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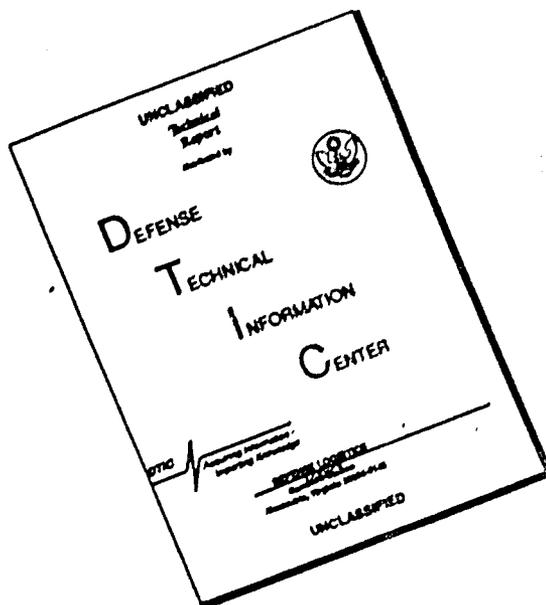
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DEPARTMENT OF THE ARMY
Headquarters, 27th Engineer Battalion (Combat)
APO San Francisco 96257

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EGF-27-CO

13 May 1967

SUBJECT: Operational Report - Lessons Learned (RCS CSFOR-65) for
Quarterly Period Ending 31 April 1967

THRU: Commanding Officer
34th Engineer Group
APO US Forces 96291

THRU: Commanding General
USA Engineer Command Vietnam (Prov)
ATTN: AVCC-P&O
APO US Forces 96491

THRU: Commanding General
United States Army, Vietnam
ATTN: AVHGC-DH
APO US Forces 96307

THRU: Commander in Chief
United States Army, Pacific
ATTN: GPOP-OT
APO 96588

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

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SECTION 1. Significant Organization or Unit Activities.

1. Cantonment Construction Activities.

(1) Organization:

Headquarters and Headquarters Company, LONG GIAO

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A Company, LONG GIAO

B Company, LONG GIAO

C Company, LONG GIAO

D Company, LONG GIAO

(2) Attachments:

2d Platoon, 595th Engr Co. (LE), LONG GIAO

Quarry Detachment, 595th Engr Co. (LE), GIA RAY

2d Platoon, 67th Engr Co. (DT), LONG GIAO

156th Engr Detachment (WD), LONG GIAO

(3) Mission: Engineer cantonment construction in the LONG GIAO - XUAN LOC - GIA RAY Quarry area.

b. Command.

(1) During this report period, the Battalion continued to be assigned to the United States Army Engineer Command, Vietnam (P) and was reattached from 79th Engineer Group to 34th Engineer Group on 20 Apr 67 for operational control.

(2) LTC ALLEN P. RICHMOND, III, assumed command of 27th Engr Bn (C) on 23 Apr 67 from LTC CHARLES R. ROBERTS.

(3) CPT GERALD C. BROWN assumed command of A Company, 27th Engr Bn (C) on 25 Mar 67 from CPT MICHAEL D. DAVIES.

(4) CPT GILBERT L. ROBINSON assumed command of B Company, 27th Engr Bn (C) on 5 Mar 67 from CPT JERRY M. LOWRANCE.

(5) CPT THOMAS E. WARBERG assumed command of C Company, 27th Engr Bn (C) on 11 Feb 67 from CPT HAROLD M. NEWMAN.

(6) CPT FRANK VINCI, JR. assumed command of D Company, 27th Engr Bn (C) on 5 Mar 67 from CPT JOHANN R.W. KOHLER.

(7) The first elements of D Company (HQ and 1st Platoon), 27th Engr Bn (C) were released from attachment to the 3d Brigade 4th Infantry Division on 13 Mar 67. 2d and 3rd Platoons of D Company arrived at LONG GIAO on 20 Mar 67. D Company activities are recorded in this report from 17 Oct 67.

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(8) 27th Engr Bn (C) was completely reunited at Blackhorse Base Camp, LONG GIAO, RVN from 1830 hours 15 Apr 67 to 0745 hours on 16 Apr 67 for the first time since C Company departed CONUS on 12 Aug 66.

c. Personnel, Administration, Morale, and Discipline,

(1) Personnel: The Battalion strength decreased from 804 to 794 during the report period. Most gains and replacements for D Company carried an Infantry MOS and were received through replacement channels of the 3d Brigade 4th Infantry Division.

- (a) KIA - 1 (D Co., 27th EBC)
- (b) Med Evac out of Country - 1
- (c) ETS - 1 Off, 18 EM
- (d) Transfer within RVN - 5 Off, 14 EM

(2) Administration: Generally, no administration problems have been encountered which could not be overcome locally. Correspondence and communication between Battalion and D Company was virtually none existent during their attachment resulting in few E-6 and above promotions.

(3) Morale:

(a) Morale within the Battalion has continued at an extremely high level. During this period, an almost ideal combination of operational support and base camp construction was experienced providing a variety of job opportunity and a welcomed return to an increasing number of base camp facilities.

(b) The Battalion EM Club, operating as an Other Sundry Fund, has been enjoying continued popularity as evidenced by its increasing Net Worth. Assets are maintained in the form of a generous supply of resaleable merchandise such as beer, soda and snacks. In addition, in order to provide maximum return to the troops as intended in the spirit of the regulation, the EM Board of Governors approved the expenditure of some of the accrued profits for two commercial shows selected from the monthly published list of Commercial Acts/Shows by USARV. These two shows were enthusiastically received by the troops and materially contributed to the present high state of morale.

(c) Excellent Chapel Services and medical facilities continue to do their part in maintaining troop morale.

(d) During this report period, the increased operational support activities provided members of this Battalion the opportunity to earn 20 Bronze Stars, 24 Army Commendation Medals and 3 Purple Hearts.

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(4) Discipline: Disciplinary problems have been relatively few during the report period. Statistics show 30 Article 15's, 3 Summary Court, and 3 Special Court. The high state of discipline is attributed to the variety of job assignments and the fact that the men put in the required 75 hours per week on the job.

d. Intelligence and Counterintelligence. Nearly all intelligence concerning enemy activity continues to be obtained by direct liaison with the S2 of the 11th Armored Cavalry Regiment, the major unit located here at LONG GIAO. Intelligence summaries coming through Engineer Channels of Command take 6 to 10 days to arrive and have little value for the maintenance of daily cantonment, worksite and convoy security.

e. Plans, Operations, and Training.

(1) Plans:

(a) During this period, the operations section continued refinement of Base Development Plans and Unit Area Layouts. Working drawings, to include electrical design for messhalls, administration buildings and a 60 Bed Surgical Hospital were completed. Maintenance shops and warehouse storage facilities are currently in the design stages and are expected to be completed early next report period.

(b) A preliminary survey and feasibility study was prepared for the extension of XUAN LOC Airfield to C-130 capability. Later during the period after receipt of a construction directive, a detailed survey and working drawings were completed.

(c) A detailed survey and working drawings were prepared for the Forward Area Liaison Field at LONG GIAO. An "As Built" survey and drawing was completed of the 1500 foot strip and preliminary survey work now completed for its extension to C-123 capability.

(d) "As Built" surveys of the completed road net and drainage system for Blackhorse Base Camp were completed during this report period.

(2) Operations:

(a) Headquarters Company, 27th EBC.

(1) A Headquarters Company has limited capacity to do either horizontal or vertical construction for itself without conflict with its basic mission of service support to the Battalion. But, during this period, Headquarters Company personnel were able to accomplish the erection of latrines, showers and a 300 man messhall primarily due to ample prior coordination with Staff Sections.

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(2) Three 830-M scrapers were assigned to the Equipment Platoon of Headquarters Company and materially contributed to the accomplishment of the Base Camp Road System prior to the Monsoon Season. These three 830-M scrapers were equivalent to 14- 5 ton dump trucks in hauling capacity without the requirement for additional equipment such as front end loaders and dozers.

(b) A Company, 27th EBC.

(1) During this quarter, A Company, 27th Ingr Bn (C) continued the horizontal construction of the 11th Armored Cavalry Regiment Base Camp. Construction activities consisted of road and drainage networks, operation of laterite pit, operation of batching plant, placing concrete pads for latrines, showers, messhalls and a 60 Bed Surgical Hospital, establishing a suitable water point and constructing an airfield and helipads.

