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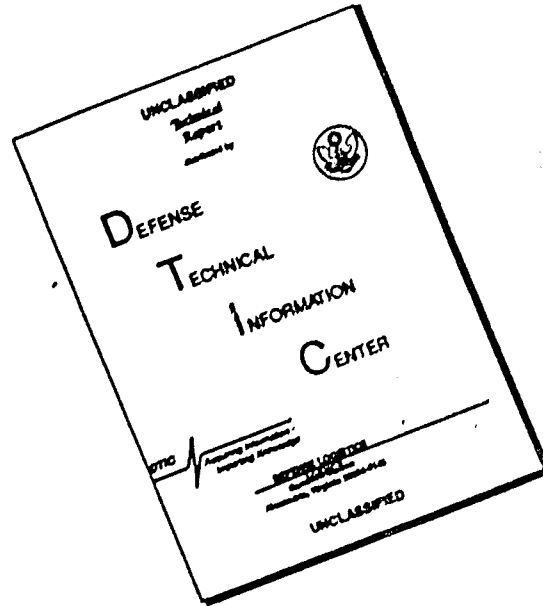
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DEPARTMENT OF THE ARMY  
OFFICE OF THE ADJUTANT GENERAL  
WASHINGTON, D.C. 20310



AD 835739

IN REPLY REFER TO  
AGAM-P (M) (2 Jul 68) FOR OT RD 682194 8 July 1968

SUBJECT: Operational Report - Lessons Learned, Headquarters, 864th  
Engineer Battalion (CONST), Period Ending 30 Apr 1968 (U)

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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, 864TH ENGINEER BATTALION(CONSTRUCTION)  
APO 96240

EGACBC-3

30, April 1968

SUBJECT: Operational Report of the 864th Engineer Battalion (Construction)  
Period Ending 30 April 1968, RCS GS FOR-65 (R1)

THRU: Commanding Officer  
35th Engineer Group (Construction)  
APO 96238

Commanding General  
18th Engineer Brigade  
APO 96377

Commanding General  
United States Army, Vietnam  
ATTN: AVHGC(DST)  
APO 96307

Commander in Chief  
United States Army, Pacific  
ATTN: GPOP-DT  
APO 96588  
TO: Assistant Chief of Staff for Force Development  
Department of The Army (ACSPOR DA)  
Washington, D.C. 20310

1. Section 1, Operations: Significant Activities.

a. Battalion Narrative

Changes in the command and staff elements of the 864th Engineer Battalion occurring during this reporting period included the Battalion Commander, Company Commanders of Headquarters and Headquarters Company, B Company and C Company, and the Assistant Operations Officer. On 26 February 1968, LTC Donald A Wisdom assumed command of the Battalion vice LTC Laurence L Heimerl who having had command for seven months was reassigned to Headquarters, United States Army, Vietnam. 1LT Dennis R Britt assumed command of Headquarters and Headquarters Company on 10 April 1968. CPT William W Lee, former Assistant Operations Officer assumed command of Company B upon the departure of CPT Barry H Pritchard, but commanded the company for two days before being reassigned to

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SUBJECT: Operational Report of the 864th Engineer Battalion (Construction)  
Period Ending 30 April 1968, RCS CS FOR-65 (R1)

Military Assistance Command, Vietnam. On the day of CPT Lee's departure, CPT Ralph M Danielson, newly arrived in country, assumed command of B Company. CPT Donald C Anselm, Company Commander of D Company was also reassigned to MACV and was replaced by LLT James H Oren, formerly the Unit Operations Officer.

This reporting period was highlighted by the relocation of organic companies and ever increasing emphasis on the Lines of Communication (LOC) upgrading program. In January, C Company relocated to a point on National Highway QL-1 adjacent to a Korean Fire Base. In February, they were joined by an Earthmoving and Vertical Platoon from B Company. Both companies were assigned areas of responsibility for the rehabilitation of QL-1.

During this reporting period, the Battalion continued to experience a shortage in assigned personnel. Throughout the quarter, the aggregate strength remained at approximately one-hundred spaces short of TO&E authorization. Although replacements were received they did not compensate for the losses. The shortage of qualified senior non-commissioned officer replacements is an area of grave concern. As of 30 April 1968, this Battalion had assigned thirty-three non-commissioned officers in pay grades E-7, E-8, and E-9 as opposed to an authorized strength of forty-four. Of these thirty-three assigned three are thirty day losses, four are sixty day losses and four are ninety day losses. As of this date there are no projected gains. The most critical MOS areas are 51H40, Construction Platoon Sergeant, and 51H50, First Sergeant. Of the eleven losses for the next ninety days, two are 51H50, and five are 51H40. This Battalion has received one 51H40 and two 51H50 replacements during this reporting period. The majority of replacements received have been in MOS's which were not authorized or short in the Battalion thereby requiring an extensive On the Job Training Program (OJT). The morale of the Battalion continued to be high, indicated in part by the high overseas extension rate of personnel for their respective companies. Administration in the Battalion did not experience any significant changes.

The new Battalion Commander instituted a contest whereby a dynamic name symbolizing a "Can Do" attitude would be selected. Of the many names submitted "Pacemakers" was appropriately chosen.

For the period January through April, there were three changes in attachments. The 40th Engineer Detachment (Well Drilling) and the 588th Engineer Detachment (Well Drilling) were attached to this organization from the 14th Engineer Battalion (Combat), 35th Engineer Group (Construction). The 14th Engineer Battalion was reassigned to the 45th Engineer Group (Combat). A Platoon of the 553rd Engineer Company (Float Bridge) was attached in February.

