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

IN REPLY REFER TO
AGAM-P (M) (16 Jul 68) FOR OT RD 682192 19 July 1968

SUBJECT: Operational Report - Lessons Learned, Headquarters, 19th Engineer Battalion (Combat) (Army), Period Ending 30 April 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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19th Engineer Battalion (Combat) (Army)

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DEPARTMENT OF THE ARMY
HEADQUARTERS 19TH ENGINEER BATTALION (COMBAT)(ARMY)
APO San Francisco 96238

EGA-BE-3 30 April 1968

SUBJECT: Operational Report Lessons Learned (RCS CSFOR-65), for Quarterly Period Ending 30 April 1968.

THRU: Commanding Officer, 35th Engineer Group (Const), 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: Commander in Chief of Staff for Force Development, Department of the Army (ACSFOR-DA), Washington, D.C. 20310.

SECTION I. Significant Organization or Unit Activities.

1. Command.

a. During the quarterly reporting period February 1968 through April 1968 the 19th Engineer Battalion (C)(A) continued its primary mission of upgrading QL-1 to MACV standards from Bong Son to Mo Duc. It also continued its non-divisional engineer support within its AOR to the Americal Division for the quarter, the Third Bde of the 4th Inf Division from 29 February 1968 to 30 March 1968, and the 173rd Airborne Brigade from 1 April 1968 until the present date.

b. The 19th Engineer Battalion, organized under TOE 5-35E, consists of HHC and four (4) line companies. Attached to the 19th Engineer Battalion are the 73rd Engineer Company (CS) and the 137th Engineer Company (LE).

FOR OT RD
682192

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c. The Battalion Headquarters, A Company, and the 137th Engr Co (LE) have operated from the Battalion base at LZ English North (Camp Schook), C Company and the 73rd Engr Co (CS) from LZ Lowboy, D Company from LZ Thunder, and B Company from LZ Max.

2. Personnel, Administration, Morale, andDiscipline.

(None)

3. Intelligence and Counter Intelligence.

a. During the recording period the Reconnaissance Section of the S-2 completed a total of 9 vehicular revisional bridge reconnaissance missions covering a total of 165 miles on Rt QL-1 in order to update initial Bridge and Road Reconnaissance Reports.

b. The intelligence collection and dissemination efforts of the section were enhanced by the receipt of daily intelligence summaries from the 2nd Brigade of the 1st Cavalry Division (Airmobile) and the 3rd Brigade of the 4th Infantry Division; also the 11th Light Infantry Brigade and 173rd Airborne Brigade. Close coordination with elements of the 40th ARVN Regiment has increased intelligence information concerning Viet Cong and NVA build-up in local villages.

c. The period started with a sharp increase of enemy activity initiated by the VN/NVA Tet Offensive. There were a total of 255 enemy contacts for this period.

(1) Five bridges were destroyed by fire, 2 were destroyed by demolition, and 3 were partially damaged by VC Sappers.

(2) Elements of the battalion were fired on by enemy small arms, automatic weapons, and grenades in 94 separate incidents.

(3) Minesweep teams and work crews were caught in 13 well planned enemy ambushes. In all incidents, the enemy fired numerous automatic weapons from well fortified positions on both sides of the road and contacts lasted as long as 45 minutes. Two ambushes were initiated by mines; one pressure detonated and one Claymore command detonated.

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(4) Vehicles and personnel encountered 26 mines and booby trap devices. Eight of these were dud M-79 (40mm) projectiles placed in the road after the minesweep team had passed.

(5) The company minesweep teams detected 43 mines and booby trap devices on QL-1 during this period.

(6) The VC constructed a total of 89 obstacles and barriers on QL-1. These ranged from trenches dug by hand in the road, to barricades of logs, rocks, bricks, and local household furniture. Many of these were booby trapped.

(7) The enemy destroyed 37 culverts by placing large (100-200 lb) explosive charges or artillery rounds inside the culverts.

(8) The battalion received mortar fire 5 times and received catapulted satchel charges twice.

(9) VC psychological warfare efforts resulted in 7 incidents of propaganda literature aimed at American Forces in Vietnam, and were placed at work sites along QL-1.

(10) The battalion headquarters was faced with 3 different crowds of local Vietnamese demonstrators. The groups, each 300 - 400 women and children, were peacefully disbursed through the use of interpreters from the 40th Regiment, 22nd ARVN Division.