(2) Horizontal construction this period by A Company included: 57,541 sq yds of roads, 8,040 lin ft of ditches, 2,623 lin ft of culverts, 68,835 cu yds of laterite, 34,181 cu ft of concrete and 28,700 gallons of dust pallative.

(3) Water point construction began with the clearing of vegetation, cutting of trees and burning of refuse in a ravine located just outside the Blackhorse Base Camp. Thirteen underground springs were counted in this location. Twelve- 40 lb cratering charges were placed on the proposed centerline of the dam and blown to provide an interlocking keyway for the earth fill and to compact the in-place material. A 24" culvert was installed at the base of the dam to keep the water from hampering fill emplacement. Laterite was hauled in and compacted over the culvert and an overflow spillway of 2- 24" culverts was constructed. The culvert at the base of the dam was then closed and the surface covered with sandbags to prevent erosion. To date the dam is holding fast and continues to provide sufficient reservoir for Blackhorse Base Camp.

(4) Under project directive 66-26DC-79, A Company was directed to construct a 1500 foot forward liaison airstrip and 150'x150' apron within Blackhorse Base Camp, LONG GIAO, RVN.

The native soil at the proposed site consisted of a medium clay having an in-place CBR of 0-3. Available within the base camp area was laterite soil having a compacted CBR of 60, but which, due to its high clay content, lost strength rapidly when wet. It was evident that in order to have an acceptable airfield, even for observation aircraft, some surface treatment would be necessary in order to weatherproof the surface.

At the time the project was being undertaken the only asphaltic material available was RC-3. Rather than place the RC-3 directly on the surface as a dust pallative, it was decided that a more durable and stronger surface could

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be obtained by mixing the asphalt with the laterite and obtaining a road mixed asphaltic surface. The sequence of construction was as follows:

Clear and grub area for runway and apron removing most of organic material to a depth of 6 inches.

Compact in place soil using sheepsfoot roller.

Place 18 inches compacted laterite base in two-9 inch lifts. It should be noted that this strip will, in the final construction plan, be the taxiway for a C-130 airfield. Design of the airfield is based on C-130 criteria.

Scarify top three inches of laterite, mix with asphalt and compact on primed base.

This sequence of construction was followed for the access road to the parking apron. This road was 200 ft long and 12 ft wide. An initial design to determine the amount of asphalt required was made based on the criteria contained in Paragraph 150 of TM 5-337. This design indicated an application rate of 1.5 Gal/Yd² or 11 barrels for the road. Due to the high percentage of fines present in the aggregate this amount of asphalt was found to be insufficient. An additional 5 barrels were added to obtain the required consistency. The material was windrowed to one side, a prime coat of 0.25 Gal/Yd² was applied and after sufficient curing the material was spread and compacted. Equipment used during this phase was a motorized grader for scarifying and mixing, a 400 gallon towed asphalt distributor, and a 13 wheel roller for compaction. The entire operation, excluding curing, took six hours and good results were obtained. In order to get down on raveling of the aggregate an additional seal coat of 0.25 Gal/Yd² was applied and allowed to cure.

The same technique was attempted on the parking apron and runway. However, due to the increase in amount of fines created during compaction of the laterite by a sheepsfoot roller, the amount of asphalt required was approximately twice the recommended amount with little evidence that the proper consistency was being approached, the use of the laterite as aggregate was abandoned.

Instead of using the natural laterite, it was decided to attempt to use sand which was available from dredging operations from the Son Dong Nai near LONG BINH, RVN. The same sand has been previously used as concrete aggregate at this location. Although a sieve analysis was not available at the time it appeared to be a well graded sand having a medium fineness modulus (Approx. 2.75). A test strip was prepared at the East end of the runway. An area 15 ft x 200 ft was graded and scraped free of loose fines. Twenty cubic yards of sand were placed on the strip and 14 barrels of asphalt were applied and well mixed by rolling with a motorized grader. After the material was mixed it was windrowed to one side. The base was then

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primed with 0.25 Gal/Yd² of RC-3 and after curing the mix was spread and compacted. Results from this test strip were excellent. The finished surface was 2 to 2½ inches thick and after 3 weeks of curing appeared to be stable and dense.

This same method was utilized for the remainder of the airstrip. In order to stagger the longitudinal joints at the ends of each strip the lengths of the strips alternated between 200 ft and 400 ft. The 200 ft strip required 20 yds³ of sand and the 400 ft strip required 40 yds³. A 400 ft strip could be compacted, including curing of the prime coat, in one ten hour day utilizing one grader. Part way through the project, the attached 800 gallon trailer mounted distributor was withdrawn from the project. An interim solution for spreading asphalt was devised utilizing a 25 ton lowbed trailer. The trailer was loaded with the barrels of asphalt and as the trailer was driven down the windrow of sand the drums were opened and the asphalt poured onto the sand. The material was then mixed with a grader between each of the several applications. As a solution to applying the prime coat on the base the same method of pouring the asphalt from the back of a trailer was used. In order to spread the material thin enough, long handled rubber squeegees resembling push brooms were used. Although admittedly slower than using an asphalt distributor this method proved successful and allowed the job to continue when asphalt distributor equipment was not available. The drawback to this method besides sacrifice of speed was the difficulty in distributing the asphalt evenly along the windrow.

There were several problem areas encountered during the project. First of all the percent of asphalt present in the mixture is highly critical since small variations in the amount of asphalt greatly affects the stability of the mix. Design and control of sand asphalt mixtures should utilize the Marshall Stability Method, (Chapter 4, Section III, TM 5-337), however, in the absence of the requisite equipment, an average design was used and adjustments made by inspection of the results. Insufficient asphalt allows the sand to be readily abraded from the surface while too much asphalt produces an unstable mix. Another problem concerned the application of the prime coat. Unless all fines are removed from the base the prime coat will not adhere properly. To solve the problem the base was wet down and rolled thoroughly with the thirteen wheel roller to give a dense slightly damp surface. This preparation is especially important when the prime coat is squeegeed on by hand. Care must also be taken to avoid leaving excess amounts of the prime coat on the base since this would dilute the mixture and create local unstable areas.

An experienced grader operator who is capable of mixing the material without disturbing the base and spreading the mix in even lifts is of prime importance in road mixed asphalt. It is also necessary for the supervisor to become familiar with the appearance of a mix that has the proper proportion of asphalt. Having the personnel hand mix small batches is useful in this regard.

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After the mix has been placed and rolled, it will continue to soften during the heat of the day for several weeks. As the mix continues to cure this instability will decrease. Occasional rolling with a steel wheel roller during the curing period will also help to densify and stabilize the mix.

If patching is required it can easily be accomplished by mixing small amounts of sand asphalt and patching as described in Section III, Chapter 9, TM 5-337.

(c) B Company, 27th EBC.

(1) During the first month of this report period, B Company completed the Rock Quarry development, crusher site and cantonment at GIA RAY and continued to operate the crusher at company strength until 1 Mar 67. Hq, 1st and 3d Platoons moved from GIA RAY to the battalion base camp at LONG GIAO to assume portions of the cantonment construction until 13 Mar 67 when B Company (-) moved out on Operation JUNCTION CITY. 2d Platoon remained at GIA RAY to continue crusher operations until they were relieved by the Quarry Detachment of the 595th Engr Co. (LE) on 1 Apr 67. B Company totaled 1,365 cubic yards of rock crushed this report period.

(2) Operating as a complete unit, B Company constructed their directed mission of 11,182 sq ft of messhalls for the 2d Squadron, 11th Armd Cav Regt, during the period 1 Apr 67 to 14 Apr 67. During this period B Company also began preparation to move to PHU QUOC Island in the Gulf of Thailand to construct a portion of a 1000 man POW Camp. This unit is currently engaged in this mission.

(d) C Company, 27th EBC.

(1) During this quarter C Company, 27th Engr Bn (C) continued the vertical construction of the 11th Armd Cav Regt Base Camp. Construction activities consisted of latrines, showers, messhalls and a 60 Bed Surgical Hospital.