The construction operations were, as last period, not of a nature generating opportunities for significant intelligence activity. However, a few noteworthy incidents occurred which brought Battalion units into close proximity with enemy operations. During the early part of January, two bridges were blown on QL-1 north of Nha Trang. This blocked the only route to north-bound traffic from Cam Ranh Bay. A bridge was repaired and a bypass constructed to insure a steady flow of traffic on the LOC. Construction effort required for these two projects consisted of two squad days. The most significant event was the attack on Nha

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Trang. On the night of 29 January, at 0030 hours, three companies of North Vietnamese (NVA) attacked the northern part of the city. The Khan Hoa Province Headquarters was virtually destroyed by an NVA company. Another company was engaged near Roberts Compound and held in position by allied forces until the latter part of the day. The Battalion was not directly affected by this operation because of its location at Camp McDermott in the southern reaches of Nha Trang. On the first of February, a large steel bridge spanning rice paddies west of Nha Trang was blown. A bypass with two culverts was constructed in a six hour period utilizing elements from two companies. During the latter part of February, a Popular Forces platoon was successful in dispersing a spread of Viet Cong from C Company borrow pit on QL-1. It was reported that the enemy was armed with a B-40 rocket launcher. On the evening of 18 February 1968, thirty odd mortar rounds were dropped into the McDermott complex. Three rounds hit our Battalion Motor Pool and damaged an asphalt distributor and a welding set. A Post Engineer building adjacent to the Battalion S-4 area was completely destroyed. On 21 April 1968 at 1910 hours, the 569th Engineer Company (TOPO) (CORPS) received a round which destroyed one Topo-Van, a fuel truck and a water tower. The unit is currently 85 per cent operational as a result of enemy action. There are only two Topographic units of this type in country. Major replacement TO&E items are extremely scarce and for the most part not available. Requisitions have been submitted to cover these combat losses.

The two most significant accomplishments in the area of construction operations consisted of the completion of a 2400 man cantonment area and the employment of the Battalion minus on QL-1. With three companies involved in the rehabilitation of QL-1, the Battalion has fully entered into a new era of horizontal construction. High priority vertical projects are continually assigned to the Battalion detracting from the LOC program. Paving of QL-1 has picked up momentum and is continuing at a commendable rate. The Battalion has been extremely fortunate this quarter in having good construction weather for the most part. This has enhanced our concerted horizontal construction effort on QL-1, simultaneously affording this unit the opportunity to complete much of its vertical commitments. During the last four days of this quarter the good weather was replaced by torrential rains. Areas being prepared for base course north of Soui Vinh were hardest hit. That portion of the road which had been surfaced south of the northern intersection of the old QL-1 and the newly constructed Soui Vinh Bypass experienced severe shoulder, and side and back slope erosion. In the area of statistics, the Battalion produced 85,000 tons of crushed aggregate, placed 1397 cubic yards of concrete, constructed 33,420 square feet of standard three and standard four billets, built 46,132 square feet of various other structures, hauled 316,160 cubic yards of fill, completed 5.4 KM's of highway to MACV standards, and performed maintenance on 102 KM's of national highway QL-1.

The battalion has provided salvaged material worth 250,000 piasters to civic action projects during this reporting period. Assistance in the form of technical advice, material, and equipment support has been provided to the city of Nha Trang for facilities damaged during the "TET" offensive. The Battalion contributed 100 per cent to the "TET Aggression Relief Project" fund raising campaign. The Battalion doctor, CPT Hattaway, assists the local hospital in their public health program. Assistance has been given to approximately 800 MEDCAPS during this period. The Battalion has adopted the Montagnard village of

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Period Ending 30 April 1968, RCS CS FOR-65 (R1)

Chi Chi during this period. Assistance has been given to build a school, dispensary, houses, and a water well system. Also, equipment support has been provided to help in clearing operations and establishing drainage. Action has been taken to gain support from various civil and private organizations in the United States by publishing a brochure. This brochure contains information as to conditions in Chi Chi, and the requirement to raise the standard of living commensurate with local Vietnamese villages.

Training during this period included thirteen Command Information Topics plus seventy-two hours of mandatory training topics and twenty hours of integrated training. Mandatory training included weapons qualification and familiarization with the M-14 rifle, M-60 machine gun and the 3.5 rocket launcher. The unit was assisted by the 5th Special Forces at Dong Ba Thin by providing instructor personnel.

Attached as inclosure number one is a list reflecting the organizational structure of this organization.

b. Headquarters and Headquarters Company

The influx of replacements continues to occupy the major share of the Personnel Section's effort. In addition to routine personnel matters the personnel officer administers local national employment funded under MCA, AIK, and O&MA. Survey parties continued with their support of the line companies on QL-1, and survey requirements for vertical and horizontal construction in the Nha Trang and Dong Ba Thin areas. Soils personnel maintained their constant vigil to insure quality control of construction materials used. In design, projects completed include:

- (1) Avionics Repair Facility
- (2) 120 man protective bunker
- (3) Battalion size Tactical Operations Center (TOC)
- (4) Joint Forces TOC for the defense of Nha Trang
- (5) Post Exchange hardstand and drainage in Nha Trang
- (6) Air control cab for Dong Ba Thin Army Aviation Tower.
- (7) Dong Ba Thin infiltration gallery and water supply complex
- (8) Officers Club for Camp McDermott
- (9) Culvert headwalls for QL-1
- (10) Transmitter Site, Dong Ba Thin (as built)
- (11) Hon Tre Water Well System (as built)
- (12) Topographic facilities, Nha Trang (as built)

The S-4 Section engaged in out loading excess construction materials to be returned to depot stock and supplied the line companies with materials for newly assigned projects.

c. A Company

During this period Company A continued to operate two Multi-Unit Rock Crusher Plants. Because of the increased priority given to LOC work, it became necessary to increase rock production at the Ba Ngoi Complex. In order to accomplish this, a 75TPH Primary Rock Crusher was moved into the Ba Ngoi Quarry

