tank, and a tactical operation center.

(4) MACV, Hoai Nhon: The scope of this project includes the construction of a 40' x 16' billets, a 10' x 20' Shower/Latrine, a septic tank and Leach field. During the last quarter, the billet, septic tank and leach field were completed. The latrine was partially completed. These buildings are constructed with revetment type concrete block walls.

(5) Ammunition Base Depot, Phu Tai: This project requires the accomplishment of two major tasks; land clearing around the perimeter of the ABD and repair of existing protective berms. New plans changing the scope of the projects were received after land clearing had begun but before repair work had begun. The using unit, the 184th Ordnance Battalion, received the directive to reduce the size of the ABD and change it's designation to an ASP. As a result the number of berms requiring upgrade or repair was reduced to 37, but the requirement to level 33 berms outside the new perimeter was generated. To date 23 of the 37 berms have been rebuilt and strengthen. Repair has been accomplished by first cutting the berms down 2 to 3 feet with a case model 450 light dozer, then rebuilding to the required 11 foot height by hauling, spreading and compacting successive 6 inches of fill. 96% of the land clearing is complete with all 33 berms leveled and a 150 meter cleared area cut around most of the perimeter.

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(6) Construction of Revolutionary Development Route 505: Route 505 is being constructed in northern Binh Dinh Province to open the inaccessible areas to commercial traffic. 15,235 cubic yards of laterite have been hauled, graded and compacted to date to complete 11 kilometers of road. Completion of this part of the road has opended the villages of My Phu, Chanh Giao, and Thian Doa to traffic.

(7) Phu Hiop Airfield Upgrade and Resurfacing: The tasks necessary to upgrade this 4100 foot long airfield include removing the M8A1 matting surface, placing an additional 6 inch lift of cement stabalized sand on the existing basecourse, paving with asphaltic concrete, and marking it to specification. Work accomplished to date includes the removal of the M8A1 matting, placement of 6 inches lift of cement stabilized sand on 2800 feet of the total 4100 foot distance, and placement of asphaltic concrete on an equivalent of 390 linear feet.

(8) Repair of QL-19: In mid April, two companies of the 84th Engr Bn began repair of a 100 KM long section of QL-19 extending from QL-19's intersection with QL-1 to the Mang Giang pass. To date 11,734 CY of select fill have been placed to restore the shoulders on 17.5 KM of road. Potholes have been repaired along 7 kilometers of the road.

(9) POL Tank Repair, Qui Nhon: Two each 10,000 BBL POL tanks at Tank Farm #1 in Qui Nhon became unserviceable because of excessive leaking through the tank bottoms. Subsurface failure caused by disturbance of the area drainage system was suspected. The method of repair decided on included the construction of a concrete foundation under each tank and the placement of an interior concrete pad on the bottom of each tank to seal any leaks which may have resulted from corrosive action or warping of the tanks caused by settling. The berms around each tank were enlarged and filled with water to a depth (about 9 inches) which permitted the tanks to be floated from their original position. The berms were drained and allowed to dry. The sub-base was scarified, regraded and recompacted. Crushed rock was hauled to the area to construct a basecourse. A 12 inch reinforced concrete foundation slab was prepared for each tank. The berms were refilled with water to a depth (about 21 inches) which permitted the tanks to be floated onto the foundation pads. The berms were again drained. Interior concrete slabs were constructed on the bottom of each tank. Work remaining to be done includes caulking the interior joints and seams with mastic and coating the interior concrete slabs with epoxy sealing compound. A third tank which was perforated by hostile fire was repaired by bolting a steel patch sheet in place over the hole and coating the area around the patch with mastic.

(10) OP/SPT at Tuy Hoa, North Field: The purpose of this project was to prepare a facility to enable the forward air control team which support Phu Yen Province to operate from the airfield closest to Province Headquarters. The scope of work included the construction of revetments for two aircraft, the placement of an asphaltic concrete parking pad inside each revetment, building a WP rocket storage bunker, coating the existing runway with a non-skid compound, and removal of a chain link fence from the north end of the runway. All tasks were completed during this reporting period.

