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SUBJECT: Operational Report - Lessons Learned, Headquarters, 35th Engineer Battalion (Cbt), Period Ending 30 April 1968 (CORRECTED COPY)

SEE DISTRIBUTION

1. Subject report is forwarded for review and evaluation in accordance with paragraph 5b, AR 525-15. Evaluations and corrective actions should be reported to ACSFOR OT RD, Operational Reports Branch, within 90 days of receipt of covering letter.

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.

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KENNETH G. WICKHAM
Majoi General, USA
The Adjutant General

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35th Engineer Battalion (Cbt)

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DEPARTMENT OF THE ARMY
HEADQUARTERS 35TH ENGINEER BATTALION (COMBAT)
AFO SAN FRANCISCO 96337

SUBJECT: Operational Report - Lessons Learned, Headquarters, 35th Engineer Battalion (Combat), for Quarter Ending 30 April 1968, RCS CSFOR-65 (R1)

THRU: Commanding Officer
        45th Engineer Group (Const)
        APO San Francisco 96337

        Commanding General
        18th Engineer Brigade
        APO San Francisco 96377

        Commanding General
        United States Army, Vietnam
        ATTN: AVHGC - DH
        APO San Francisco 96307

        Command-in-Chief
        United States Army, Pacific
        ATTN: GPOP - OT
        APO San Francisco 96558

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

Section 1: Significant Organizational of Unit Activities.

SUMMARY: The battalion entered the reporting period in II CTZ, with the primary mission of upgrading QL-1 from its intersection with QL-19 north to Bong Son. In Early February, during the peak of the TET offensive, the battalion was moved by land to Qui Nhon and by sea to Da Nang, and was placed in general support of III Marine Amphibious Force. The battalion was assigned the mission of opening QL-1 from Da Nang north over the Hai Van Pass and west across the Bowling Alley, and the follow-on mission of upgrading QL-1 from Nam O, 15 km north of Da Nang, north to Hu Loc. The Battalion Headquarters and Headquarters Company, two line companies, and attached Light Equipment (-) and Panel Bridge (-) Companies are currently located at Camp Nam O, north of the Cu De River and on the beach south of the Hai Van Pass;

CORRECTED COPY as per Hqs, 35th Engr Bn Letter dated 6 June 1968

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two line companies, augmented with a platoon of the Light Equipment Company and a section of the Panel Bridge Company, are located at Hill 24 on the Lang Co Peninsula, north of the Hai Van Pass. Major achievements of the battalion include the opening of Hai Van Pass and the Bowling Alley in ten days, and the dramatic upgrading of the road in succeeding weeks. Comments by functional heading follow:

1. Command:

   a. The function and value of the Engineer Group was vigorously demonstrated in the few days preceding redeployment of the battalion. Critical equipment and personnel shortages were corrected, and advance liaison with III MIF and ancillary support units was accomplished with outstanding effectiveness.

   Paragraph b deleted per 35th Engr Bn Letter dated 6 June 1968

2. Administration, Personnel, Morale, and Discipline:

   a. During the reporting quarter, the personnel section processed 362 personnel for return to CONUS for reassignment or separation. This was a slight increase over last quarter. Replacements during the reporting period numbered 330, causing the strength posture to drop from 98.9% to 95.6% of authorized. Although the total strength posture remained favorable, the shortage of experienced combat engineer non-commissioned officers persisted, with only 68.5% of the authorized positions filled. A slight rotational hump is projected for November 1968. Necessary action to alleviate this situation will be taken.

   b. The relocation of the battalion from II CTZ to I CTZ brought about a sharp increase in casualties, consisting of 1 KIA and 33 WIA. Most of the casualties were incurred during initial operations in I CTZ.

   c. Morale of the battalion was sparked by the initial success in opening the road, and by the engineering challenge represented in particular by the Hai Van Pass area. A combination of hard work, hazardous conditions, and visible achievement created a high esprit which was immediately reflected in a major increase of requests for tour extensions. The Pass has become, perversely, an object of deep affection to the troops.
3. Intelligence and Counterintelligence:

a. In I CTZ, the 35th has established an effective system for accumulating intelligence from III MfF, 5th and 7th Marine Regiments, and local CAP and RF/PF units. Timely intelligence is achieved through close and continuous liaison with local tactical units.