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and one additional track drill was loaned to this unit from Company A, 87th Engineer Battalion (Construction). Throughout this period, the drilling capability of the Quarry Section was far exceeded by that of the Crusher Plant Section and as a result the highest production week was 5,780 cubic yards. Towards the end of the period, considerable assistance in Quarry Operations was gained with the arrival of Mr Frank Dean of Jinton Engineering. Equipment and personnel had to be taken from the Nha Trang operation in order to augment the Ba Ngoi operation. As a result, rock production at Nha Trang decreases somewhat, but the total output from both complexes exceeded that of last quarter. A steady program for placing of asphalt in Nha Trang continues with a total of 7,000 tons of asphaltic concrete paved on assigned projects. A total of 85,000 tons of crushed rock was produced at all crusher complexes. When the base course operation on QL-1 lagged the paving operation, a dump truck platoon was formed and placed under operational control of this company. The platoon had a total of thirty trucks assigned which increased considerably the amount of base course being hauled to the national highway. Loading bins constructed at the Ba Ngoi Quarry aided immeasurably in the loading of trucks and curtailed front loader requirements. The dump truck platoon was phased out due to the contract truck haul operation. When the battalion's hauling operation was augmented by a civilian truck contract, the base course material being loaded out averaged about 560 tons per day. At the end of the period, the truck contract operation was further augmented by rail transportation of base course. Although Bridge capacities on the railway reduce the hauling capability of each gondola to 30 tons, the train consists of twenty gondolas with a hauling capability of 1200 tons per day. Eight 5 ton dump trucks with drivers and maintenance personnel from Company A are still attached to Company D augmenting the placement of base course and transporting of asphalt to the paving operation. The paving operation is being performed by the 610th Engineer Company (Construction Support) under operational control of the 87th Engineer Battalion (Construction).

In late January, WO1 Evans, the unit's Automotive Repair Technician, departed this command. LLT Lewis E Stepp, WO1 Barr, and WO1 Harrington arrived in late January. LLT Stepp assumed the duties of Platoon Leader of the Provisional Equipment Platoon at Nha Trang, a position formerly held by LLT James F Pierce who departed this unit in early January to assume duties as Battalion Property Book Officer. CW2 John Jewell and SFC Thomas Rhubottom, departed in early March. Both individuals had done extensive work in this Engineer Direct Support Maintenance Section. Transition was made easily though, as WO1 Barr assumed the duties of Engineer Direct Support Maintenance Supervisor. WO1 Harrington assumed the duties of the Automotive Repair Technician formerly held by WO1 Evans.

d. B Company

Company B, established last quarter as the major construction unit in Nha Trang, diversified its efforts this quarter into two primary areas of endeavor, vertical construction in the Nha Trang area and LOC reconstruction. As of 10 March, the Earth Moving Platoon and elements of the First Construction Platoon joined Company C at the established base camp on Highway QL-1 to augment the progress of LOC Rehabilitation. This quarter saw the completion of the Beverage Store Depot, a bituminous concrete hardstand that encompassed 4,500 square yards.

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Another project that was started in the preceding quarter was the paving in the Pie Slice area, (GP 35-P260-67). A total in excess of 32,000 square meters was paved. At Camp Sip Ja Sung, a ROKA compound north of Nha Trang, earthwork continued and berms were formed bringing B Company's involvement in that area to a 95 per cent completion.

Construction in the Long Van area of Camp McDermott consisted of two each two story billets (4800 square feet each) and one each two story BOQ of 4800 square feet. In Camp McDermott proper, completed construction consisted of three latrines and two quonsets of 1920 square feet each. Construction began on two 1920 square feet quonsets to facilitate expansion of the 22nd Finance Detachment. Completed elsewhere in McDermott were the Topo Maintenance facilities consisting of a 1200 square foot maintenance building and a grease rack, modification of a Topo Trailer ramp, a 250 barrel hot water system which will supply water to two existing 500 man showers, reinforcement of the Battalion perimeter, and additional bunker protection.

At Ba Ngoi Quarry and Crusher Complex construction included a railroad loading facility, two loading bins for base course outloading by dump trucks, a thirty foot high reveted headwall, and a personnel protective bunker.

The major construction project undertaken by B Company this quarter, was the Joint Forces Tactical Operations Center, referred to as the "TOC". The site chosen for the structure is on the beach across Beach Road from 1st Field Force Vietnam Headquarters. The facility consists of 37,000 square feet of area inclosed by a security fence which contains the TOC and a security guard booth. Construction features of the TOC include a twelve inch thick blast rock masonry exterior and a three inch thick lumber interior structure separated by a sand filled cavity three feet thick at the bottom, a reinforced pan type floating slab, 6" by 6" bearing columns supporting a roof complex consisting of rafters, laminated decking, and a sand blanket capped by a reinforced concrete slab. The interior working area is surrounded by a wall that averages four feet in thickness at the base tapering off to 2 1/2 feet at the ceiling. The working area is partitioned with three quarter inch plywood, except for special partitioning requirements in areas devoted to communications. The interior working area of 5460 square feet is divided into six administrative rooms, a storage area, three communications rooms, a conference room, and a centrally located war room. The primary power source will be provided by Vinnel Corporation, and the military will provide additional generators for standby power. The 7400 square foot building is being constructed by US Army personnel and a local civilian work force. Completion of the TOC will be during the first month of the next reporting period.