(11) The battalion's Volunteer Informant Program resulted in the following items being turned over by local Vietnamese to be destroyed:

75mm Recoilless Rifle rounds	7 ea
57mm Recoilless Rifle rounds	250 ea
60mm Mortar rounds	474 ea
81mm " "	88 ea
82mm " "	6 ea
4.2inch " "	15 ea

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3.5inch Mortar rounds	2 ea
90mm " "	21 ea
105mm Artillery rounds	52 ea
155mm " "	47 ea
175mm " "	2 ea
8 inch " "	3 ea
Grenades; M-26, Stick, Chicom	60
M-79(40mm) rounds	52 ea
CBU Air Force Bomblets	1 ea
M-16 AP Mines	180 ea
M-14 AP Mines	1 ea
Bangalore Torpedo	1 ea
Artillery Booster Charge	21 ea
Rockets	4 ea
TNT	20 lbs
LAW	1 ea

(12) The battalion apprehended 15 suspicious Vietnamese who were turned over to local infantry units. Interrogation revealed 4 of these to be confirmed VC.

(13) Casualties resulting from these incidents to the battalion and attached units were 7 US KIA and 38 US WIA.

4. Plans, Operation and Training.

a. During the quarterly reporting period elements of this Battalion spent 81½ days in LOC upgrading and operational support, and 6½ days in training.

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b. The 19th Engr Bn continued upgrading QL-1 to MACV standards by constructing timber pile bridges (Most of which replaced bailey bridges) and widening the existing road. During the quarter, the Battalion built seven (7), class 35 two way, class 50 one way, timber bridges with a combined total length of 390 feet. The Battalion hauled 327,711 cubic yards of fill to upgrade and widen the road to the required 24 foot roadway with 8 foot shoulders.

c. Road widening required extensive drilling and blasting to cut through solid rock. It required the use of 7,152 pounds of explosives which yielded 11,055 cu. yds. of blast rock. This blast rock was used as sub-base in bad spots on the road. Existing culverts were extended and masonry headwalls built in preparation for road widening. Many drainage structures, such as stone arch bridges, were replaced by culverts in order to widen the road.

d. Maintenance effort along QL-1 during the quarter involved keeping the existing bridges and drainage structures repaired, recutting existing ditches, keeping culverts open and filling potholes. The 19th Engr Bn also replaced 679 LF of culvert destroyed by the enemy and opened by-passes for 5 timber bridges that were destroyed.

e. In conjunction with providing equipment support for road work and bridge building, elements of the 137th Engr Co continued their task of placing a sand asphalt seal coat on the road. 174,265 sq yds. of road were sealed in this manner. The 137th Engr Co also continued the operation of laying a base course on the sections of QL-1 already widened and shaped. As of 30 April 1968, 25% of the Battalion's 41.6 mile AOR has the base course placed. This involved the use of 39,029 cu yds of 2½"(-) crushed rock laid in a six to eight inch lift. The 137th Engr Co also continued quarrying and crusher operations at Duc Pho until 31 March 1968, when they closed down operations and moved their quarry and crusher equipment to LZ Lowboy and put it under the control of the 73rd Engr Co.

f. The 73rd Engr Co has established a heavy construction support facility, currently consisting of a large quarry, 2-75 TPH Primary crushers, and 2-75 TPH Secondary crushers, currently producing an average of 780 cubic yards of 2½"(-) rock per day. An asphalt plant has also been under construction and is currently awaiting certain critical parts before production of asphalt can

start. The plant is presently 95% complete. It will make possible the paving of QL-1 in the 19th Engr Bn's AOR.

g. Major operational support was provided on the following projects:

(1) Daily repair of the airfield runway and aprons at LZ English was performed by welding the MSA1 matting.

(2) Construction of aircraft revetments at LZ English. Empty 55 gallon drums were hauled for protective revetment walls.

(3) Construction of causeway at Bong Son River. A causeway across the Bong Son River was constructed using 2,585 cu yds of fill, 625 cu yds of sand, and 980 cu yds of rock. Included in the causeway were 2-5'x10' box culverts and one 70' DS Bailey Bridge.

(4) Operation of water points. The 19th Engr Bn relocated 2 water points from LZ English to the Bong Son River and 1 water point from QL1-411 to QL1-399 for support of units in the Battalion AOR.

i. Direct support was provided to units in the battalion's AOR in the form of equipment, such as D-7E dozers. An estimated 200 acres of land was cleared for fields of fire and denial of concealment to the enemy. Demolition teams were also furnished to blow tunnels, bunkers, and duds found by units in the battalion's AOR.

j. In support of LOC upgrading and operational support missions this quarter, the Battalion hauled and compacted a total of 331,901 cubic yards of fill, operated two 75 TPH rock crushers, produced 84,487 cubic yards of crushed rock, surfaced 174,265 sq yds. of QL-1, and assembled 3,584 feet of culvert.