(2) Vertical construction accomplished this period by C Company included: 2,800 sq ft of latrines, 2,950 sq ft of showers, 29,800 sq ft of messhalls, 3,600 sq ft of ADAMS Huts, 9,600 sq ft of quonset for Hospital Operations and 3,840 sq ft of administration building. Sufficient portions of the electrical distribution and interior wiring for the 60 Bed Surgical Hospital were completed (dependent on arrival of materials) so that beneficial occupancy was possible on 23 Apr 67. Two T-17 membrane dustoff pads were also completed as part of the hospital complex.

(3) On 5 May 67, 1st Platoon of C Company was helilifted to the 53d Signal Battalion radio relay station atop CHUA CHAN (Hill 837). The assigned mission included adding 2- 20 ft x 43 ft Pascoe buildings with concrete floors, and completion of the water distribution system for the 40 man cantonment. To date the preliminary siting work and

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helilifting of all supplies has been completed.

(e) D Company, 27th EBC.

(1) During the previous two quarters, D Company, 27th Engr Bn (C) was attached in directed support of the 3d Bde 4th Inf Div. Construction activities consisted of hardstands, drainage, culverts and roads within the base camp at BEAR CAT.

(2) While still in BEAR CAT, D Company was involved with the construction of a Forward Area Liaison Airfield. This mission involved hauling laterite for a 1200 ft x 40 ft runway and a 100 ft x 40 ft parking area and the clearing of trees to get the proper minimum glide angle. Lack of front end loaders and their complete unavailability at this time hampered the project but a solution was found for loading trucks with a HD-16 tractor. By using two tractors working together, a ramp was built of laterite to which a truck could back up to and be loaded by a dozer pushing the laterite onto the truck over the rear end of the truck. This was an acceptable solution due to the small volume of laterite which had to be moved. The use of a front end loader would have been more efficient. The lack of this critical piece of equipment was especially evident during this project.

(3) On 24 Nov 66, the Brigade Advance Party consisting of part of the Supply and Transport (S&T) Company and Delta Company moved to the new permanent base camp of the Brigade at DAU TIENG, YT 4947. During this move and in operations shortly thereafter, D Company found that they were to be committed to many diversified projects and that platoon convoys were to be frequent occurrences. To facilitate control and have the platoon sergeant and platoon leader able to communicate during convoys, one AN/VRC 125 was mounted in the platoon sergeant's 3/4 ton truck. This proved to be quite beneficial and the loss of the radio to one squad did not hamper operation.

(4) During D Company's tenure at DAU TIENG, there was a major effort placed on base development and the installation of a road and drainage system. For the creation of a base development plan, the Executive Officer was attached to the Brigade Staff and worked directly for the Brigade Executive Officer. This arrangement worked well since the base development plan was completed by the deadline imposed by higher headquarters. D Company's contribution to the road and drainage system was 1200 meters of road and the emplacement of 650 ft of culvert.

(5) At DAU TIENG D Company and their attached grader assisted in the construction of a C-130 capable airfield. With a limited amount of time allowed for construction by IIFV, 24 hour operation was undertaken. Averaging 7- 5 ton dump trucks and a 20 hour haul day, 42,000 cu yds of laterite were hauled to the airfield in approximately 18 days.

(6) Responsible for maintenance of the main LOC between DAU TIENG and TAY NINH, the logistics base which supported the

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Brigade, this unit was involved with the maintenance of approximately 25 miles of road and 5 bridges - one a three span 210 ft double single Bailey Bridge. The maintenance effort included building a mine boom for the Bailey Bridge which spanned the Saigon River. This was accomplished with high tensile steel wire from a wrecked C-123 craft hung between 55 gallon drum floats. From this was suspended one row of concertina. "I" beams from a destroyed bridge were used as deadmen for the main cable. The maintenance effort also included rebuilding two timber tressel bridges and repairing two culverts. This was done by lifting the bridges with an M88 tank retriever, replacing the footers, rebracing and redecking the bridges. The culverts were repaired by replacing the headwalls and some end sections.

(7) Other tasks of a base development nature were also performed by D Company at DAU TIENG. The company was responsible for supplying potable water for the occupying unit. A water tower and fill stand was constructed for a 1500 gal/hr erdlator utilizing water pumped from the Saigon River by the Michelin Plantation Distribution System. D Company also poured a 20 ft x 100 ft concrete reefer pad for the S&T Company, constructed a Class III storage and dispensing area, and built a PX Annex which consisted of a tropical hutment and a stage with dressing rooms for visiting USO Shows. Tactical support rendered in the base camp involved the supervising of the installation of perimeter barriers and the construction of a brigade TOC.

(f) 104th Engineer Company (Dump Truck): During the period 11 Feb 67 to 10 Apr 67, one section consisting of 14- 5 ton dump trucks with operators and 2 NCO's were attached to this unit. Their contribution to the hauling of laterite, sand and gravel contributed measurably to this Headquarters successful completion of the road system prior to the Monsoon Season, construction of the Blackhorse Airfield with a sand asphalt surface treatment, and the average placement of 75 cu yds of concrete per day. On 28 Apr 67, the 2d Platoon of the 67th Engr Co. (DT) assumed the hauling support mission to this Headquarters previously held by the 104th Engr Co. (DT).

(g) 595th Engineer Company (LE).

(1) Headquarters, 27th Engr Bn (C) sponsored and staged the arrival of the 595th Engr Co. (LE) in the RVN. The 595th personnel arrived at VUNG TAU on 23 Mar 67 and their equipment arrived at Saigon on 28 Mar 67. The unit move to the Blackhorse Base Camp was accomplished in stages starting on 28 Mar 67. The 595th was attached as a unit to this Headquarters from 26 Mar 67 to 20 Apr 67. 2d Platoon and the Quarry Detachment remain in attachment to this Headquarters.

(2) In addition to the missions of Engineer Equipment Support and operation of the Quarry at GIA RAY, the 595th L.E. Company was assigned the mission of hardstand construction. To date the 595th Engr Co. (LE) as a unit, and the 2d Platoon has completed 376,000

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so ft of vehicle park hardstands. Their excellent equipment support enabled this Headquarters to haul and place a record 34,000 cu yds of laterite in one standard work week. The Quarry Detachment totaled 1,229 cu yds of crushed rock this report period.

(3) On 20 Apr 67 this unit with the exception of 2d Platoon and the Quarry Detachment was reassigned to the 86th Engr Bn at BEAR CAT.

(h) 156th Engineer Detachment (Well Drilling).

(1) Well drilling operations have continued this period at XUAN LOC and GIA RAY, RVN. Well #156-3 was drilled by this unit for the 1/83d Arty in XUAN LOC to a depth of 107 ft. It test pumped 64 gal per minute with a 10 ft drawdown. Well #156-4 was drilled by this unit for the quarry at GIA RAY to a depth of 115 ft. Water was not reached prior to the unit's movement in operational support of B Company, 27th Engr Bn (C). Drilling will continue at GIA RAY on their return.

(2) Three deep wells are required as part of B Co.'s present operation. The first well, #156-5, is currently in progress and at a depth of 50 ft.

(3) On 20 Apr 67 the 156th Engr Det (WD) was reassigned from the 79th Engineer Group to the 34th Engineer Group and continued to remain attached to the 27th Engr Bn (C) for OPCON.

(3) Training. The only training conducted during this period was weapons qualification and familiarization prior to each operational support mission. All personnel fired individual weapons; crews fired their crew served weapon.

f. Logistics and Maintenance.

(1) The S4 Section has continued its monumental task by requisitioning, expediting, transporting, storing and issuing 3,287 tons of Class II and IV supplies for construction this period. This task has been made considerably more difficult by the remoteness of the base camp and the distance supplies must travel by armed convoy.

(2) An outstanding accomplishment of the S4 Section has been the average daily production of 61,268 gal of potable water throughout the period. This represents continuous production at 82% of the rated capacity for base camp and operational support activities.

(3) Shortages of authorized TO&E equipment appreciably hindered the speed and efficiency with which D Company could successfully accomplish a mission as a separate company. Specifically this concerned front end loaders, pioneer electric tool trailers and a pneumatic tool set for the 2500E air compressor. It is recommended that every effort be made to provide

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engineer units on a separated assignment with at least their TO&E equipment.

g. Force Development. None.

h. Command Management. None.

i. Inspector General. This Headquarters has recently received an I.G. Schedule date of 21 Nov 67. This represents almost 16 months of operation in RVN prior to the first required I.G. Inspection.

j. Information. None.

k. Civic Affairs. During the construction activities of this report period, this Headquarters has conducted only a limited Civic Action Program primarily due to the remoteness of the base camp and the vast scope of the construction commitment.