(11) Phu Hiep Tank Farm: Sand berms around six POL tanks evidenced significant erosion and their interiors became partially filled with drifting sand. Work accomplished included upgrading existing berms and stabilizing them with soil binder. Sand which had drifted inside the berms was excavated to insure the interior volume was sufficient to contain the contents of the tanks with a full one foot high freeboard to spare.

(12) LOC Maintenance and Repair: Extensive repairs were made on a 16 kilometer section of QL-1 between Vung Ro Bay and Phu Hiep in preparation for turnover. Shoulders , which were disturbed by the installation of a buried pipeline, were brought to grade, shaped, recompacted, and stabilized with liquid asphalt. Major surface failures were corrected by deliberate repair. At present, repairs are very near to being 100% complete and preparations have been made for the imminent transfer of maintenance responsibility on this portion of the road to the Vietnamese Ministry of Public Works.

(13) Headquarters, 937th Engineer Group (C), Phu Tai: In September 1969, when a 240-Bed POW Hospital being constructed by the 84th Engineer Battalion (Construction) was 75% completed, construction was suspended. The 84th Engineer Battalion was tasked to bring this facility to a standard acceptable for occupancy by Headquarters, 937th Engineer Group. Tasks accomplished included completion of water and electrical distribution systems; construction of revetments and bunkers ; construction of a helipad; completion of the messhall; and partitioning of several buildings for offices and living quarters. The 937th Engr Group moved to this facility in mid-March 1970.

c. Intelligence and Counter Intelligence: Enemy Activity was moderate during the quarter with an increase in activity over the previous quarter. In 18 scattered incidents, five men were wounded and 9 pieces of equipment were damaged. The principle sources of intelligence have been the capitol ROK Infantry Division, 22nd ARVN Division , 173rd Airborne Brigade, MACV Advisors of Binh Dinh and Phu Yen Provinces, 4th Inf Div and 1st Field Force

d. Plans and Training; Plans and a timetable were made for the turnover of highways in the 84th Engr Bn AOR to theVietnamese Ministry of Public Works, RVN. Plans were made for the movement of two units of the 84th Engineer Battalion. In late February 70, A company moved from Tuy Hoa to Phu Tai, and in early April, D company moved from Tuy Hoa to An Khe. Sunday morning training classes emphasized safety, weapons familiarization, first aid, drug abuse, sapper defense, rules of engagement, and maintenance procedures.

d. Personnel, Administration, Morale, and Discipline; Dur ing the past quarter 84 personnel were recommended for awards. This represents an increase of 147% from last quarter. 308 EM were promoted to the next higher grade. 56 EM voluntarily extended their foreign service tour in the Republic of Vietnam. 67.2% of the Battalions strength is enrolled in the Savings Bond Program. There were 4 congressional investigations, and 11 complaints registered with the Inspector General. There were 117 disciplinary actions which included 106 Article 15's and 11 Special Court Martials.

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f. Logistics: During the past quarter, the S-4 Section gave logistical support to organic companies and attached units of the 84th Engr Bn (Const). The areas of logistical support include:

(1) Procurement and distribution of Class A rations for 900 personnel daily.

(2) Operation of two water points producing 45,000 gallons of potable water daily.

(3) Supply of Class II TO&E equipment. An average of 30 equipment requisitions were processed weekly by the Property Book Section. During the quarter, 50 pieces of TO&E and MCA equipment were acquired.

(4) Supply Class IV Construction Materials to all units for MCA funded projects. An average of 150 requisitions for construction materials were processed weekly by the S-4 section.

(5) Re-supply of unit basic loads and demolitions through the Phu Tai Ammunition Base Depot. An Average of 10,000 pounds of dynamite were used monthly for quarry work until quarry operations were terminated on 8 March 1970.

(6) Supply material for the construction of QL-1 Bridge No 241, a class 1. steel &concrete highway bridge being constructed by the 201st ARVN Engineer Bn at Tuy Hoa. This project is currently 50% complete. When completed , it will be the largest bridge in Vietnam.