5. Logistics.

a. Shortages of several types of critical construction materials and equipment continued. Following is a list of critical shortages:

(1) Construction Materials

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(a) 6"x16"x21' timber stringers

(b) Mild steel welding rod

(c) Reinforcing steel rod

(2) Equipment

(a) Graders

(b) Front Loaders

(c) 250 CFM Pneumatic Tool and Compressor Outfit

(d) Rock drill, track mounted

(e) 5-T Dump Trucks

(f) Water Distribution Equipment

(g) Compaction Equipment

b. The major problem area continued to be the long haul distance involved in obtaining material. Materials had to be drawn from the depot in Qui Nhon, then moved 60 miles north to the Battalion's S-4 yard, and then finally transported to the various job sites. Another problem was the lack of many critical engineer construction materials in the Qui Nhon Depot, such as 6x16 timber bridge stringers. Fuel was also difficult to obtain in the northern part of the Bn AO (Duc Pho) and hampered progress many times.

c. Direct and Field support was also a problem. Because of the distance of supporting units and the lack of support, equipment was slow in being repaired or replaced and repair parts were difficult to obtain.

Section II, Part 1, Observations (Lessons Learned)

1. Personnel.

(None)

2. Operations.

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Pile Alignment

ITEM: Alignment and cutting of piles on pile bents or piers.

DISCUSSION: When constructing timber pile bridges using pile abutments and intermediate pile bents, the necessity for correct pile alignment cannot be overstressed to maintain proper bearing between the cap and piles. Since most pile driving operations leave some piles askew from the vertical, those piles need to be pulled in line before the final cuts are made. This process is time consuming and causes considerable difficulty in obtaining a true flat bearing surface on which to place the cap.

OBSERVATION: Two steel truss members from a discarded French Eiffel bridge can be cut about 30' in length. Using 36" bolts, threaded to about half their lengths, the two truss members can be positioned on each side of the bent and tightened with the bolts placed between each pile. The piles are then correctly aligned to be cut using a saw guide.

Road Widening

ITEM: Widening existing roadway.

DISCUSSION: When widening a road constructed through rice paddys suitable means must be found to establish a stable foundation in saturated unstable soil.

OBSERVATION: Since it is not practical to remove the muck the most practical method is to place sufficient surcharge to displace it. When available, blast rock may be used. Where blast rock is not available a sand blanket can be satisfactorily employed. The base must be constructed of granular free draining material rising approximately one foot above existing paddy elevation.

Bridge Construction

ITEM: Site preparation and clearing for multiple pile bent timber bridge construction.

DISCUSSION: In clearing a gap for a multiple pile bent timber bridge the entire gap is usually cleared to include approximately 20' at each approach for placement of the deadman anchorage system.

Therefore, to drive the intermediate pile bent, the anchorage system has to be completed and backfilled to facilitate ample working area for the pile driver. This procedure reduces the effective utilization of the pile driver since the abutment wall has to be placed before the anchorage system can be installed and backfilled.

OBSERVATION: By first clearing the center of the gap for the center intermediate pile bent on short span bridges the intermediate pile bent can be driven before clearing operations are started for the remaining intermediate and abutment piles. Since the pile driver assembly is a critical piece of equipment, the piles can be driven continuously until completed by working from the center of the bridge out toward the abutments.

Non-Electric Caps

ITEM: Misfires using non-electric blasting caps.

DISCUSSION: During the extensive use of demolition required to widen QL-1 to MACV standards, there has been considerable misfires using non-electric blasting caps. Upon investigation it was found that in every case of misfire, the time fuse had not been cut completely square.

OBSERVATION: It is recommended that care be taken to cut the fuse squarely. Also remove a small amount of powder from an extra time fuse and insert it into the cap before the time fuse is inserted. First-time detonation was obtained every time with this method.

Mine Detectors

ITEM: Care of transistorized mine detectors.

DISCUSSION: This battalion conducts daily minesweeps along 42 miles of Highway QL-1 daily. Several mine detectors have been turned in for repair because the insulation has been worn on the base exposing the coils to dirt and damage. Also the handles have been broken at the joints and many short circuits have occured. These mine detectors are very fragil and require a great amount of care. While sweeping, the search heads occassionally brush against the ground. Even the slightest ground contact mounts up over a long period of time and the head becomes worn.

The constant swinging action also puts a strain on the joints which are very weak.