2. Operational Support Activities.

a. General.

(1) Organization of Responsibilities.

A Company Route 321, Route 20 and Route 1 from LONG BINH to XUAN LOC.

B Company Route 333, 334, 335, 336, and Route 1 from junction of Route 336 to GIA RAY.

C Company Route 2 South to TAOR boundary and Route 320 to BEAR CAT.

D Company MEKONG DELTA.

(2) Mission. Operational support to the 11th Armd Cav Regt within their tactical area of responsibility (TAOR) and missions as assigned by 34th Engr Gp.

b. Command. During operational support missions the supporting element from this unit is within the command structure of IIFV.

c. Personnel, Administration, Morale and Discipline. Due to the line companies, elements of Headquarters Company and equipment operators being committed in various operations throughout a large portion of the III Corps Tactical Zone, a single battalion pay officer was utilized. Prior coordination and cooperation resulted in the fast, efficient payment of over 700 personnel participating on three operations in two days, with minimal requirements for air transportation. A Battalion Pay Officer allows all the unit officers to continue their assigned combat support tasks without interruption.

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d. Intelligence and Counterintelligence.

(1) Prior to each operational support mission the S2 Section of this Headquarters has provided valuable current intelligence through air and ground reconnaissance.

(2) Due to the lack of operations in the TAOR this period, no ground reconnaissance and only minor aerial reconnaissance was conducted. Engineer Intelligence is greatly needed in this area and every effort is being made to move reconnaissance teams throughout this area.

e. Plans, Operations, and Training.

(1) Plans. Employment as infantry in defense of Base Camp continued to be the responsibility of this Headquarters when the 11th Armcd Cav Regt is committed as a unit. Revisions to the basic operations order were published and implementation of the operation order practiced this period.

(2) Operations.

(a) Headquarters Company, 27th EBC: Throughout this report period Headquarters Company engineer equipment and operators participated in Operations CEDAR FALLS, Phase I & II of Operation JUNCTION CITY, Operation PORTSEA and Operation MANHATTAN.

(b) A Company, 27th EBC.

(1) This period the first combat support mission was assigned on 15 Mar 67 when a liaison was made to the 1st Australian Task Force at NUI DAT. Engineer Support was required to open QL 23 from DAT DO to XUYEN MOC as part of Operation PORTSEA. The mission included clearing jungle 200 meters to either side of the road which was 18 KM long; repairing culverts and holes; replacing eight bridges with large diameter culverts, and constructing one 120 ft DD Bailey Bridge and one 70 ft long DS Bailey Bridge. When the route was cleared to XUYEN MOC additional work was required to construct a C-123 capable airstrip. The company with additional heavy equipment moved to a forward position near DAT DO on 18 Mar 67. The move was made down QL 2 in conjunction with the 1st Squadron of the 11th ACR.

(2) On 20 Mar 67, the operation commenced at the West end of LTL 23 just East of DAT DO. Two dozers were utilized on either side of the road to clear underbrush. Due to the limited number of bulldozers available, the scope of clearing was reduced from 200 meters either side to 50 meters. This distance would be increased as additional equipment became available. The first day only a dismounted Australian Infantry Platoon was available for security so it was necessary to deploy organic security in the following manner: One platoon was forward screen 75 to 100 meters on either side of the road and in advance of the main body. Their mission was to flush out snipers and search for command detonation or trip wires. Another Platoon swept the road in detail, repaired the road as required and provided local

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security. The third platoon provided flank and rear security for the main body and rode shotguns for the dozers working on clearing. The trucks and equipment not actually engaged in clearing or repairing followed behind the dozers and just in front of the rear security. The following days a section of armored personnel carriers augmented the security force but the basic plan remained in effect. The APC's also assisted in securing the laterite source when it was necessary to haul from a rear location. The First Field Squadron, Royal Australian Engineers augmented clearing operations with one TD-16 bulldozer on the third day. Clearing of LTL 23 to 50 meters each side of road continued with road repairs as necessary until 26 Mar 67 when the company moved to a new location on the SONG RAI River.

(3) On 27 Mar 67, work commenced on clearing rubble from three blown bridges on LTL 23 that had been dropped on top of each other in the SONG RAI River. Demolition work was required to break up the old bridge prior to their removal. One and one-half platoon days were required to clear the gap. On 28 Mar 67, A Company supported by the 500th Engineer Company (Panel Bridge) and an Australian Assault Pioneer Platoon commenced construction of a 120 ft DD Bailey Bridge across the SONG RAI which was opened to traffic at 1630 hours. The following day the same engineer team constructed a 70 ft DS Bailey Bridge across the SUOI CAY GIA at YS 607641.

(4) Company A replaced eight other destroyed bridges on LTL 23 by placement of large (60 and 72 inch) diameter culvert as required, constructed two company size compounds for two Regional Force ARVN units in the vicinity of the SONG RAI for defense of the bridges, and performed selective clearing and principal road drainage construction for a refugee village on the high ground at YS 581632. During this time, road clearing operations continued with Australian support which now included 3 dozers, one frontloader and one grader, clearing the road to 50 meters each side. D Co, 6RAR was assigned the mission of defense of both bridges until relieved by ARVN.

(5) On 5 Apr 67, the company moved forward to XUYEN MOC with the 3d Platoon sweeping the road for mines. Five mines were discovered and all blown in place. The company move was completely successful. The entire 6th Battalion Royal Australian Regiment, minus D Company, who was left on the bridge, moved with the company to secure the engineer's worksites by day, and conduct search and destroy operations as effort was available. An entrencher, one grader and two D7E dozers were attached at this point for the remainder of the operation.

(6) From this new base camp, A Company constructed a C-123 airfield inside the town of XUYEN MOC at the ARVN compound. The airfield was successfully completed through the excellent cooperation of the local American advisor, MAJ CORRAL and the subdistrict chief, CPP-DUC. They cooperated fully in procurement of right of way for the airfield, clear areas and approaches, the relocation of 3 families and movement of 23 graves.

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(As a token of cooperation for property damaged, Company A reshaped the major village roads with a grader, gave the villagers the sawed up wood from trees cut, dug 30 new graves and assisted the three families in their moving, which undoubtedly was largely responsible for the good relationships established.) The airfield was constructed with a 2100 ft x 60 ft runway, a 140 ft overrun/turn around at each end, and a 150 ft x 150 ft parking apron from good quality native laterite compacted to a minimum of eight inches. Airfield was completed on 12 Apr 67.

(7) 2nd Platoon removed a M16A1 minefield, consisting of 311 mines placed in 1963. The minefield had been burned over so all mines were located and blown in place. Several booby trapped grenades were found in the minefield which were also destroyed in place. A minefield recording form was available and proved to be quite accurate.

(8) During this entire period clearing continued, this time widening the clear area along side the road to 100 meters. On 8 Apr 67, one of the attached Australian dozers struck a mine near the road and was totally destroyed in the resulting fire. During the night of 14 Apr, a message was received to move to home station the following morning (instead of 17 Apr as planned). Approximately 6 tenths of a mile of road remained to be cleared and the Australian team was to complete this after the departure of A Company.

(9) On 15 Apr 67, the company moved to home station, coming up QL 15 with the 9th US Infantry Division's 1st Brigade, and with an 11th Armored Cav Regt escort to Blackhorse Base Camp.

(10) The second operational support mission for A Co., 27th Engr Bn (C) was the mission of opening Route LTL 1 to GIA RAY on 22 Apr 67. Sometime the night before the Viet Cong had blown two (2) bridges located at coordinates YT 537061 making this route impassable and putting the compound located at GIA RAY in a dangerous tactical situation in the event of attack. 1st Platoon of Company A was given the mission.

(11) Situation: There were two (2) bridges located in the area, one on the main road and one on a bypass. Both bridges were blown. The bridge on the main road (concrete "T" beam) was dropped on the near shore end, while the far shore end of the bridge still rested on its abutment. The bypass bridge, also concrete, was dropped completely into the gap.