b. The 35th has to date achieved only limited success in its attempt to purchase information or end items of enemy ordnance. Recent hiring of relatively large numbers of local Vietnamese laborers appears to be affecting this program favorably. In the Bowling Alley, a high percentage of enemy mines are marked with the characteristic three stones; such is not the case in the Hai Van sector.

c. Enemy command-detonated mines remain an unsolved threat to the battalion. Placed ten to thirty feet from the edge of the road, these mines are beyond the practicable limit of minesweep team operations, and are capable of selective targetry. The battalion has had only limited success in discovering such mines, but greater success in recovering the blasting wire after ambush. Hopefully, this latter results in logistical problems not anticipated by the enemy.

4. Operations and Training:

a. The battalion assigned and attached units are listed in Enclosure 1.

b. Operations:

(1) On 6 February, the 35th was ordered to move from LZ Hammond, vicinity Chu Nhon, to Da Nang. Loading elements landed at Da Nang on 12 February and the battalion, moving by LST and freighter, closed a road north of Da Nang, on 16 February. On arrival, the 35th was placed in general support of III MfF, and was assigned the mission of opening QL-1 to the north. Attached to the 35th Engineers were the 517th Engineer Company (Light Equipment) and the 51st Engineer Company (Ponol Bridge).

(2) Enemy action had closed the sector of QL-1 over the Hai Van Pass with three major breaks and a series of minor obstacles; in the Bowling Alley sector between Phu Cla and Phu Loc, every bridge and culvert was destroyed, and intermediate obstacles had been created by extensive laying. Efforts to reopen the road over Hai Van Pass by elements of the 7th Marine Engineer Battalion and the 61st Naval Construction Battalion in the first two weeks of February had been costly and unsuccessful. Initial attempts by the 35th Engineers on 13 and 14 February to reconnoitre the pass were equally unsuccessful. On 15 February, the Commanding General, 1st Marine Division, ordered cessation of engineer effort until the tactical situation could be stabilized.
(3) On 17 February, the 2nd Battalion, 502nd Infantry, 101st Airborne Division closed in the Hai Van area; the 1st Battalion, 327 Infantry, 101st Airborne Division closed in the Phu Loc area a few days later. Extensive search and destroy, patrolling, and ambush operations were immediately initiated.

(4) During the period 20-24 February, A and C Companies, 35th Engineers, operating in close coordination with elements of the 2nd Battalion, 502nd Infantry, 101st Airborne Division, opened the Hai Van Pass. Major obstacles removed included the repair in place of a damaged 60-foot single-trestle M4T6 dry span, the blast-cutting of a 200-foot section of road which had been destroyed, and the replacement with culvert of a demolished 20-foot concrete slab bridge.

(5) On 25 February, A and B Companies were moved over the pass to a forward position on the north side of the Lang Co bridge. On 26 February, ground reconnaissance by B Company along the Bowling Alley west toward Phuoc An was halted by enemy ambush. On the morning of 27 February, K Company, 3rd Battalion, 5th Marines, supported by air strikes, assaulted Phuoc An. Reconnaissance elements of B Company, 35th Engineers, reached Phuoc An by noon on 27 February, and by nightfall pioneer repairs had been completed to a point less than 3 km east of Phuoc An. On 28 February, B Company built its way into Phuoc An and that night, secured by K Company, 3rd Battalion, 5th Marines, built a 105-foot, four-trestle M4T6 dry span across the river at Phuoc An. Working west on 29 February, B Company linked up with elements of the 32nd Naval Construction Regiment working east, and QL-1 was open from Da Nang to Phu Bai. The first supply convoys moved north over the road on 1 March.

(6) The assignment of the 35th in general support of III MAF terminated on 15 March 1968. Its current mission is the upgrading of QL 1 to two-lane all weather capability from Nam O to Phu Loc.