OBSERVATION: First, a piece of corrugated cardboard or simular material should be placed over the bottom of the search head. This prevents the wearing of the plastic on the coils. Second, to keep the search head dry, a plastic bag should be fastened around the search head. This is especially applicable during the monsoon season when the area you are likely to sweep is wet and/ or muddy. Third, a piece of bamboo taped to the handle as a splint will strengthen the handle and especially the joints which break quite easily under the constant swinging action. None of these alterations interfere with the operation of the mine detector and increase the life of the detector considerably.

AIK

ITEM: Utilization of AIK labor.

DISCUSSION: Engineers involved in construction tasks occassionally use AIK labor. Substandards performance from AIK labor is some times noted.

OBSERVATION: To secure the best results using AIK laborers, the standard good leadership practices should be employed. That is, treat all with respect, learn their individual strengths and weaknesses, treat them equally and comment on tasks well done, in addition, hire a regular crew. Tell them approximately how long they will be needed and even if it is an inconvience to you keep your word as to time of pick-up, release, and pay. A show of concern about their health and well being will insure you of loyal laborers.

Dump Trucks

ITEM: Dump hinges on 5 ton Dump Trucks M51A2.

DISCUSSION: There has been a problem with clamp hinges cracking or failing when dumping in rough terrain. This failure is caused by lateral movement of the dump bed in the elevated position when traveling over uneven ground.

OBSERVATION: In rough areas where fill is to be spread, the first few loads should be dumped in piles and spread with a grader or

dozer to provide a level area for spreading loads. During the operation, the area should be kept as smooth as possible. This will lessen the lateral movement and decrease the strain on the critical component, the dump hinge.

Pickets

ITEM: Picket driver.

DISCUSSION: On construction of wire defensive barriers it has been found that the erection of steel pickets can be slow and time consuming. Several men are required to drive a picket with a sledge hammer. A jeep or 3/4 has to be used to stand on while driving the pickets. Injuries and broken handles from miscalculated strikes with the sledge hammer are frequent.

OBSERVATION: An expedient device to be used as a cap can be made from a 2' section of pipe 4 inches in diameter with a 1" plate welded on one end and the other end open. To this tube weld two handles of 1" pipe or drill steel, 180 degrees apart, twelve inches long and 10" up from the open end of the tube. This device is very handy for driving pickets. The cap is placed over the end of the picket to be driven.

3. Training and Organization.

(None)

4. Intelligence.

(None)

5. Logistics.

(None)

6. Equipment and Maintenance.

Brakes

ITEM: Failure of brakes on 5 Ton Trucks, M51A2 and M52A2.

DISCUSSION: This unit has had frequent problems with brakes building up pressure and not releasing, causing the wheels to

remain locked on the vehicle. This situation is caused by sand or other foreign matter getting into and lodging in the brake master cylinder by-pass port, thus not allowing the fluid pressure to release back into the master cylinder when the pedal is released.

OBSERVATION: The master cylinder can be removed and the by-pass port drilled to 3/32" which will allow a grain of sand or foreign matter to move through the port without restriction. This allows the brakes to release to the original position. The original performance of the master cylinder is not affected. The replacement of master cylinders is considerably reduced.

Wheel Cylinders

ITEM: Wheel cylinders, MFR code 63477, Part No. FD 6145, on Hough Scoop Loader H-90CM.

DISCUSSION: This unit has had frequent problems with wheel cylinder failure on the H-90CM loader. The availability of replacement cylinders has been a problem. Very often this part is not readily available causing extended down time.

OBSERVATION: A 5 ton dump truck rear cylinder FSN 2530-353-3038 was used in lieu of the cylinder MFR. Code 63477, Part No. FD 6145. This has resulted in keeping the deadline rate for H-90CM loaders to a minimum.

Bucket Loader

ITEM: Inoperable clam feature on front loader.

DISCUSSION: Leaking swivel connectors on buckets of H-90CM bucket loaders have been recurring maintenance problem causing down time. As often happens, requisitions for needed parts cannot be readily filled. To get them off deadline an expedient repair method was needed.

OBSERVATION: The clam features of the bucket can be temporarily discontinued. This can be done by placing a piece of 1/16" sheet steel between hose 17 and tube 18 (Figure 97, TM 5-3805-201-15, Feburary 1964) to block the hydraulic lines leading to the swivel connectors.

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The clam of the bucket is then spot-welded in the closed position to prevent its opening while the loader is being operated as a straight bucket. By doing this, this unit has removed bucket loaders from lengthy deadline status while waiting on repair parts. Whenever swivel connectors become available through supply channels the reconversion can be accomplished in a few hours.

D7E Dozer

ITEM: D7E Dozer push beams.

DISCUSSION: This unit has experienced cracking of D7E dozer push beams, usually at a location approximately 2' from the blade. This beam needs to be strengthened in that spot.