(12) At 1200 hours, 22 Apr 67, 1st Platoon left with one (1) crane, one (1) dozer on a lowbed, 40 ft of 60 inch culvert loaded on a lowbed and ten (10) 5-ton dump trucks loaded with laterite. Escort was provided by 3/5 Cav, 9th Inf Div. The bypass bridge was repaired first by installing the 60 inch culvert: Debris was removed as much as possible, the culvert placed and filled over, using some material from the bridge site and the laterite brought from base camp on the roadway. The roadway was shaped

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by a dozer and compacted by a 5 ton dump truck. The road was open to traffic within three hours after arrival on the job site. By 1700 hours, the work party closed back into Blackhorse Base Camp without incident.

(13) The second bridge, located on the main road, was repaired by filling over the partially dropped bridge until it reached road level. There appeared to be sufficient drainage area under the end that was still up on its abutment. Fifteen (15) dump trucks and one dozer were used to accomplish this, making two complete hauls of laterite from the Base Camp laterite pit. It took 5 hours to complete expedient repair of this bridge.

(c) Headquarters, B Company (-) and C Company.

(1) This unit supported the 1st Inf Div on Operation JUNCTION CITY during the period 13 Mar 67 - 15 Apr 67. During the support period, the unit cleared 125 acres of jungle, constructed a 760 man Special Forces/CIDG Camp at XT 617810, furnished equipment support to the 1st Engr Bn during construction of a C-130 airfield, maintained LOC and provided an average of 7 mine sweeping teams daily. See Inclosure 1, After Action Report.

(d) D Company, 27th EBC.

(1) During the period 17 Oct 66 through 7 Apr 67 Company D was assigned as the direct support engineer company of the 3d Bde, 4th Inf Div.

(2) The first base of operation was BEAR CAT where the unit participated in Operations BREMERTON and FAIRFAX, YT 1648. In BREMERTON a demolition and mine sweeping team of four men was attached to one infantry battalion. These people were employed in teams of two per line company and performed tunnel destruction and other demolition work. This mission was moderately effective since much of the work the demo team accomplished should have been done by the individual infantryman. The aspect of control by an engineer officer was lost since the teams were operating away from the base camp in the NHON TROC Swamp and the number of people committed did not warrant a control headquarters from the engineer company. What eventually developed was the control of the four man team by the infantry battalion headquarters and commitment of the team only when there was a specific mission which could not be done by the infantry. Missions of this sort were large tunnel complexes, fortifications and riverside facilities such as river crossing sites and piers.

It was found during operations of this type that C-3 or C-4 was the most desirable explosive to use due to its versatility. TNT, cratering charges, shaped charges were too large and bulky for the demo team to carry and the TNT and military dynamite did not have the molding or waterproof characteristics needed in the swampy area. Personnel rotated 48 hours in and 24 hours out all the time so that teams were rotated between the operational area and base camp every two weeks.

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During this operation several route recons were performed along with a bridge redecking, YT 1296. In the recons, it was found that a recon performed on the ground with engineers in APC's derived the best results. Several areas were reconned by air at low level, and this followed up by a ground recon. Many roads and trails not discovered on the aerial recon were found on the ground recon.

The bridge redecking was simply a matter of covering four steel "I" beams with 3 inches of decking after improving the abutment sills. This was done in three hours by one platoon and the existing bridge was brought up to Class 30. No heavy equipment was needed and the platoon's TO&E tools, vehicles and trailers were sufficient to carry all tools, personnel and materials to the bridge site.

(3) On 24 Nov 66, the Brigade Advance Party consisting of part of the S&T Company and D Company moved to the new permanent base camp of the Bde at DAU TIENG, YT 4947. The first and perhaps the biggest problem encountered in this area (the site of the Michelin Plantation) was the neutralization of an unrecorded defensive minefield installed by ARVN within the past 5 years. This minefield was in the exact area where the base camp was to be located and consisted of approximately 450 M-16 American Anti-Personnel mines, homemade booby traps made of grenades and mortar rounds and fougasses.

Several factors governed our decision to go ahead with manual location and destruction in place of the mines. The area was overgrown with grass and weeds at some places six to eight feet high. Barbed wire and concertina had been strung throughout the area in various compositions and the mines and booby traps were set in this wire. In some areas, troops were living in close proximity to areas where known mined areas existed.

Prior to the above solution an M48 tank dozer was procured but it was ineffective in the barbed wire and became disabled after hitting one mine. An APC was then tried in an effort to clear the grass, but is also proved vulnerable to AP mines. Burning was the last and most effective means which was tried. By utilizing a mixture of diesel fuel and MOGAS sprayed out of a pump type water fire extinguisher, an acceptable area could be burned prior to using a mine detector. This was also good in the areas where barbed wire and mines had been used together with booby trapped hand grenades. Utilizing the above method the minefield was neutralized with a minimum of effort and risk.

(4) During Operation FORT NISQUALLY, Delta Company was given the mission to make two roads, YT 4945, passable for wheeled artillery convoys which had to reach firing positions outside the base camp.

(5) During Operation ATTLEBORO in War Zone C the 2/22 Inf Bn (Mech) took part in the operation in the vicinity of TAY NINH City, XT 2050. It was decided to send one engineer platoon, full TO&E, with them on the operation. This was a bad decision as we later found out. The APC's

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are strictly a cross country vehicle and the engineers could not follow with their wheeled vehicles. We attempted to split up the engineers and put them in the APC's so they might accompany the infantry. When the engineers took their minimum tools into the tracks, they were too separated and were only effective as teams of three or four men. Hence from then on, demo and mine sweeping teams were sent with an infantry battalion, but only if they were needed and requested. A full platoon was never again committed to the direct support of a battalion. If the unit had its own tracks, it would have been possible to go with the mechanized unit into combat.

(6) During Operation CEDAR FALLS in the Iron Triangle XT 5535, D Company committed four demo teams of three men each plus one officer to the 2/22 Inf Bn. It was found that the officer with the Bn Hq as an advisor was quite beneficial. He was able to render advice to the infantry commander on how to employ the engineer elements with his command and also to look out for the welfare of the engineers as a whole. This commitment came from one platoon, hence some resemblance of unit integrity was retained. Later, on Operation JUNCTION CITY, this same type of support was needed, but in all three infantry battalions of the brigade. Therefore, the platoon Sgt and one senior squad leader of one platoon were put with the respective infantry battalion headquarters and the rest of the platoon became the demo teams. Each senior engineer advisor with the infantry battalions submitted SITREP's each night and gave a status report on his teams. This provided the required overall control and retained the flexibility to provide each infantry battalion the engineer support they needed.

(7) On Operation GADSTON, D Company committed one platoon to direct support of the 2/22 Inf Bn (Mech) since there was a major water obstacle this unit had to cross on the first day of the operation at XT 1976. The direct support ended after this mission when the platoon reverted back to company control.

The river which had to be crossed was impossible to bypass. It had steep banks fifteen feet high, a water gap of 62 feet, a current velocity of three to four feet per second and a bridge site which was unsecure. The initial recon of the site was done, under small arms fire, by the platoon leader who eventually erected the bridge. The reconnaissance and polaroid pictures taken helped immensely.

On the basis of the data gathered, it was decided to put in a LTR at the site. This bridge was to be helilifted into the site while the constructing engineer platoon was to ride to the site on APC's. This platoon had the additional mission of clearing the mines which were known to exist in the access roads and to improve the approaches. Cratering charges were used to reduce the angle of the approaches.

The bridge delivery and erection went smoothly although the engineer platoon was delayed in reaching the site due to the presence of mines on the road. When the APC's began crossing all went well for the first company of

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tracks but one track in the second company hit a mine on the near shore approach and stopped the crossing operation. This area had been swept with mine detectors and passed over by APC's but apparently the mine was too deep for a mine detector to detect and the earth above it was not compacted enough until a series of tracks passed over the mine. This was the only delay in the operation.

(8) Several pioneer construction projects were performed by the company during Operation JUNCTION CITY. One was the construction of a Brigade TOC at XT 6779 and the other was a forty-five foot bridge capable of carrying Class 20 traffic at WT 9775. The TOC was built by digging a slot in the ground three feet deep with a dozer and constructing sandbag walls in the slot to support the roof. The walls were to support a roof of logs 8 to 10 inches in diameter covered with sandbags. The complex consisting of three rooms stood up very well. One platoon was involved two days in the construction.