(7) During the period 1 March - 30 April, the 35th has accomplished the following work on QL-1:

(a) cut and moved 271,800 CY of earth
(b) blasted and moved 104,500 CY of rock
(c) hauled and placed 108,300 CY of fill
(d) placed 3070 LF of culvert
(e) constructed 58 headwalls/retaining walls
(f) constructed 275 LF of Class II bridge
(g) placed 5300 CY of 2½ inch minus base course rock
(8) In addition to its primary mission of upgrading QL-1, the battalion has:

(a) Hauled and placed 32,590 CY of laterite in construction of ammunition storage berms at Da Nang Air Base.

(b) Moved 200,000 CY of sand in the preparation of a 27 acre hardstand area for the Da Nang Sub-Area Command Depot.

(c) Accomplished a variety of minor operational support missions for local Marine and Army elements.

(d) Constructed a 315-foot M476 floating bridge across the Truoi River in a night bridging operation on 31 March - 1 April.

(e) Opened a quarry and rock crusher site at Lang Co. Operated by the Quarry Section, 517th Engineer Company (LE), the 75 TPH crusher produced 10,000 CY of 2 1/2" (-) during the period 9-30 April.

c. Training: Training emphasis was placed on weapons, counter-ambush techniques, maintenance, and OJT.

Summary: During the quarter, the command devoted 70 days to operations, 11 days to troop movements, and 3 hours once each week to training.

5. Logistics: Major logistics problems lie primarily in the field of spare parts. To date, the battalion has received less than one-tenth of the vehicular ordnance and engineer equipment spare parts requisitioned in I Corps. The spare parts supply system has not reacted adequately to the sudden displacement of an Army Engineer Battalion to an area previously occupied only by Naval, Marine Corps, and US Air Force elements. Class I, III, V, and LOC Class IV materials have been provided by Naval support facilities.

6. Force Development: None.

7. Command Management:

a. Command management efforts have been focused primarily on production. The maintenance of comparative production statistics, augmented by rigid project scheduling, has resulted in highly competitive efforts by subordinate assigned and attached units, and in a significant improvement in productivity.

b. The initial planning, estimating, and scheduling load on the Battalion S-3 Section for the upgrading of QL-1 was exceptionally heavy for so small a staff. Broad estimates and mission assignments, refined as planning data was obtained and digested, resulted in a schedule which has to date proved both realistic and optimum.
8. Inspector General: None.

9. Information: None.

10. Civil Affairs:

   a. On arrival of the battalion in I CTZ, relations with local Vietnamese were complicated by the devastation resulting from the TET offensive, a breakdown in civil administration, and the total abandonment of all villages along the Bowling Alley. With stabilization of the tactical situation and a return of the refugee population, major strides were taken in the establishment of friendly working relationships with local Vietnamese. Particularly successful were the hiring of large numbers of Vietnamese laborers, the establishment of a MEDCAP program by the battalion surgeon, several minor but popular civic action projects, and the innate friendliness of the engineer soldier.

   b. At Camp Nam 0, relationships with local villagers were strained by the location of over two thousand graves within the camp perimeter. Fears that the 35th was violating the graves were overcome by painstaking efforts to avoid damage to the graves, accentuated by marking the graves with engineer tape, by assistance in removing the graves, and by claims assistance. Although most of the graves were removed, the success of the program was highlighted by several requests from local villagers to place new graves within the perimeter.

Section 2, Part 1: Observation (Lessons Learnt)

1. Personnel: None.

2. Operations:

   Item: Security of Isolated Base Camps

   Discussion: In II CTZ, the battalion headquarters and two companies were located alone at LZ Hammond. During closeout of the Base Camp, security problems became so acute, as a result of decreasing manpower to defend a constant perimeter, that additional security had to be obtained from friendly elements located in the vicinity. In I CTZ, the Base Camp sites at Nam 0 and Hill 24 were also isolated, and initial occupation was complicated by inadequate security of an extensive perimeter.