(7) Supply materials for the following Self-Help Projects. Security Lighting for ROK Div. HQ and Security Lighting for Log Support Gp.

g. Civic Action: During the past quarter, emphasis was shifted from civic action to ARVN affiliation because of the Vietnamization Program. During the past quarter, voluntary contributions for orphanages amounted to $VN 65,005. A bridge walkway on a highway bridge over the Song Lei Giang at Bong Son was repaired.

h. ARVN Affiliation: A liaison team has been working continuously with the 201st ARVN Engineer Bn in construction of a 3600 ft Bridge on QL-1 over the Son Da Rang River at Tuy Hoa . The team has provided contact with US specialists in supply , equipment , steel structure, concrete , and quality control work. Problem solving in concrete prefabrication, pile driving, and steel work has been expedited by this team. The CO 84th Engineer Battalion personally accompanied the CO, 201st Engr Bn on a liaison trip to the Bong Son Bridge worksite. This visit proved to be highly successful in that many construction techniques were shared, resulting in significant increases in efficiency of both battalions. During the quarter, dump trucks of the ARVN 226th Panel Bridge Company worked with C/84th in hauling fill to the Ammo Base Depot. The 22nd ARVN Engineer Bn and the 84th Engr Bn worked together to begin planning an additional 2 1/2 KM section of Revolutionary Development Road 505 in northern part of Binh Dinh Province.

2. Lessons Learned: Commanders Observations, Evaluations, & Recommendations.

a. Personnel: None

b. Intelligence: None

(1) Item: Floating Tanks

OBSERVATION: 10,000 BBL POL Tanks which had been constructed during the early troop buildup in Vietnam are now leaking. Part of the cause was the poor foundation upon which the tanks had first been constructed. Repair would be useless until the tanks were placed on a firm foundation.

EVALUATION: A concrete pad was the only acceptable foundation for the area in which these tanks were located. The tanks had to be moved to the side so that this pad could be constructed. They were too old and rusted to be disassembled and too heavy to be moved by crane.

RECOMMENDATIONS: The bottom and sides of the tank were nearly water tight. Therefore the tanks would float, just as a glass will float upright in a basin of water. With this in mind, the berms encircling the tanks were extended on one side about 75 feet and filled with seawater. The tanks broke loose from their foundation after about 9 inches of water were pumped into the berm, and were pushed by manpower off their foundation to a temporary resting site. The water was drained from the berm and the concrete pad was placed at the original tank site. The berm was refilled with water and the tanks were moved on to their new foundation. Repair could then be accomplished.

(2) Item: U-Shaped Berms

OBSERVATION: A project at the Ammo Base Depot in Qui Nhon required the rebuilding of a number of U-shaped protective berms which had been badly eroded in past monsoon rains. Specifications required these berms to be at least 11' high with a minimum width of 3' at the top. Limited earth moving assets were available but repair had to be done quickly to return the berms to the desired protective strength before the next monsoon and to prevent enemy units from capitalizing on the weak existing state of the berms.

EVALUATION: A repair method had to be devised to make maximum use of all available TC&E assets. The height and narrow width of the berms dictated that each piece of equipment could be used on only certain parts of the berms. Compacting the berms was a particular problem because of the steep sloping sides.

RECOMMENDATION: The rear of the berm was effectively developed with 290 tractor scrapers. The 290 can manuver on the rear of the berm and has sufficient distance to spread an evenly distributed load of earth. This procedure was acceptable for constructing the berm to a height of 7' after which 290 manuvering became difficult. The sides of the berm and the remainder of the rear were constructed using 5 ton dumps. 5 tons have the capability of backing up the steep sloped berms.

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Compaction was accomplished by two methods. A self propelled, segmented compactor or towed vibratory compactor was found to provide maximum compaction at the center of the berm structure. Compaction of the sides of the berms was accomplished by use of a double barrelled sheeps foot roller. Unnecessary slippage material on the sides of the berms was removed by back blading the sides of the berm with a D7 dozer.

(3) Item: Removal of M8A1 Matting

OBSERVATION: A runway covered with M8A1 matting was to be resurfaced with asphaltic concrete. The matting was unserviceable and had to be removed by the fastest means available.

EVALUATION: Time was the only important commodity in the task of removing the matting. Disassembly of the matting was too difficult and time consuming, and was unnecessary since the matting was unserviceable.

RECOMMENDATION: The joint across the runway on every 5th section of matting was opened using a ripper tooth on the D7-E dozer. This broke the matting into sections which were then pulled off to the side of the runway by another D7-E dozer.