The bridge of pioneer material was decided upon after the jungle around the forty-five foot gap was considered too dense to remove for emplacement of a dry span by helicopter. There had been an existing bridge at this site at one time and two wood piles 10" diameter still existed from the bridge. The piles were cut off two feet above the water level and a piece of M4T6 balk, which the mech units carry with them (8 pieces/Bn) strapped on top of the two piles. This created a bent for an intermediate support. Logs were cut in the area, after reinforcing the work force with extra chain saws (12 each) to make stringers and decking. The stringers were 8" to 10" in diameter and the decking was 4" to 6" in diameter. The structure built consisted of two spans, each span of which was sixteen feet wide. The unstable approaches to the bridge were stabilized by using branches and small timbers to create a type of corduroy road. The total effort on this project was thirty-two men and 15 chain saws for 5 hours.

(9) In Operation JUNCTION CITY, D Company was required to clear 2 landing zones. The first LZ (WT 0779) was to be an artillery fire support base and Brigade Hq. During this clearing operation one platoon was utilized for 2½ days clearing the area with chain saws and demolitions prior to the BOD. Two additional days were needed to clear the mask for the artillery fields of fire. Chain saws of the type normally issued to engineer units were found to be lacking in durability for heavy hard wood clearing. Of the 9 chain saws utilized, only one functioned at the end of the clearing operation. An engineer mechanic was sent on the operation for the expressed purpose of repairing the chain saws. This helped but not to any significant degree. It is recommended that a heavier chain saw in greater numbers be issued to combat engineer units for participation in clearing operations.

Later in the operation, a landing zone at XT 1281 for a company resupply point was required. This involved climbing down a ladder from a hovering CH-47 Helicopter and clearing an area 100 ft x 60 ft to accommodate one UH1B Helicopter. Due to our inexperience with this type of airmobile operation many problems were encountered.

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Initially there were to be two ladders used from the helicopter, but for safety reasons only one was used. This ladder swayed considerably until the first two or three men reached the ground and could hold the ladder steady. Another problem on this operation was how to lower the pioneer tools (e.g. chain saws, 2 man saws, axes and demolitions) from the chopper. The solution of lowering the damageable items by rope was found to be acceptable, while the non-breakable items were just dropped freely to the ground. Two chain saws were delivered this way and it seemed to have no adverse effect on the equipment.

During these clearing operations, it was found that the standard timber cutting charge was not sufficient for the test shots. D Company resorted to increasing the amount of explosives by one-half the amount the formula dictated. This worked satisfactorily. As a standard in these two operations, one platoon was able to satisfactorily clear an LZ 100 ft x 70 ft, to include a satisfactory glide path, in approximately four hours. This is in medium heavy timber with a double canopy.

(10) The last major operation in JUNCTION CITY involved clearing mines for 4 miles on Route 22 (XT 6976 to XT 0785) in War Zone C; improving the road for wheeled vehicles and clearing the jungle back for 30 meters on each side of the road. This operation involved the use of 6 tractors with bull blades, two flamethrowing APC's and a grader. With this great amount of equipment working in one area, the use of a contact truck was extremely beneficial. A platoon 3/4 truck outfitted with the company welding set, a tool box, selected engineer tools from the 2nd Echelon set and two skilled mechanics significantly reduced deadline of engineer equipment. On the HD-16, which was especially vulnerable to hydraulic problems, an expedient solution was found. The hydraulics hoses to the tilt cylinders were disconnected and the ports plugged.

(3) Training. None.

f. Logistics and Maintenance.

(1) Rome plow cabs: The lattice protective guard on the rome plow cab is fragile and readily destroyed during jungle clearing operation. This unit has replaced the lattice guard successfully with used rock crusher screen.

(2) Over heating of the D7E Tractor: During clearing operations in heavy jungle areas, the D7E tractor will over heat after approximately two hours of operation. It was found that the tractor would operate in normal range with the thermostats removed. However, the warm up period must be increased.

(3) Radiator guard for D7E Tractor: This guard is much too fragile for jungle clearing. This unit has fabricated a satisfactory radiator guard using three quarter inch mild steel rod.

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(4) Tilt cylinder hoses and connectors for D7E and HD16M Tractors: During clearing operations, hoses and connectors of the tilt cylinder were damaged frequently resulting in many hours of downtime. In many instances the Battalion Maintenance Section removed the tilt cylinder, replaced them with a rigid brace and blocked hydraulic lines to provide a satisfactory solution for clearing operations.

(5) Filler neck for hydraulic reservoir on the HD16M Tractor: During clearing operations, the filler neck is easily broken by trees overriding the blade. This unit has removed the filler necks and covered the opening with sheet metal and gasket. The hydraulic reservoir can be filled through the oil level check plug opening.

g. Force Development. None.

h. Command Management. None.

i. Inspector General. None.

j. Information. None.

k. Civic Action. A Company, 27th Engr Bn (C) conducted a limited Civic Action Program in conjunction with Operation PORTSEA, a combined US and Australian Operation in PHUOC TUY Province. Several Civic Action projects were undertaken but only one involved a coordinated US - Australian effort. This project involved a 3 day MEDCAP in which 180 local nationals were treated.

Civic Action projects involving only US Forces were directly related to the accomplishment of the engineer mission and usually involved the use of US Engineer Equipment. Most of the actions undertaken consisted of the initiation of work by US personnel and equipment and the final completion of the project by local nationals or the ARVN customer unit. Examples of the above were 3 wells dug with a crane and clamshell attachment, the construction of a road net for a refugee village, and the relocation of vietnamese houses for a C-123 airfield. Local nationals appeared receptive to the effort by US Forces involved on all projects undertaken, especially the MEDCAP performed by US and Australian medical personnel.

SECTION 2. Part 1. Observations (Lessons Learned).

1. Personnel.

a. Item. Battalion Pay Officer.

Discussion: Although it is desirable to have each company commander or his designated representative pay their respective troops whenever possible, it is feasible to have a single Battalion Pay Officer. To reduce the difficulty of acquiring sufficient aircraft and flight time for each pay officer during wide spread operations and to permit these officers to continue supervision and control of their operations without interruption, this unit has successfully paid 700 widely spread troops with a single pay officer in 2 days.

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Observation: With ample prior coordination, a single Battalion Pay Officer can efficiently and economically pickup the payroll and pay the entire Battalion.

2. Operations.

a. Item. Installation of Australian corrugated metal pipe culvert.

Discussion: Australian culvert is very difficult to work with as it is assembled with "J" bolts, has very little structural strength and can not be preassembled and hauled to the construction site. This is frequently a hardship under tactical conditions and it is recommended that American units going on operations with Australians take required American culvert material when possible.

Observation: Installation of Australian culvert by US Troops under tactical conditions will require considerably more time than American culvert for assembly at the culvert site.

b. Item. Mine Warfare.

Discussion: During Operation PORTSEA this unit encountered both manufactured and improvised mines. The most frequently encountered was a mine improvised from a bomb fuse. The fuse was a FMU-7A/B and carried a partial Federal Stock Number of FSN 1325-570-2492. This mine is quite potent and is capable of knocking out a bulldozer. Eleven of these were located in an 800 meter distance along the route clearing. All of these mines were off the road but within 100 meters of the road. They were partially buried and hard to locate.

Observation: Difficulty in detecting improvised mines requires through investigation of all avenues of off-road travel with mine detectors and visual inspection.

c. Item. Minefield removal.

Discussion: It was found in removing a 4 year old minefield (M-16 mines) that $\frac{1}{2}$ pound charges of C-4 will not always detonate the mines. One pound charges of C-4 molded around the fuses will detonate the mine properly in every case attempted. Similarly, a one pound charge of TNT will not detonate all mines, and experience has shown that approximately 15% would be blown apart without detonation.

Observation: A one pound charge of C-4 molded around the fuse of an M-16 mine is recommended for positive detonation.

d. Item. Preparation of subgrade for airfield construction.