   Observation: Whenever possible, Engineer Base Camps should be co-located within an established perimeter occupied by tactical units.
Item: Minesweep Techniques

Discussion: When faced with the responsibility to minesweep approximately 31 miles of road on foot daily, the 35th located pairs of minesweep teams along the length of its AO. These minesweep teams spend the night with friendly units located in the vicinity of their starting points. In the morning, the pair of minesweep teams part, one sweeping north, the other south, until they meet other sweep teams proceeding in the opposite directions. This procedure enabled the entire length of road to be mineswept in a fraction of the time it would take one team to do it, and with much less fatigue to the minesweep team members.

Observation: Dispersion of minesweep teams is a worthwhile practice whenever feasible.

Item: Lifting Rams, D7E Dozer

Discussion: Considerable difficulty was encountered, in rocky terrain due to falling rocks damaging the hydraulic fluid tube assembly on the D7E dozer.

Observation: This situation was rectified by shifting the tube assemblies around so that the hydraulic fluid tubes face downward.

Hydraulic fluid tubeassy.
Original position

Right assy., placed on right side

Right Side

Hydraulic fluid tube assy.
New position

Left assy., placed on left side

Right Side

Item: Breakage of Hydraulic Hoses, D7E Dozer.

Discussion: While using the D7E dozer in the quarry operation, frequent breakage of the hydraulic hoses on the dozer was encountered.

Observation: To relieve this situation, a guard of PSP was constructed over and around the hoses to protect them from the rocks.

Item: Excessive Secondary Blasting
Discussion: In the quarry operation it was noted that the amount of secondary blasting required to reduce some of the large rocks obtained from the primary blast required much demolitions and time. Secondary blasting slows down the overall production of the quarry.

Observation: The use of a crane with headache ball cut down the amount of secondary blasting required, and significantly improved the efficiency of the quarry.

Item: Rock Drill Steels

Discussion: When drilling in rock with sand seams, an attempt to drill too deep resulted in broken and lost drill steel.

Observation: When drilling in a new blast quarry, the drilling was adjusted to the rock. If there were a number of sand seams in the rock, the drilling was limited to 15 feet. This practice resulted in much less broken drill steel.

Item: Replacement of Turbo-chargers on D7E Dozers

Discussion: Due to the extremely dusty conditions in Vietnam, the crankcase ventilation on a D7E dozer became clogged frequently, and tended to damage the turbo-charger.

Observation: To rectify this situation, all operators were instructed to check the crankcase ventilation at least twice daily.

Item: Compressor Substitutes in Demolition Preparation

Discussion: In an area requiring extensive blasting, compressors became critical for drilling bore holes.

Observation: Shaped charges were used to drill bore holes large enough to accommodate cratering charges for the main blast. For best effect, the standoff distance on the shaped charges were approximately doubled.

Earth augers were successfully used to drill boreholes for cratering charges in relatively soft sandstone and laterite vertical faces.

Item: Jack Shaft Damage to 5-ton Dump Trucks

Discussion: Excessive jack shaft failure in 5-ton dump trucks has been noted. Many operators prefer a clutch with 3/4" to 1" free travel in the clutch pedal. This fast clutch action puts needless strain on the jack shaft.
Observation: The strain on the jack shaft was substantially lessened if the clutch pedal had a free travel of at least 2" before it began to disengage. The decrease in the strain on the jack shaft was the result of gradually engaging/disengaging the clutch.

Item: Effectiveness of a Track Drill

Discussion: During the widening of Hai Van Pass the 35th Engineer Battalion (Combat) encountered many instances where it was necessary to blast a vertical rock face which rose 15 to 20 feet above the road surface.

Observation: A track drill was found to be very effective in such instances and afforded a greater flexibility in drilling the bore holes. The track drill was able to reach to greater heights and drill in more awkward positions than a man with a jack hammer drill.

Item: Quarry Security

Discussion: While operating a quarry and crusher site in a combat zone, the noises produced by the quarry and crusher machinery provide noise cover which could facilitate enemy infiltration.

Observation: To eliminate noise cover, quarry/crusher operations were restricted to daylight hours. The equipment was maintained after dark, thus getting maximum useful production out of all equipment.