LOC rehabilitation this quarter witnessed the entry of B Company into Battalic efforts on QL-1. A work force of seven squads, three from the 1st Construction Platoon and four squads of the Earth Moving Platoon provide B Company's engineer effort. Since their arrival on site, a cantonment area for eighty men was constructed with latrines, showers, and tent frames. The earth moving statistics compiled by the Pacemakers of B Company are as follows: 3300 feet cleared, 1000 feet ripped, and approximately 40,000 cubic yards of fill has been hauled to establish 2500 linear feet of subgrade. Construction has begun on forms for

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precast concrete bridge stringers to be used on QL-1. It has been necessary to construct bypasses for a continuous flow of traffic on QL-1 while culverts and bridges are being constructed. Local borrow pits are in the proximity of the construction area.

LOC Restoration and Maintenance for this quarter included operational support missions on four bridges, two of which were repaired in the midst of the TET offensive. Reconnaissance on QL-1 in the Company's Area of Responsibility (AOR) has been carried out weekly as directed and was conducted under hazardous conditions during the TET offensive.

Ten revetments for Army Chinook helicopters are in the initial stages of construction. The Aviation Support Facilities Project consists of an 84 by 200 foot steel framed hanger, one 20 by 50 foot tropicalized building and three 20 by 43 foot quonsets. The site has been surveyed, the hanger surveyed, and concrete floor slabs placed for the administrative buildings.

Civic Action by Company B was most evident in the clearance of rubble in downtown Nha Trang after enemy action during the TET offensive. Company B also donated materials for rebuilding destroyed areas and hauled bricks for other civilian projects. Individual donations were made by B Company personnel in accordance with the TET Aggression Relief Program. A small arms firing range was constructed by Company B for the Vietnamese Navy Training Schools in Nha Trang.

This quarter witnessed a Change of Command on Monday, 15 April 1968, when CPT William W Lee assumed command of B Company, previously held by CPT Barry H Pritchard since 20 December 1967. CPT Lee was reassigned to United States Army Vietnam having commanded the company for only two days. On the day of his departure, CPT Ralph M Danielson, newly arrived in country, assumed command.

## e. C Company

The scope of work for Company C has centered almost entirely around the rehabilitation of Highway QL-1 this period, and the development of a base camp for the Company. Construction on Highway QL-1 has gone exceptionally well for the past three months, considering it was an abrupt reverse to the vertical construction projects which the Company had previously in Nha Trang. This was mainly due to the "all out" effort and the high priority which has been placed on the rebuilding of Highway QL-1. During this period a total of 68,040 cubic yards of fill were hauled and placed on the road. An additional 13,720 cubic yards of fill was hauled to construct twelve by-passes around narrow bridges. The bridges were demolished to allow for construction of wider culverts and bridges to accommodate the two lane highway. The bypass facilitates the smooth uninterrupted flow of traffic during construction of the new culverts and bridges.

In addition to the large quantity of fill hauled, 14,000 additional cubic yards have been removed from the existing road due to soft spots, or unsuitable material. Often, the material removed from the old road is suitable for bypass construction. A total of eleven culvert sites have been completed on the new road. They range in size from a four barrel 48" culvert to a one barrel 18" culvert. The Company has utilized a total of 1753 linear feet of culvert for the eleven sites. Total equipment hours utilized on the road this period number

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11,380, while 77,050 man-hours have been expended. During the period approximately 11,100 feet of the road has been striped and grubbed, 9,000 feet of subgrade prepared and 6,100 feet of subbase material has been placed. In addition to the road work, another portion of the QL-1 project was a base course Off-Loading facility. This facility consists of two concrete slabs, 100 feet long, which slope up on each side of the railroad tracks at a 40 degree angle. The sloping portion of the slab is six inches thick and approximately 12' wide, with a 6" thick, 5 feet wide slab at the bottom of the slope. A total of 105 cubic yards of concrete was poured to complete the facility. This facility will expedite the handling of base course from Ba Ngoi Quarry by utilizing railroad cars to haul it to the Off-Loading facility. This material is stockpiled, then moved as required by 5 ton Dump Trucks to QL-1 for base course placement. This will greatly facilitate the placing of base course, reduce maintenance requirements caused by an excessive haul distance from the Ba Ngoi Quarry and increase availability of dump trucks for other haul requirements on QL-1. If the base course could not be hauled by railroad the hauling distance for the 5 ton Dump Trucks would range from thirty to forty miles.

The major portion of the potable water supply system on Hon Tre Island has been completed. The new system provides potable water for personnel stationed on the island and eliminates the necessity of transporting water by LCU's from Nha Trang. The system includes three deep wells with submersible pumps, two 600 GPM booster pumps, two in-line-chlorinators, two each 250 barrel tanks, a 1000 barrel tank, three pump houses, and approximately 3500 linear feet of pipe lines. A total of 4000 man-hours and 450 equipment-hours were expended on this project.

## f. D Company

In February of this reporting period the company assumed construction responsibility for those incompletd projects left by the 14th Engineer Battalion (Combat), in the Dong Ba Thin area.

Among the projects assigned was the operation and maintenance of the My Ca Float Bridge. This bridge provided the necessary link between Cam Ranh Depot (located on the Cam Ranh Peninsula) and the mainland. To operate and maintain the bridge the 1st Platoon of the 553rd Float Bridge Company was attached to this company. The float bridge was open to traffic in mid June 1966 and has continued in service until 17 April 1968 when the new Long-Ho permanent bridge was opened to traffic. Plans have been implemented to rehabilitate the float bridge. After twenty-eight months in salt water it is estimated that 60 per cent of the pneumatic floats will not be salvageable.