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Discussion: One of the biggest problems in subgrade construction was that of compaction. During the dry season in Vietnam, the soil is almost void of moisture. After a grader had shaped the subgrade, there was at least 2 inches of dust on the surface of the runway. This material had to be compacted before a laterite surface could be put down. Water distributors were used to apply water to the subgrade. At first, putting the water down during the day was tried. It was found that the high temperature of Vietnam made it very difficult to put sufficient water into the soil to reach the optimum moisture content. Watering the subgrade all night and compacting it in the morning proved to be the best solution to this problem.

Observation: Adequate water for compaction of in place material can be attained by night application followed by early morning compaction.

e. Item. Efficient use of the Rome Plow.

Discussion: The Rome Plow, when properly used, can be an efficient means of clearing jungle. While on Operation JUNCTION CITY the mission was to clear 125 acres of jungle using 3 Rome Plows and 4 bulldozers. As clearing operations began, it was noted that the best method of falling large diameter trees was to employ the stinger on the left side of the plow to split the tree until it could be easily pushed over. Inexperienced operators have a tendency to push trees over rather than use the stinger; this is not only inefficient but it also has a tendency to increase dozer downtime. It was also observed that Rome Plows are at a disadvantage when they are employed to remove fallen debris. The debris has a tendency to slide off the right edge of the blade and thereby considerably increases the number of passes required. The Rome Plow can be effectively used to remove debris if it is used in conjunction with a bull-bladed dozer working on its right side. The bull-blade dozer collects the debris as it comes off the angled blade of the Rome Plow. Working as a pair greatly increases the efficiency of each tractor.

Observation: A greater amount of jungle can be cleared more efficiently if Rome Plows are used properly and in conjunction with a bulldozer to aid it in removing the fallen debris.

f. Item. Loading engineer equipment for transport on an LST.

Discussion: During a recent unit move, B Company personnel, TO&E equipment and attached engineer equipment were required to travel by LST. Two pieces of engineer equipment (25 ton Lowbed Trailer w/dozer and a rough Terrain Crane) required special consideration. A special ramp was constructed to prevent the lowbed trailer from bottoming out at the hump in the bottom of the LST near the front lading ramp. The rough terrain crane, due to its height, required removal of parts of the cab and release of a considerable amount of air from the tires before it would pass through the loading entrance. It is also recommended that the dozer be the last piece of equipment loaded so that a suitable ramp for unloading can be prepared if required for the remainder of the vehicles.

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Observation: Considerable engineer effort can be conserved if adequate consideration is given to loading of large engineer equipment on an IST.

g. Item. Construction of berm around CONEX bunkers.

Discussion: The design of a Special Forces Camp required placement of 60 CONEX containers into a berm. First, the entire outer berm was pushed into place, then slots were pushed thru the berm with dozers for the CONEX bunkers. Since the cut was approximately 13' wide and the CONEX only 6'6" wide, sandbag revetments had to be constructed to regain the original configuration of the berm. A better solution was found during construction of the inner berm. A CONEX is placed on a pad constructed in the proper location. A team of dozers, one on each side, push fill up on each side of the CONEX, being careful not to move it. This continued until the CONEX is almost completely buried. The procedure is repeated until all CONEXES are in place. The berm is then pushed up from within and/or without the compound, depending on the terrain. This placement method requires that doors and firing ports must be dug out by hand. This, however, is considerably easier and less time consuming than constructing sandbag revetments.

Observation: Method of placement of CONEX containers in berms suggested above results in better defensive positions, requires less manual labor and fewer sandbags.

h. Item. Mine/Road Clearance.

Discussion: While on Operation JUNCTION CITY, this unit provided mine sweeping teams for daily road clearance. On 3 successive days, the teams followed the same route and started sweeping at the same point on the road. On the third day, this procedure resulted in the total destruction of the 5 ton truck carrying the mine sweepers by the mine planted in the road just to the rear of where the sweeping had begun the previous days. After the mine exploded the clearing teams immediately set about a deliberate clearance of the whole area. While this was in progress, a tactical convoy approached, disregarded the warnings of the OIC of the clearing party and proceeded down the uncleared road. Result - one (1) ACAV destroyed, 5 men seriously injured. Shortly after the smoke cleared, the clearing team from the other direction approached. They were sweeping 3 abreast, detector heads about 18" off the ground, and were proceeding at normal cadence. After they had joined up with our teams, a 4 ton drove up the road they had just cleared. The right rear wheel set off a mine the clearing team had missed resulting in the total destruction of the vehicle, two (2) men killed and one (1) critically injured.

Observation: (1) Clearance parties must vary their route of approach to uncleared areas and begin road clearance at the outer limit of friendly control. (2) Proper technique must be used with mine detectors

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or effort is in vain. (3) Tactical convoys must wait until routes are cleared.

i. Item. Mine Sweeping Demo Teams assigned to Infantry Units.

Discussion: When traveling with the infantry the weight of supplies and equipment became a very important consideration. Mine detectors were carried on the individuals back in a sandbag rather than in the heavier plastic case. The burlap offered enough protection for the detector and was an easy method of securing the instrument. Each team carried no more than 10 to 15 pounds of explosives at one time because of the ready availability of resupply by helicopter.

Observation: Proper planning of equipment and demolitions to achieve minimum essential requirements can substantially increase the efficiency and mobility of a mine clearing team.

j. Item. Shortage of aggregate for concrete.

Discussion: While at DAU TIENG one of the neighboring engineer units attempted to make concrete from cement and laterite, due to shortage of sand and gravel. The laterite was sifted through wire screen to separate the fine from the coarse material, then recombined in measured proportions with cement. The resulting concrete had fair strength, and acceptable finish and proved adequate for the expedient floor in a Brigade TOC. Due to shortage of material at the time, Company D used concrete mixed with sand gathered from a nearby river. The strength of the resulting concrete, using steel U-type and screw-type pickets for reinforcing, was more than adequate.

Observation: The use of cement laterite and cement river sand has proven adequate as expedient concrete where sacrifice of strength is not critical.

k. Item. Long Range Voice Communication with AN/GRC - 19AM Radio.

Discussion: This unit has found that reliable long range communications can be accomplished with the AN/GRC - 19 when worked in conjunction with an AN/GRA-50 antenna. Ranges of 200 miles with voice transmission have been consistently accomplished over favorable terrain. Static operations, in the Delta Area or similar terrain, that would allow deliberate installation of the AN/GRA-50 antenna and require little relocation of AM equipment are particularly suited to long range communications.

Observation: During wide spread company size operations, this unit has found that long range voice communications (200 miles) can be achieved with the AN/GRC-15 used in conjunction with the AN/GRA-50 antenna.

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13 May 1967 26

SUBJECT: Operational Report - Lessons Learned (HCS CSFOR-65) for
Quarterly Period Ending 31 April 1967

SECTION 2. Part II. Recommendations.

1. Personnel. None.
2. Operations. None.
3. Training and Organization. None.
4. Intelligence. None.
5. Logistics. None.
6. Other. None.

Allen P. Richmond 3d

1 Incl
After Action Report,
Operation JUNCTION CITY

ALLEN P. RICHMOND, III
LTC, CE
Commanding

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EGF-3 1st Ind
SUBJECT: Operational Report - Lessons Learned (RCS CSFOR-65) for
Quarterly Period Ending 31 April 1967

Headquarters, 34th Engineer Group (Const), APO 96291 26 May 1967

TO: Commanding General, US Army Engineer Command Vietnam (P), APO 96491

1. The 27th Engr Bn Operational Report - Lessons Learned is forwarded
IAW USAECV(P) Reg 1-19 dated 15 April 67.

2. Reference Section I, para 1f (3), concerning TO&E shortages.
This headquarters is aware of TO&E shortages and is continually
investigating all resources in an effort to alleviate these shortages.
Information has been received from USAECV(P) - AVCC-SU that all TO&E
shortages of front loaders will be filled prior to 1 June 67.

FOR THE COMMANDER:



W C TOMSEN
Major, CE
Adjutant

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AVCC-P&O (13 May 67) 2d Ind CPT Hubbard/ccb/BH 404
SUBJECT: Operational Report-Lessons Learned (RCS CSFOR-65) for Quarterly
Period Ending 30 April 1967

HEADQUARTERS, UNITED STATES ARMY ENGINEER COMMAND
VIETNAM (PROV), APO 96491 8 JUN 1967

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

1. The subject report, submitted by the 27th Engineer Battalion (Cbt), has been reviewed by this headquarters and is considered adequate.