3. Training:

Item: Intensive Training Pays Dividends

Discussion: In preparation for its move north, the 35th instituted an intensive training program while at LZ Hammond. The training covered small unit tactics, counter-ambush tactics, hand grenade practice, and weapons familiarization. The day following its counter-ambush training, a minesweep team was ambushed. Because of its recent review of counter-ambush tactics, the minesweep team was able to suppress enemy fire causing the enemy to break contact.

Observation: Intensive training in combat skills pays high dividends.

Item: Tamping of Bore Holes with Cement

Discussion: A prime factor in determining the effectiveness of a blast is how well the bore hole is tamped. If a charge is tamped correctly the main force of the blast will not be lost by merely blowing out the material used for tamping, but will confine the blast to the inner depths of the rock. Cement was found to be very effective tamping material.
Sinco there were usually a large number of holes
to prime before each blast, the cement had sufficient
time to harden and thus formed a good tamp.

4. Intelligence: None.

5. Logistics:

Item: LST Capacities

Discussion: Much of the battalion was moved from Qui Nhon to Da
Nang via LST. In researching the capacity of an LST, the manual stated
there was 14,000 sq ft of usable space. To best utilize every square
foot of space on the LST, the 35th measured both cargo decks, scaled
the decks and the battalion equipment, and worked with the models until
it obtained the best loading plan.

Observation: By scaling the LST and battalion equipment, and for-
mulating the loading plan by use of models, it was possible to realize
an actual storage area of 19,000 sq ft, an increase of about 35%.

Item: POL Resupply

Discussion: The battalion elements based at Hill 24 have no avail-
able source of POL; all diesel fuel must be hauled to these elements
from the Da Nang area. The organic fuel transport capability of the
battalion was inadequate to haul diesel fuel to those elements in
quantities which matched their consumption rate. Arrangements were
made with a commercial supplier to deliver fuel directly to Hill 24.

Observation: The fuel haul capability of an Engineer combat bat-
talion with attached Light Equipment and Panel Bridge companies must
be augmented if elements of the battalion are so widely separated
that repetitive hauls cannot be made in one day.

Item: The Tactical Support Functional Component (TSFC) System

Discussion: The battalion draws Class IV LOC construction material
from the 3rd Naval Construction Brigade using the Navy TSFC System.
This system provides complete bridge assemblies, which are pre-designed,
pre-cut, and pre-stocked.

Observation: TSFC bridges have a limited waste factor; site
adaptation, material deterioration, and other contingencies occasion-
ally result in inadequate materials to complete the project.
TSFC materials are specifically allocated to LOC and other predetermined purposes. As a result, the materials are separated from general construction materials, and are not subject to competition by users for bunker materials and other purposes.

6. Organizational:

**Item: S-2/S-3 Functions**

**Discussion:** During its initial operations in I Corps, the 35th was simultaneously faced with a major requirement for coordination with Army and Marine tactical elements, and with a major requirement for operational planning and execution. The battalion S-2 Section was given responsibility for tactical coordination, permitting the S-3 Section to focus its entire efforts on the mission.

**Observation:** This adaption of the consolidated S-2/S-3 concept can be effectively employed without structural consolidation of the two sections.

**Section 2. Part II: Recommendations**

1. That a headache ball be made part of the standard equipment of the quarry section of an engineer light equipment company.

2. That the effectiveness of the TSFC system be analyzed in terms of cost, responsiveness to demand, and flexibility, with a view toward possible adoption by the Corps of Engineers.

JOHN V. P. RISH, Jr.
LTC, CE
Commanding
SUBJECT: Operational Report - Lessons Learned, Headquarters, 35th Engineer Battalion (Combat), for Quarter Ending 30 April 1968, GCS CSFOR-65 (R1)

DA, Headquarters 45th Engineer Group, APO 96337 1 MAY 1968

TO: Commanding General, 18th Engineer Brigade, APO 96377

1. This Headquarters has reviewed the Operational Report - Lessons Learned for the 35th Engineer Battalion and considers it an accurate description of activities and accomplishments during the reporting period ending 30 April 1968.