The earthmoving platoon continued upgrading QL-1. During the last quarter 2.6 miles of Phase III had been completed. This quarter 2.5 more miles were completed and the platoon started on a 1.8 mile by pass west of the village of Soui Vinh. The existing road through the Village of Soui Vinh was too narrow and would have required extensive efforts to relocate villagers. The base course material placed was compacted to 100 per cent modified AASHO to insure a sound base for asphaltic concrete. The 610th Engineer Company (Construction Support) supported this operation by placing 17,900 lineal feet of finished

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pavement 24 feet wide and 3 inches thick. Statistics for this highway included 102,297 US man-hours, 1520 Vietnamese man-hours, 19,480 equipment hours, 166,892 cubic yards of borrow material hauled, 14,560 cubic yards of 3 inch minus base course placed, 12,500 feet of completed subbase, 18,100 feet of finished base, installed 124 feet of 48 inch culvert and completed 3.4 miles of double lane, class 50 roadway. To further improve the security requirements of the Cam Ranh-Dong Ba Thin military complex, the Platoon assisted in clearing a 100 meter wide path around the perimeter of eight military outposts. A total of 475 acres was cleared using 39.5 dozer days. The first construction platoon provided the necessary engineer effort for installation of culverts and precast concrete bridges. The platoon also came to the aid of the crushing operation at Ba Ngoi by constructing a 30 foot long and 16 foot high addition to the existing head-wall in a day and night operation. To further enhance the crusher output, a 15 by 75 foot crusher pad was placed for the 75 TPH crusher. This project required 1210 US manhours and 250 equipment hours.

The men of the Second Construction Platoon combined their engineer skills to complete the 18th Engineer Brigade Chapel at Dong ba Thin. The esthetically pleasing "A" frame structure is 40 feet wide by 63 feet 6 inches long with a 20 foot high gabled roof and 5 foot eaves. The highlight in the construction sequence took place in the placing of the concrete footers and piers that supported the thirteen individual "A" frames. The piers had to be formed and placed at the precise spacing of five foot on centers, and at a uniform elevation of two feet and eleven inches. The exterior of the Chapel was stained in dark mahogany in conjunction with the "A" frames. The interior was done in a clear stain to highlight the natural beauty of the wood. Construction of the Chapel required 10,740 US manhours, 13,910 VN manhours, and 1330 equipment hours. The guests of honor at the opening ceremonies on 18 March 1968 was Brigadier General Rawlins, Director of Construction, MACV, and Brigadier General Roper, Commanding General of the 18th Engineer Brigade.

The platoon completed construction of two prototype revetments designed by 18th Engineer Brigade and modified by the Battalion. Construction of the first revetment commenced on 14 March with the placement of a 12 foot by 101 foot 6 inch concrete pad. The "U" shape revetment has "A" frame wing walls, 9 foot 6 inches high and 57 foot 6 inches long, with a base dimension 7 foot 6 inches in width. The back wall of the revetment is 35 feet long, 9 foot 6 inches high, also of "A" frame construction. The sides of the "A" frame are covered with corrugated metal roofing and sand filled. Two swing gates, each hinged to posts at the open end of the revetment, are supported by two 8 inch coaster wheel assemblies. This revetment was completed in two platoon weeks. This revetment was designed and constructed to afford maximum protection. The helicopter is landed on an extended concrete revetment pad, then manhandled into the revetment by means of hydraulic wheel jacks. The two wooden gates are closed securing the aircraft. The second prototype constructed is similar to the standard M8A1 parallel revetment. The dimensions of this structure are 5 feet high, 57 feet long and 25 feet wide. Several features were added to the standard revetment to afford additional protection. This revetment proved to be more desirable in that helicopters can be flown directly into the revetment and man handled out if necessary. Kits could be fabricated and would require a minimum engineer effort

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in construction to modify existing revetments. After the helicopter is flown into the revetment from either direction, M6A1 flaps are raised by crewmen to protect the helicopter blades. Then a wooden drawbridge is raised at both ends to completely inclose the helicopter. This structure requires one platoon week for completion. If approved, this revetment will be used throughout II Corps Tactical Zone.

The continuing exemplary efforts of the unit mess personnel has resulted in winning the 35th Engineer Group's Best Mess Award for the months of January and March. It should be noted that the unit has received this award four times in the past seven months at three different mess hall locations.

2. Section 2, Lessons Learned: Commander's Observations, Evaluations, and Recommendations.

a. Personnel

(1) Hiring of Local National Employees

(a) OBSERVATION. In every theater of operations since World War I there has been a requirement for additional engineer effort over and above existing resources. To meet the ever increasing demand of construction, augmentation of engineer units is a necessity.

(b) EVALUATION. The selective use of technically qualified local nationals can assist in alleviating this untenable situation. Local nationals have been most effectively utilized by this Battalion as masons and carpenters. Without this augmentation, many of the assigned projects would not have been completed on schedule. There are many other areas that deserve consideration for local hire under this organization's present TO&E.

(2) Organization of Work Forces

(a) OBSERVATION. Local National work forces are now being utilized for sophisticated vertical construction. Due to the difference in customs and language difficulties in communication have arisen. Also, holidays celebrated by the Local National work force seldom coincide with the holidays observed by the US Army.

(b) EVALUATION. It has been observed that a segregation of US Forces and the Local National forces does not impede construction in comparison to combining forces. Holidays destroy the function of the squad if integrated because the US members of the squad only are available to work on that day. Therefore, in the interest of utilizing time to the fullest, separate squads maintain a working integrity that can not be matched by mixed squads. This is most apparent during average work days, because the starting and stopping times are different for the two forces. Under extenuating circumstances it has been found that local nationals can be effectively utilized for periods in excess of 8 hours when properly motivated.

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SUBJECT: Operational Report of the 864th Engineer Battalion (Construction)  
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b. Operations.