(4) Item: Leaking Pipes

OBSERVATION: Work was slowed on a recent MACV project for lack of plumbing supplies. Unions, elbows, and couplings were not available for the plumbing installation. An alternate method of connecting sections of pipe was needed to prevent serious delay of the project.

EVALUATION: The first solution was to weld the pipe. This method was good for connecting the pipe, but did not provide a water tight seal. An additional seal had to be found.

RECOMMENDATION: Mastic Sealing Compound, FSN 8030-598-4502, was used to provide the water tight seal. Each weld was covered with a thick layer of mastic. Polyethylene plastic was tied in place over the mastic to hold it to the weld while it set up. Curing time for the mastic was 24 hours. A test of the waterline after all welds were sealed showed that all joints were 100% water tight.

(5) Item: 20T Euclid Dump Truck

OBSERVATION: During the course of quarry operations by the 84th Engr Bn, we have encountered a recurring problem. Rocks were constantly being thrown up by the tires on 20T Euclid dump trucks, breaking the transmission housing.

EVALUATION: The transmission housing was in need of some type of protection.

RECOMMENDATION: This problem was eliminated by our Bn maintenance section. A steel plate was fabricated to cover the transmission housing and protect it from damage.

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(6) Item: Patching

OBSERVATION: Jackhammers have been used to square off potholes for repair of asphalt roadways. This was acceptable for small potholes but was time consuming where large areas had to be prepared.

EVALUATION: The preparation of these larger areas tied up the air compressor and jackhammer for too long a time. A quicker, simpler means was needed.

RECOMMENDATIONS: The necessary preparation was affected using the scarifier mounted on a Westinghouse grader. One pass of a grader was sufficient to loosen large sections where the road surface had failed. This method proved useful on QL-1 in the Tuy Hoa area where seepage from a pipeline buried beneath the road had caused surface failures, and along the edge of the road where alligator cracks had developed.

(7) Item: Alignment of Anchor Bolts

OBSERVATION: A standard method incorporating the use of a transit and measuring tapes was used to properly align the anchor bolts in a pile cap. The anchor bolt is used to secure bearing plates to the pile cap. This process is very tedious and time consuming.

EVALUATION: A more expedient method was needed which would not compromise the accuracy of the original method.

RECOMMENDATION: A 2"x4" wooden template was constructed with holes drilled in the proper positions for the bolts. The anchor bolts were securely fastened in these holes and the template was attached to the pile cap form insuring that the anchor bolts would be properly positioned once the concrete was placed.

(8) Item: Curing Compound

OBSERVATION: When curing compound is applied to a concrete slab, it changes the texture of the slab so that it is no longer porous. If grout is to be applied, this surface must be scarified so that it will regain its original texture.

EVALUATION: Considerable time is required to prepare a concrete surface so that grout can be applied. Another method of curing the concrete would eliminate this loss of time.

RECOMMENDATION: Wet sand bags were used to cover the portions of the concrete slab where grout would later be applied. Additional time was required to complete this portion of the process, but the entire time involved was greatly reduced because it was no longer necessary to scarify the concrete slabs.

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(9) Item: Drain Pipes

OBSERVATION: Four inch pipes were to be installed through an abutment and its wing walls to provide for the drainage of water through the abutment.

EVALUATION: A method was needed to secure these pipes in the forms so that, when the concrete was placed, they would not be jarred from their positions.

RECOMMENDATIONS: The pipes were welded to the rebar lattice of the abutment or, when necessary, to short pieces of rebar connected to the rebar lattice. This secured the pipes sufficiently for the placing of concrete.

(10) Item: Causeway

OBSERVATION: A causeway had been constructed 2/3 of the way across the Song Lai Giang River in Bong Son. This causeway was built to provide a working surface for construction tasks on the Bong Son Bridge. When the pile driving was nearly complete on the existing causeway, it was necessary to construct the remaining 1/3 of the causeway.

EVALUATION: Before constructing the final 1/3 of the causeway, a section in the middle of the existing causeway was removed and a 110 ft double double baily was placed over the gap. This gap would take the full flow of the river when the causeway was completed. Earthmoving was begun for the final 1/3 of the causeway and it was observed that much of the fill put in the gap was washed away by the current. This increased as the causeway lengthened because the narrowing channel increased the speed of the flowing water.