2. Concur with the Battalion Commander's observations and recommendations with the exception of his recommendation to analyze the Navy TSFC System with a view toward possible adoption by the Corps of Engineers. The Navy system referred to is a partial adaptation of the comprehensive system established by the Corps of Engineers - The Engineer Functional Components System. This system is explained in TM 5-301. TM 5-302 furnishes construction drawings and TM 5-303 contains complete bills-of-material for the various structures. This Headquarters recommends an evaluation of the Army system to determine current needs. With necessary changes, the Engineer Functional Components System would appear to be an excellent means of establishing a standard, orderly construction system throughout Vietnam and other theaters of operation.

George B. Pink

GEORGE B. PINK
COLONEL
Commanding
1. This headquarters has reviewed the Operational Report - Lessons Learned for the 35th Engineer Battalion (Combat) for the reporting period ending 30 April 1968 as indorsed by the 45th Engineer Group. The report is considered an excellent account of the activities of the Battalion.

2. This headquarters concurs with the comments of the Battalion Commander with the following comments added.

   a. Reference: Section 2, Part II, paragraph 1. A wrecking ball will be considered for addition to the equipment available to the Quarry Section of a Light Equipment Company during the next MTOE action.

   b. Reference: Section 2, Part II, paragraph 2. This headquarters concurs with the comments of the Group Commander rather than those of the Battalion Commander with reference to the TSFC system. The Engineer Functional Components system would indeed appear to be an excellent means of establishing a standard, orderly construction system throughout Vietnam and other theaters of operation. This headquarters recommends that this system be reviewed and updated for use in Vietnam.

   Douglas K. Blue
   Colonel, CE
   Deputy Commander
AVHCC-DST (9 May 68) 3d Ind

CPT Arnold/dls/LBN 4485

SUBJECT: Operational Report - Lessons Learned, Headquarters, 35th Engineer Battalion (Combat), for Quarterly Period Ending 30 April 1968,
RCS CSFCR-65 (R1)

HEADQUARTERS, US ARMY VIETNAM, APO San Francisco 96375 29 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, 35th Engineer Battalion (Combat).

2. Reference item concerning Tactical Support Functional Component (TSFC), page 10, paragraph 5; and page 11, paragraph 2: Nonconcur. The Engineer Functional Components System currently contains a variety of bridge facilities; however, it is noted that no facilities are available in the timber trestle type bridges. The use of the EFCS necessitates that requirements be established in sufficient time to allow for orderly requisitioning, procurement, and shipment to meet the demands of the construction unit. To be responsive it would be necessary to stock a wide variety of facilities which entails a large investment in money and depot storage space. By stocking the basic materials in sufficient quantities to meet requirements, units should be able to design and construct facilities while at the same time hold depot stockages at a much lower level than could be expected if EFCS packages were stocked.

FOR THE COMMANDER:

JOHN V. GETCHELL
Captain, AGC
Assistant Adjutant General

Cy fbrm:
HQ 35th Engr Bn (Cbt)
HQ 18th Engr Bde
GPO^-DT (9 May 68) 4th Ind
SUBJECT: Operational Report of HQ, 35th Engr Bn (Cbt) for Period
Ending 30 April 1968, RCS CSFOR-65 (R1)

HQ, US Army, Pacific, APO San Francisco 96558 12 JUL 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 indorse-
ments and concurs in the report as indorsed.

FOR THE COMMANDER IN CHIEF:

K. F. OSBOURN
MAJ. AGC
Asst AG
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Indoosure 1:
Operational Report - Lessons Learned
Headquarters, 35th Engineer Battalion (Combat)

ORGANIZATION OF 35TH ENGINEER BATTALION (COMBAT)

The 35th Engineer Battalion (Combat) consists of:

a. Headquarters and Headquarters Company (minus Land Clearing Platoon)
b. Four engineer line companies (A, B, C, D)
c. 517th Engineer Company (Light Equipment)
d. 511th Panel Bridge Company
Operational Report - Lessons Learned, Hqs 35th Engineer Battalion (Cbr) (U) (CORRECTED COPY)

Experiences of unit engaged in counterinsurgency operations, 1 Feb - 30 Apr 68

CO, 35th Engineer Battalion (Combat)