## (1) Correcting Soft Spots in Road Construction

(a) OBSERVATIONS. In sections where the existing elevation of a road being upgraded is only slightly higher than the watertable, problems with numerous soft spots develop after breaking through the existing base course. When cutting these sections out with dozers or 290M Tractors/Scrapers, the highly concentrated weight of this equipment makes the soil more unstable and causes greater quantities of water to rise to the surface. This results in having to cut four to five feet in depth to place rock and sand to reduce the capillary action and stabilize the section of road.

(b) EVALUATION. When soft spots develop, it has been observed that a front loader proves very successful in correcting this problem. It is light and highly maneuverable compared to a dozer or a 290M Tractor/Scraper and is capable of cutting a neat, smooth section quickly and more efficiently.

## (2) Construction Sequence.

(a) OBSERVATION: Problems incurred during rehabilitation of Highway QL-1 has brought about a construction sequence for this battalion. Instead of a lengthy explanation as to problems encountered, present sequence only will be covered.

(b) EVALUATION. The construction sequence used in rehabilitation of the existing obsolete highway is as follows; the existing shoulders are cut half-way down to the ground level, to prevent back filling on a slope which gives little or no bond between material used as fill and existing material in the embankment.

Next, when cutting down shoulder embankments to the existing watertable or high-water marks, a sand or rock blanket of approximately one foot in thickness must be used to separate the water table from the select material being used. This blanket provides subsurface drainage and prevents capillary action.

Select material is then placed in six inch lifts to an elevation of approximately one foot below the existing roadbed and compacted using a sheeps-foot and a 50 ton roller. The minimum density required for the last foot after compaction, must meet 95 per cent modified AASHO, below this, 90 per cent. The existing roadbed is then ripped and distributed evenly across the forty foot width. Additional material, if needed, is hauled in to obtain sub-base elevation.

Prior to placing 8 inches of base course material, select material is used to build the shoulders up 4 inches. This method works very well as a side form to contain the first lift of base course. French drains are cut at 100 foot stations to provide base course drainage in event of heavy rains prior to the

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surface treatment. The French Drains are placed more frequently if required. The second lift is then placed across the 40 foot width.

The base course of 3" minus is placed in two four inch lifts, and compacted with steel wheel and pneumatic tired rollers. This finished surface is then primed with MC-0, cured for twenty four hours, and paved with two each one and one half inch lifts of asphaltic concrete.

The finished product is: a sub-grade with a minimum CBR of 5, compacted to 90 per cent AASHO, a sub-base six inches thick, CBR 20, compacted to 95 per cent AASHO, a base course 8 inches thick, CBR 80, compacted to 100 per cent AASHO, asphalt cement, three inches thick, compacted to 100 per cent, and eight foot shoulders compacted to 100 percent AASHO, with a 5 inch crown from center line of the pavement.

(3) Removal of existing embankment material, no longer suitable, due to design criteria of the QL-1 rehabilitation.

(a) OBSERVATION. While rehabilitating QL-1, several areas were encountered which contained unsuitable material. This material was discovered when subjected to heavy convoy traffic and heavy construction equipment. In all cases the "unsuitable" material was a supersaturated clay ranging from dark gray to light blue in color. When subjected to heavy loading this material began to "pump" and act like a Gelatine.

(b) EVALUATION. Removal of this material often proved difficult because it would not support even a full tracked medium tractor. The material is generally removed to a depth of 5 to 8', then two feet of sand is placed in the excavation, followed by one foot of predominately rocky fill. This method has succeeded in stabilizing the area and permitted normal fill operation from that point on.

(4) Obtaining the necessary compaction on back fill for culverts.

(a) OBSERVATION. Often, difficulty is encountered in the backfilling of culverts. Effective compaction equipment such as vibratory tampers are not available.

(b) EVALUATION. By utilizing sand for back fill, the compaction can be obtained by placing the sand in 8" lifts, and then flushing down each lift with water. The required compaction can be met easily, but care must be taken to contain the sides of the fill with headwalls and provide an outlet for the excess water.

(5) LOC Restoration and Maintenance

(a) OBSERVATION. Previous methods of repairing concrete bridges blown by satchel charges has required the installation of timber decking over the destroyed section. This method often requires a great quantity of material, uses many trucks for delivering the quantity of material, and consumes many manhours.

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The French constructed concrete slab bridge is similar throughout the republic.

(b) EVALUATION. When satchel charges are used to blow holes through the concrete deck of a bridge, much of the rebar in the hole is bent or twisted. However it is still serviceable after being bent back to its original position. Rebar can be welded in place filling any gaps and thereby restoring the rebar pattern. Timber bents are then used to shore up under the bottom of the destroyed section and concrete is mixed and placed in the holes. After proper curing, the area will bear adequate loads if the bent is left in place.

(6) Installation of wood columns on a concrete slab.

(a) OBSERVATION. When precut columns were installed on a concrete slab, it was found that shims were required in some places to insure proper bearing of caps. The variance was due to sag of the screed board when the floor was finished.

(b) EVALUATION. Shims can be eliminated if each column is measured using the simple method of a taunt string at the proper height to mark each column before cutting.

(7) Pouring of concrete on a 40 degree slope.

(a) OBSERVATION. While constructing a rail Off-Loading facility for base course, it was necessary to place two concrete slabs, 6 inches thick by 12 foot by 100 foot on a 40 degree slope.

(b) EVALUATION. The solution in retaining the concrete in place until "Set" was to place 3 inch by 6 inch forms approximately 8 feet apart perpendicular to the 100 foot length. Then every other slab was placed, making the slabs 8 foot by 12 foot. To keep the concrete in place, three quarter inch plywood was fastened to the top of the form, starting at the bottom, making an enclosed form. As soon as the concrete had filled up the first portion of the slab, another sheet of three quarter inch plywood was added, and this was done until the slab was completed. When the first slabs were poured, holes were drilled in the plywood, so that anchor bolts could be placed in the first slabs placed in order to fasten down the plywood for the second placement. After the concrete for the second placement was set, a contact truck was utilized to cut the anchor bolts off even with the pad.