RECOMMENDATION: Before this became a major problem auxilary dams were constructed by dozing sand from the river bed. One dam extended from a point upstream from the causeway on the north river bank to a point on the causeway near to and north of the baily bridge. The other dam extended from a point upstream from the causeway on the south river bank to a point on the causeway south of and near to the baily bridge. This is shown in the following diagram. These dams channeled the water into the gap which had been cut in the construction causeway. The final portion of the causeway was then easily completed.

(11) Item: Differential resistance encountered during pile driving operation.

OBSERVATION: Steel pile (14BP73) are being driven for the piers and abutment foundation. A 40 ton crane with 70 feet of boom, 63 feet of leads, prefabricated 32' catwalk, and a Model 180M diesel driven hammer rated at 7500 foot lbs are the equipment being used. Test boring samples were available indicating a conglomerate of coarse sand and sandy clay encountered from a depth of 40' to 70' with very little differentiation in the test hole hammer penetration resistance between 40' and 70'. Specifications for pile driving require a minimum resistance of something less than 0.1" of pile penetrating per blow of the 180 M hammer. (10 blows per inch)

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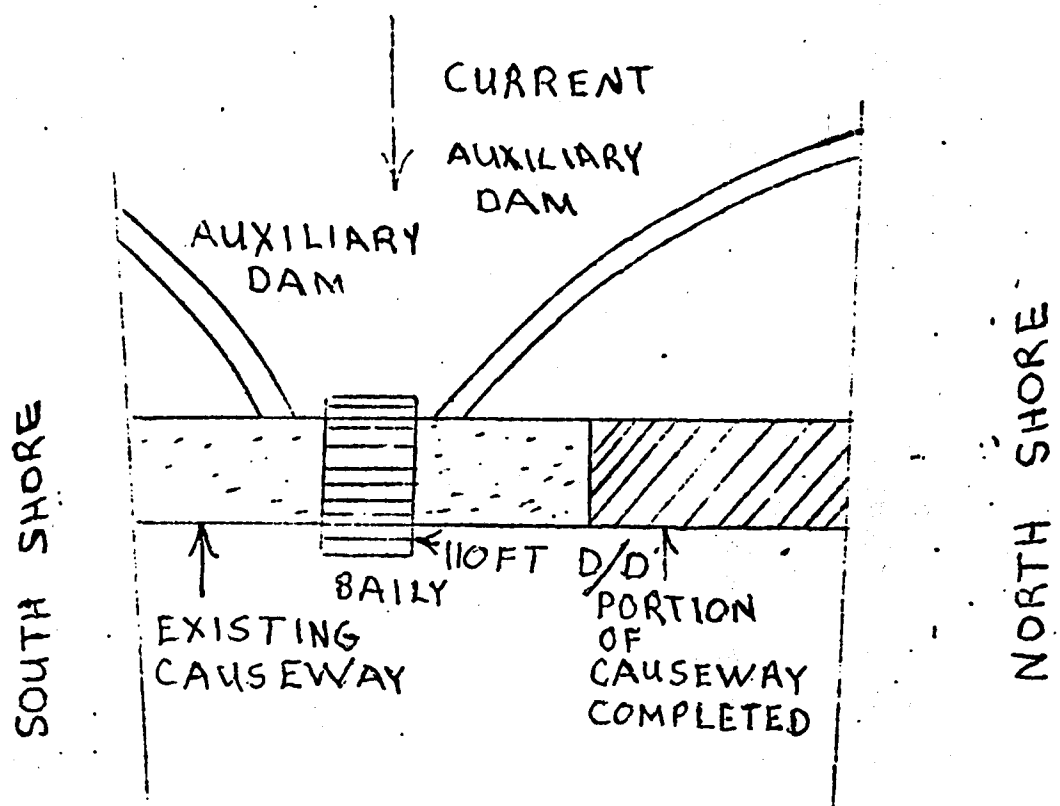

CAUSEWAY

BONG SON BRIDGE

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During pile driving operation on the near shore abutment, it became evident that there was a considerable amount of differential resistance encountered between the individual piles even though they were driven in the same general area. As an example, of this one pile in the abutment foundation was driven to a depth of 100 feet and encountered a resistance of 11 blows per inch of penetration. The next pile was driven to a depth of 63 feet and encountered a resistance of 17 blows per inch of penetration. The 14BP73 pile come in 40' lengths and much time and effort is involved in splicing the 40' lengths together. It was determined that if it was possible to obtain the required resistance of something less than 0.1" of penetration per blow of the hammer at a shallower depth, the time and materials required for the pile portion of the substructure could be reduced by as much as 30%.