OBSERVATION: The beam can be repaired by welding a 1" thick piece of plate stock the width of the beam over the repaired crack. None of the push beams repaired in this manner have failed.

D7E Dozer

ITEM: D7E Dozer end bits.

DISCUSSION: Trouble has been experienced with end bits breaking when working in rock. The breaking occurs when the end bit strikes a submerged rock.

OBSERVATION: To solve this problem, approximately one inch of the end bit can be cut off to blunt the tip. This spreads the impact force when striking an imbedded rock and reduces shear action.

Graders

ITEM: Expedient grader cutting edges.

DISCUSSION: Grader cutting edges worn down close to the mold board must be replaced to preclude damage to the mold board. Often, requisitions for new cutting edges cannot be readily filled.

OBSERVATION: New cutting edges can be made by taking two old worn edges and making one good one out of them. This is done by overlapping one edge with the other and tack welding on the front and rear face with six 3" long tack welds.

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This field expedient has not only resulted in a grader being returned to operations but has produced a cutting edge that is tougher and longer lasting than new edges.

Sump Pump

ITEM: Pneumatic sump pump.

DISCUSSION: Pneumatic sump pumps are used extensively by this unit with air compressors to pump water for various uses. After extended use of the sump pump it usually becomes fouled. A method is needed to aid the built-in screens on the sump pump and to keep the pump up-right to prevent water from seeping into the exhaust valve.

OBSERVATION: A tripod made of metal pickets can be made from which the sump pump is hung. The pump is then suspended into a 2' end section of a cut off 55 gallon drum. This keeps the pump up-right and furnishes a source of cleaner water.

Section II, Part 2, Recommendations.

1. Personnel.

   (None)

2. Operations.

   (None)

3. Training and Organization.

   (None)

4. Intelligence.

   (None)

5. Logistics.

   (None)

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SUBJECT: Operational Report Lessons Learned (RCS CSFOR-65), for Quarterly Period Ending 30 April 1968.

6. Others.

(None)

JAMES L. SUTTON
LTC, CE
Commanding

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EGA-3 (30 April 1968) 1st Ind Maj Pierce/fgz/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

1. The Operational Report - Lessons Learned submitted by the 19th Engineer Battalion (Cbt) 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.

2. The remarks of the Battalion Commander are concurred in with the following comments added.

a. Reference Section 1, Part 5, Item a. Depots are closely monitored by the Group S-4 "Expediters" to ensure prompt receipt of information relative to these critical construction materials and equipment. Requisitions are closely monitored by use of regular "follow-up" action. Depending on the relative priorities of projects within the overall Group construction program, assets of respective units are periodically re-assessed and re-distributed on a temporary-loan basis. This has proven to be an effective method of gaining optimum maximum utilization of existing equipment and materials within the Group's resources.

b. Reference Section 2, page 9, "Mine Detectors". These field expedient improvements in the use and care of mine detectors have proved very effective and serve to demonstrate the ingenuity of the combat engineer. Equipment Improvement Recommendations (EIR's) are forthcoming on the cited lessons learned. Reference Section 2, page 11, "Brakes", page 12 "Bucket Loader" and page 13 "D7E dozer" (push beams). Equipment Improvement Recommendations are being submitted on these items.

JOHN A. HUGHES
Colonel, CE
Commanding

11 JUN 1968

AVBC-C (30 April 1968) 2nd Ind
SUBJECT: Operational Report Lessons Learned (RCS CSFOR-65), for Quarterly Period Ending 30 April 1968.

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 of the 19th Engineer Battalion 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 recommendations of the Battalion and Group Commanders.

Douglas K. Blue

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 Lessons Learned (RCS CSFOR-65), for Quarterly Period Ending 30 April 1968

HEADQUARTERS, US ARMY VIETNAM, APO San Francisco 96375 15 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, 19th Engineer Battalion (Combat) (Army).

2. Concur with report as submitted.

FOR THE COMMANDER:

JOHN V. GETCHELL
Captain, AGC
Assistant Adjutant General

Cy furn:
HQ 18th Engr Bde (C) (A)
HQ 19th Engr Bn (C) (A)

GPOP-DT (30 Apr 68) 4th Ind
SUBJECT: Operational Report of HQ, 19th Engr Bn (Cbt)(Army) for Period Ending 30 April 1968, RCS CSFOR-65 (R1)

HQ, US Army, Pacific, APO San Francisco 96558 26 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

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5. AUTHOR(S) *(First name, middle initial, last name)*

CO, 19th Engineer Battalion (Combat)(Army)

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