(8) Combat Support Equipment.

(a) OBSERVATION. During the "Tet" offensive, this unit was forced to assume the role of Infantry. The lack of signal equipment, sufficient numbers of crew-served weapons and M-79 launchers became apparent. In addition to the "Tet" offensive, units of this Battalion must provide their own security in areas where threat of enemy action is continuous.

(b) EVALUATION. As construction battalions are called on more to assume direct combat roles and provide their own security, the need for an increased number of radios, M-79s, and crew-served weapons becomes apparent. These items should be authorized on a TA basis or in a modified TOE.

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(9) Changes to Plans after Starting Construction.

(a) OBSERVATION. Frequently additions or deletions are made to plans after construction has started. Changes often result in destruction of newly built facilities. This results in a great loss of time, effort, and material, not to mention the drop in morale of the construction personnel.

(b) EVALUATION. Sufficient planning time for each project should be granted so that construction may continue with only minimal delays due to additions or deletions.

(10) Drawing Equipment

(a) OBSERVATION. It has been recognized for some time that the drafting equipment furnished under the current TOE is inadequate and obsolete. Outmoded Tee squares drastically cut production. Poor quality paper used in a damp climate pulls and tears thereby resulting in poor quality work. Ruling pens and pen points supplied with the TOE set are poor in quality and outdated.

(b) EVALUATION. In an effort to produce better work, the battalion draftsmen have resorted to using personal equipment such as parallel slides, rapidiograph pen sets, and mechanical lead holders. A thorough review is needed of equipment presently being supplied to construction battalion sets and the TOE changed to meet existing requirements. As a minimum, items which should be considered for further inclusion in the system would be:

1. Adjustable drafting tables for each draftsman
2. Parallel slides for each table
3. One (1) rapidiograph set for the drafting section
4. Two (2) mechanical lead holders and assorted leads for each draftsman

(11) Construction Prints.

(a) OBSERVATION. During this period a shortage of Bruning copy paper temporarily stopped the Battalion's ability to produce construction prints. It was learned that Ozalid paper was available. By building a developer consisting of a cardboard tube and using a ball of cotton saturated with ammonia, Ozalid can be developed after exposure in a Bruning machine.

(b) EVALUATION. Use of a field expedient developing tank makes it possible to combine the normally incompatible Bruning and Ozalid processes into a satisfactory reproduction unit. After exposure, the print is placed into the tube along with the ammonium saturated cotton ball, and a usable print is developed.

- c. Training. None
- d. Intelligence. None

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e. Logistics.(1) Repair parts for non-standard items of equipment.

(a) OBSERVATION. Several items of non-standard construction equipment have been issued to engineer units without back-up repair parts support.

(b) EVALUATION. Several non-standard items of construction equipment are on hand in this Battalion's inventory such as Tambo Rollers, 200 TPH Universal Primary, Intermediate, and Secondary crushers, and a 100 TPH Barber Greene Asphalt Plant. Parts have been requisitioned through normal supply channels and OICC-RMK without satisfactory results. This results in increased downtime and lost production. A PLL type system, well organized would alleviate this problem. Backup support is definitely required on non-standard equipment.

(2) Hub Stud Bolts on 25 Ton Trailers.

(a) OBSERVATION. Hub bolts on 25 Ton Trailers must be checked daily when continuous heavy loads are being carried.

(b) EVALUATION. When trailers make sharp turns and slide the tandem axles when backing, the lug nuts work loose and if not checked periodically, will result in hub stud bolts snapping off.

(3) Equipment Improvement.

(a) OBSERVATION. During the past twelve months while performing organizational maintenance on the Tractor, Wheeled, Clark Model, 290M, it was noticed that the exhaust tubes cracked, and in some cases were broken off during normal operation.

(b) EVALUATION. To overcome the loss of equipment for operation and to reduce downtime, the welding shop fabricated an exhaust tube utilizing a discarded 105 MM shell casing. This has proven to perform very well, particularly when considering the simplicity of producing the part, and the availability of required material.

f. Organization. Noneg. Medical(1) Personal Shot Records.

(a) OBSERVATION. It was learned that numerous problems developed when personnel were required to maintain their shot records current.

(b) EVALUATION. Experience has taught that the best procedures for keeping immunizations up to date is to have each individual shot record checked monthly by Battalion medics. A list of names is then submitted to the Company Commander specifying a time and place for updating shot requirements.

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(2) Use of Marijuana.

(a) OBSERVATION. The use of marijuana (pot) is a continuous problem within the Command. Many of the personnel are not cognizant of the effects of marijuana on the body and consequences of continued use.

(b) EVALUATION. It has been our experience that a decrease in the use of marijuana can be obtained by better informing each member of the unit of its many ill effects and subsequent penalties for possession and use. This has been accomplished by lectures and visual aids. The criminal investigation department of the Provost Marshal has been most helpful in this endeavor.

(3) Reduction in Venereal Disease

(a) OBSERVATION. A high rate of Venereal Disease has been prevalent throughout this unit and positive steps were instituted to reduce this alarming rate.

(b) EVALUATION. An aggressive program in Venereal Disease was initiated and continued emphasis was placed on self protection of the individual. Lectures and medical slides showing the after effects of Venereal Diseases given by the Battalion Surgeon have proven to be invaluable in the reduction of Venereal Disease.