EVALUATION: The differential resistance encountered during pile driving operations can be explained by the fact that due to the high water table and the type of material which the piles are driven through, the piles do not take an immediate "set". The constant shock of the hammer driving the pile causes the material directly around the pile to attract water causing a lubricating effect. Since the bearing capacity and the required penetration resistance depend entirely upon friction bearing of the pile, this liquidified material tends to give a false reading. It was found that if a double length of pile was driven down to required depth and then allowed to set for a period of around 12 hours, a recheck of the penetration revealed that the resisting capacity of the soil was greatly increased due to the partial drying up of the material directly around the steel pile. In all cases it was found that a pile which had been allowed to set for a period would gain as much as 50% more resistance than the initial reading. It should be noted also that it is possible when rechecking the resistance to cause the pile to break loose from its "set" and consequently gave another low reading. The recheck should be held to a minimum to insure required bearing capacity (30 blows max).

RECOMMENDATION: When it becomes evident that at the end of a length of pile the resistance encountered is less than but is approaching the required bearing capacity, it is possible that a setting period could produce the necessary additional resistance to be within specifications without adding another length of pile. A rule of thumb which has been established at the Bong Son Bridge project is that if at the end of the second length of pile the resistance encounter is at least 2/3 of the required resistance, the pile should be allowed to "set". A recheck of the resistance after 12 hours shows that in all cases, the specifications for resistance are met.

d. Organization: none

e. Training: none

f. Logistics: none

g. Communications:

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ECCC-OP
SUBJECT: Operational Report - Lessons Learned, 84th Engineer Battalion (Construction), for the period ending 30 April 1970, RCS CSFOR-65

(12) Item: VRC-46 Radio on 3/4 ton truck

OBSERVATION: Some 3/4 ton trucks of this battalion have been used by command personnel in lieu of jeeps and as such had VRC-46 radios immediately behind the cab. The monsoon rains often caused these exposed radios to become inoperative.

EVALUATION: It was more desirable to have this radio mounted inside the truck. The radio then would not be exposed to the elements, would be less susceptable to vandalism, and would be easier to adjust.

RECOMMENDATION: With little time and effort, the radio was mounted slightly above the floor on the passenger side with the antenna attached beside the gasoline can. This resulted in longer operational use of the radio and better communications.

(13) Item: Modification of adapter card, SC-C-446213

OBSERVATION: The adapter card, SC-C-446213, would not fit properly into the KYB-6.

EVACUATION: The adapter card SC was defective when released by the manuafacturer. When this adapter card was produced, pin 12 was removed. For the adapter to fit properly, pin 11 must be removed.

RECOMMENDATION: Pin 11 was removed by a skilled Bn radio mechanic. This modification took approximately two hours. The adapter card worked properly after this modification.

h. Material: None

i. Other: None

Richard Wells
RICHARD M. WELLS
LTC, CE
Commanding

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EGC-OP (30 April 1970) 1st Ind
SUBJECT: Operational Report - Lessons Learned, 84th Engineer Battalion (Const), Period Ending 30 April 1970.

DA, HEADQUARTERS, 937TH ENGINEER GROUP (COMBAT), APO 96226, 25 May 1970

TO: Commanding General, 18th Engineer Brigade, ATTN: AVBC-C, APO 96337

TO: Assistant Chief of Staff for Force Development, Department of the Army, ATTN: ACSFOR-DA, Washington, D.C., 20310

1. In accordance with 18th Engineer Brigade Regulation 525-15, the ORLL from the 84th Engineer Battalion (Construction) for the period ending 30 April 1970 is hereby forwarded with the following comments.

a. Part II, Lessons Learned

(1) Para c, Operations Paragraph heading is missing from the report.

(2) Para c (1), Floating Tanks. It is believed that floating is a standard method of testing tanks for bottom leaks. The modification used to relocate the tanks for repair worked efficiently. The recommendation should be that bolted tanks should be placed only on concrete pads.

(3) Para c (6), Patching. This observation is not new or unique to standard construction procedure.

(4) Para c (7), Alignment of Anchor Bolts. This observation is not new or unique to standard construction procedure.

(5) Para c (8), Curing Compound. Use of the term "scarify" when applied to concrete slabs is incorrect. The slab surface has to be scored so that grout will bond. The use of wet sandbags or other covering is not a unique observation to construction practice in RVN.

(6) Para c (9), Drain Pipes. Observation is not new to standard construction practice.

(7) Para c (11), Differential Resistance Encountered during pile driving operation. This observation is not new to standard construction practice.

(8) Para g (13), Modification of Adapter Card, SC-C-446213. Problem appears to be a defect in manufacture. It is not known whether any more of the adapter cards were defective or whether this was an isolated instance.

(9) Most recommendations are written as summaries of what was done to solve a problem rather than as a recommended practice.

2. The report is considered to be an accurate representation of the battalion's activity for the period.

FOR THE COMMANDER:

Don C. [illegible], III
CPT, CE
Adjutant

AVBC-CG (30 April 1970) 2nd Ind
SUBJECT: Operational Report-Lessons Learned, 84th Engineer Battalion (Construction), Period Ending 30 April 1970

DA, HEADQUARTERS, 18TH ENGINEER BRIGADE, APO 96377 19 JUN 1970

TO: Commanding General, U.S. Army Vietnam, ATTN: AVHGC-DST, APO 96375

1. This Headquarters has reviewed the Operational Report-Lessons Learned for the 84th Engineer Battalion (Construction), as indorsed by the 937th Engineer Group (Combat). The report is considered to be an accurate account of the Battalion's activities during the reporting period.

2. This Headquarters concurs with the observations and recommendations of the Battalion and Group Commanders with the following additional comments:

a. Reference: Para 2(b)6. Patching. Nonconcur. Scarification is acceptable on large areas where the entire roadway width has to be repaired and on other large areas, however, a jack hammer must be used to cut edges adjacent to the pavement. The road grader will loosen the surrounding structure resulting in an adjacent failure. Care must be exercised removing the loose material prior to patching.

b. Reference: Para 2(b)10. Causeway. A simpler method would be to add blast rock as a rip-rap at ends of the causeway adjacent to stream.

c. Reference: Para 2(b)13. Modification of adapter card, SC-C-446213. The defect in the adapter card is not an isolated case and action taken was the correct course of action. The time required is not correct. To remove the contact pin takes a maximum of 10 Minutes.

H. C. SCHRADER
Brigadier General, USA
Commanding

CF:
CO, 937th Engr Gp
CO, 84th Engr Bn

AVHGC-DST (30 April 70) 3d Ind
SUBJECT: Operational Report-Lessons Learned, 84th Engineer Battalion (Construction), for the period ending 30 April 1970 RCS CSFOR-65 (R2)

Headquarters, United States Army Vietnam, APO San Francisco 96375 7 JUL 1970

TO: Commander in Chief, United States Army Pacific, ATTN: GPOP-DT, APO 96558

This Headquarters has reviewed the Operational Report-Lessons Learned for the quarterly period ending 30 April 1970 from Headquarters, 84th Engineer Battalion (Construction) and concurs with comments of indorsing headquarters.

FOR THE COMMANDER:

for D. J. Winter
CPT, AGC
Assistant Adjutant General

Cy furn:
18th Engr Bde
84th Engr Bn

GPOP-DT (30 Apr 70) 4th Ind
SUBJECT: Operational Report of HQ, 84th Engineer Battalion (Const) for Period Ending 30 April 1970, RCS CSFOR-65 (R2)

HQ, US Army, Pacific, APO San Francisco 96558 20 JUL 70

TO: Assistant Chief of Staff for Force Development, Department of the Army, Washington, D. C. 20310

This headquarters concurs in subject report as indorsed.

FOR THE COMMANDER IN CHIEF:

D.D. CLINE
2LT, AGC
Asst AG

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CO, 84th Engineer Battalion

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