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DONALD A. WISDOM  
LTC, CE  
Commanding

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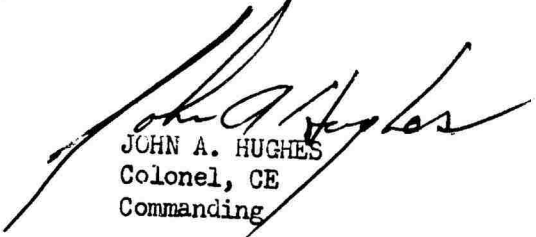
Maj Pierce/tb/2003

SUBJECT: Operational Report - Lessons Learned (RCS-CSFOR-65) (R-1) for  
Quarterly Period ending 30 April 1968.

DA, Headquarters, 35th Engineer Group (Const), APO 96238, 21 May 1968

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

The Operational Report - Lessons Learned submitted by the 864th Engineer Battalion (Const) has been reviewed by this headquarters and is considered an excellent summary of the Battalion's operations during the reporting period ending 30 April 1968. This headquarters concurs with the remarks of the Battalion Commander.



JOHN A. HUGHES  
Colonel, CE  
Commanding

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11 JUN 1968

AVBC-C (30 Apr 68) 2nd Ind

SUBJECT: Operational Report of the 864th Engineer Battalion (Construction)  
for the Period Ending 30 April 1968, RCS CSFOR-65 (R1)

DA, Headquarters, 18th Engineer Brigade, APO 96377

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

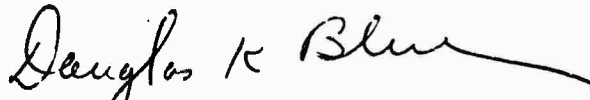
1. This headquarters has reviewed the Operational Report - Lessons Learned for the 864th Engineer Battalion (Construction) for the quarterly period ending 30 April 1968. The report is considered to be an excellent account of the Battalion's activities for the reporting period.

2. This headquarters concurs with the observations and and recommendations of the Battalion Commander with the following comments added:

a. Reference paragraph 2b(4). Flushing sand backfill with water is recognized as being a good method of obtaining compaction around culverts. Better results may be obtained, however, by vibrating the sand with concrete vibrators to obtain the desired compaction.

b. Reference paragraph 2b(8). The addition of M-79 grenade launchers to the Construction Battalion has been accomplished by the current MTOE action. It is anticipated that the MTOE action will be approved in mid-summer 1968. Additional Signal equipment and crew-served weapons will be considered by the next MTOE action.

c. Reference paragraph 2b(10). Three drafting machines have been added to the Battalion Headquarters by the current MTOE action. See paragraph 2b above.



DOUGLAS K. BLUE  
Colonel, CE  
Deputy Commander

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AVHGC-DST (30 Apr 68) 3d Ind CPT Arnold/dls/LBN 4485  
SUBJECT: Operational Report of the 864th Engineer Battalion (Construction)  
Period Ending 30 April 1968, RCS CS FOR-65 (R1)

HEADQUARTERS, US ARMY VIETNAM, APO San Francisco 96375 16 JUN 1968

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

1. This headquarters has reviewed the Operational Report-Lessons Learned for the quarterly period ending 30 April 1968 from Headquarters, 864th Engineer Battalion (Const).

2. Concur with report as submitted.

FOR THE COMMANDER:

  
JOHN V. GETCHELL  
Captain, AGC  
Assistant Adjutant General

Cy furn:  
HQ 18th Engr Bde  
HQ 864th Engr Bn (Const)

GPOP-DT (30 Apr 68) 4th Ind  
SUBJECT: Operational Report of HQ, 864th Engr Bn (Const) for Period  
Ending 30 April 1968, RCS CSFOR-65 (R1)

HQ, US Army, Pacific, APO San Francisco 96558 19 JUN 1968

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

This headquarters has evaluated subject report and forwarding indorsements and concurs in the report as indorsed.

FOR THE COMMANDER IN CHIEF:



K. F. OSBOURN  
MAJ. AGC  
Asst AG

**FOR OFFICIAL USE ONLY**ORGANIC UNITS

Headquarters and Headquarters Company, 864th Engr Bn (Const)

Company A, 864th Engr Bn (Const)

Company B, 864th Engr Bn (Const)

Company C, 864th Engr Bn (Const)

Company D, 864th Engr Bn (Const)

ATTACHED UNITS

569th Engineer Company (TOPO) (CORPS), Administrative Control

40th Engineer Detachment (Well Drilling), Administrative and Operational Control

588th Engineer Detachment (Well Drilling), Administrative and Operational Control

1st Platoon, 553 Engineer Company, (Float Bridge), Operational Control

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**DOCUMENT CONTROL DATA - R & D**

*(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)*

1. ORIGINATING ACTIVITY (Corporate author) <b>OACSFOR, DA, Washington, D.C. 20310</b>		2a. REPORT SECURITY CLASSIFICATION <b>For Official Use Only</b>	
		2b. GROUP	
3. REPORT TITLE <b>Operational Report - Lessons Learned, Headquarters 864th Engineer Battalion</b>			
4. DESCRIPTIVE NOTES (Type of report and inclusive dates) <b>Experiences of unit engaged in counterinsurgency operations. 1 Feb - 30 Apr 1968</b>			
5. AUTHOR(S) (First name, middle initial, last name) <b>CO, 864th Engineer Battalion</b>			
6. REPORT DATE <b>30 April 1968</b>		7a. TOTAL NO. OF PAGES <b>22</b>	7b. NO. OF REFS
8a. CONTRACT OR GRANT NO.		8b. ORIGINATOR'S REPORT NUMBER(S) <b>682194</b>	
8c. PROJECT NO. <b>N/A</b>		8d. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)	
8e.			
10. DISTRIBUTION STATEMENT			
11. SUPPLEMENTARY NOTES <b>N/A</b>		12. SPONSORING MILITARY ACTIVITY <b>OACSFOR, DA, Washington, D.C. 20310</b>	
13. ABSTRACT			