2. The comments made by the submitting and Indorsing commanders have been reviewed and this headquarters concurs, subject to the following added comments:

a. Section 1, paragraph 1f(3), page 11 and paragraph 2, 1st Ind, Shortages of TOE Equipment. Scoop loaders are to be issued to fill TOE shortages within the next thirty (30) days.

b. Section 2, Part I, paragraph 2a, page 22, ITEM: Installation of Australian Corrugated Metal Pipe Culvert. It should be further noted that use of this type of pipe requires considerable more fill and care in placing the fill as well.

c. Section 2, Part I, paragraph 2h, page 24, ITEM: Mine/Road Clearance. The tactical situation may require a tactical commander to cross a known uncleared area. However, such a risk should be taken only after an appraisal of the dangers involved and of the possible impact on his ability to accomplish his mission.

FOR THE COMMANDER:


RICHARD J. DUCOTE
Colonel, CE
Chief of Staff

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AVHGC-DST (27 May 67) 3d Ind
SUBJECT: Operational Report-Lessons Learned for the Period Ending
30 April 1967 (RCS CSFOR-65) (U)

HEADQUARTERS, UNITED STATES ARMY VIETNAM, APO San Francisco 96307 1 JUL 1967

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

1. This headquarters has reviewed the Operational Report-Lessons Learned for the period ending 30 April 1967 from Headquarters, 27th Engineer Battalion (Combat) as indorsed.

2. Pertinent comments follow:

a. Reference item concerning shortages of authorized TOE equipment, paragraph 1f(3), page 11, paragraph 2, 1st Indorsement, and paragraph 2a, 2d Indorsement: Concur with 1st and 2d Indorsement. Eighteen bucketloaders were issued to the Engineer Command during the first week of June 1967. This headquarters is continuing efforts to fill TOE equipment shortages.

b. Reference item concerning chain saws, paragraph 2e(d)(9): Action has been taken by this headquarters under ENSURE procedures to obtain heavier duty chain saws for this type of operation.

FOR THE COMMANDER:


E. L. KENNEDY
CPT, AGC
Asst Adjutant General

PROTECTIVE MARKINGS MAY BE
CANCELLED WHEN SEPARATED
FROM PROTECTED MATERIAL

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GPOP-DT(13 May 67)

4th Ind

SUBJECT: Operational Report-Lessons Learned for the Period Ending
30 April 1967 (RCS CSFOR-65), HQ 27th Engr Bn (Cbt)

HQ, US ARMY, PACIFIC, APO San Francisco 96558 3 AUG 1967

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

This headquarters concurs in the basic report as indorsed.

FOR THE COMMANDER IN CHIEF:

G. L. McMullin

G. L. McMULLIN
MAJ, AGC
Asst AG

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DEPARTMENT OF THE ARMY
Headquarters, 27th Engineer Battalion (Combat)
APO San Francisco 96257

EGF-27-3

2 May 1967

SUBJECT: After Action Report - Operation JUNCTION CITY

TO: Commanding Officer
34th Engineer Group
ATTN: EGF-3
APO US Forces 96291

1. Introduction: During the period 13 March 1967 to 15 April 1967, 27th Engineer Battalion (Combat) participated in Phase II, Operation JUNCTION CITY, in direct support of the 1st Infantry Division. The following is an after action report on 27th Engineer Battalion operations during this period.

2. Missions: Construct Special Forces Camp vic XT6281 and provide general engineer support to 1st Infantry Division.

3. Organization: Operation JUNCTION CITY was supported by the 27th Engineer Battalion using a Task Force Organization consisting of Headquarters and Headquarters Company (-), B Company (-), C Company, and selected items of equipment from the 79th and 159th Engineer Groups. Direct Support maintenance provided by 610th Maintenance Battalion Contact Team.

4. Sequence of Events:

a. 13-14 March 1967 - 27th Engineer Battalion Task Force moved from Blackhorse Base Camp at Long Giao to initial destination XT690870.

b. 15 March 1967 - Moved security force and heavy equipment to location vic XT6281 to clear bivouac area and construction site.

c. 18 March 1967 - B Company moved to bivouac vic XT624815. HHC (-) and C Company remained at XT690870. C Company employed in movement of supplies and prefabrication of cut timbers and bunkers for Special Forces Camp.

d. 20 March 1967 - 27th Engineer Battalion Task Force CP moved to bivouac vic XT624815.

e. 22 March 1967 - C Company moved to vic XT624815. Clearing of camp area continued. Construction of protective berm initiated. Equipment support provided 1st Engineer Battalion for airfield construction.

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2 May 1967

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F: After Action Report - Operation JUNCTION CITY

f. 28 March 1967 - B Company and the majority of personnel from HHC, 27th Engineer Battalion departed construction site for home station.

g. 2 April 1967 - C Company, minus one platoon, departed construction site for home station.

h. 15 April 1967 - C Company Platoon returned to home station thereby terminating the 27th Engineer Battalion's participation in Operation JUNCTION CITY.

5. Enemy Situation:

a. One 5 Ton Dump Truck damaged by pressure type mine on 21 March at XT678861 while engaged in route sweeping operation.

b. D7E Dozer slightly damaged by pressure type mine on 25 March vic XT6281 while clearing fields of fire.

c. No other enemy contact was experienced.

6. Missions Accomplished:

a. Transported the following materials from Quan Loi to Construction site.

- (1) 93 CONEX's.
- (2) 200,000 sandbags.
- (3) 66,448 board feet of lumber.
- (4) 3,595 U-Pickets.
- (5) 19 rolls of barbed wire.
- (6) 366 rolls of concertina.
- (7) 100 ft of 30" culvert.

b. Cleared 93 acres of jungle for Special Forces Camp.

c. Cleared 24.8 acres of jungle along Route 246 from XT625814 to XT677862.

d. Constructed 595 meters of exterior berm and 180 meters of interior berm.

e. Placed 93 CONEX's, reinforced with timbers, as bunkers and protective shelters.

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2 May 1967

SUBJECT: After Action Report - Operation JUNCTION CITY

- f. Constructed 2,630 meters of 2-4 pace double apron fence and 800 meters of triple standard concertina.
- g. Assisted Special Forces Team in sandbagging and improving of bunkers.
- h. Installed 90 feet of 30" culvert.
- i. Constructed access road to Special Forces Camp.
- j. Cleared field of fire along Route 246.
- k. Provide an average of 7 mine clearing teams to 1st Infantry Division on a daily basis.
- l. Supported the 1st Engineer Battalion with graders, dozers, and scrapers for airfield construction.

7. Effort Expended:

- a. Manhours: 11,858
- b. Equipment Hours: Dozer - 1650
Grader - 230
Crane - 86
Dump Trucks - 3,310
290H Scraper - 260
Entrencher - 65
Frontloader - 88

8. Lessons Learned and Recommendations:

a. Observation: It was found that when using Rome Plows for jungle clearing they were effective for falling trees but experienced difficulty in removing debris due to the tendency of the material to slide off the angled blade. By using a bull-bladed dozer on the right side of the Rome Plow to retain the material on the blade utilization of the plow could be increased.

Recommendation: When possible team Rome Plows with bull-bladed dozers when clearing debris for efficient operations.

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SUBJECT: After Action Report - Operation JUNCTION CITY

b. **Observation:** When employing Rome Plows it was found that the best way to fell big trees was to use the stinger on the plow to split the tree until it could easily be pushed over. It was noticed however that inexperienced operators have a tendency to try and charge the big trees and knock them over. This is not only inefficient but results in undue damage to the equipment.

Recommendation: That inexperienced Rome Plow operators be thoroughly instructed in the proper use of their equipment and be closely supervised particularly during their early training.

c. **Observation:** During jungle clearing operations dozers frequently overheat due to the collection of leaves and dirt on the cooling system. Radiators are most easily cleaned by using an air compressor.

Recommendation: That dozer radiators be inspected frequently and that an air compressor be made available to the operator for cleaning the cooling system.

FOR THE COMMANDER:

1 Incl
1 - Site Plan

HAROLD M. NEWMAN
CPT, CE
Adjutant

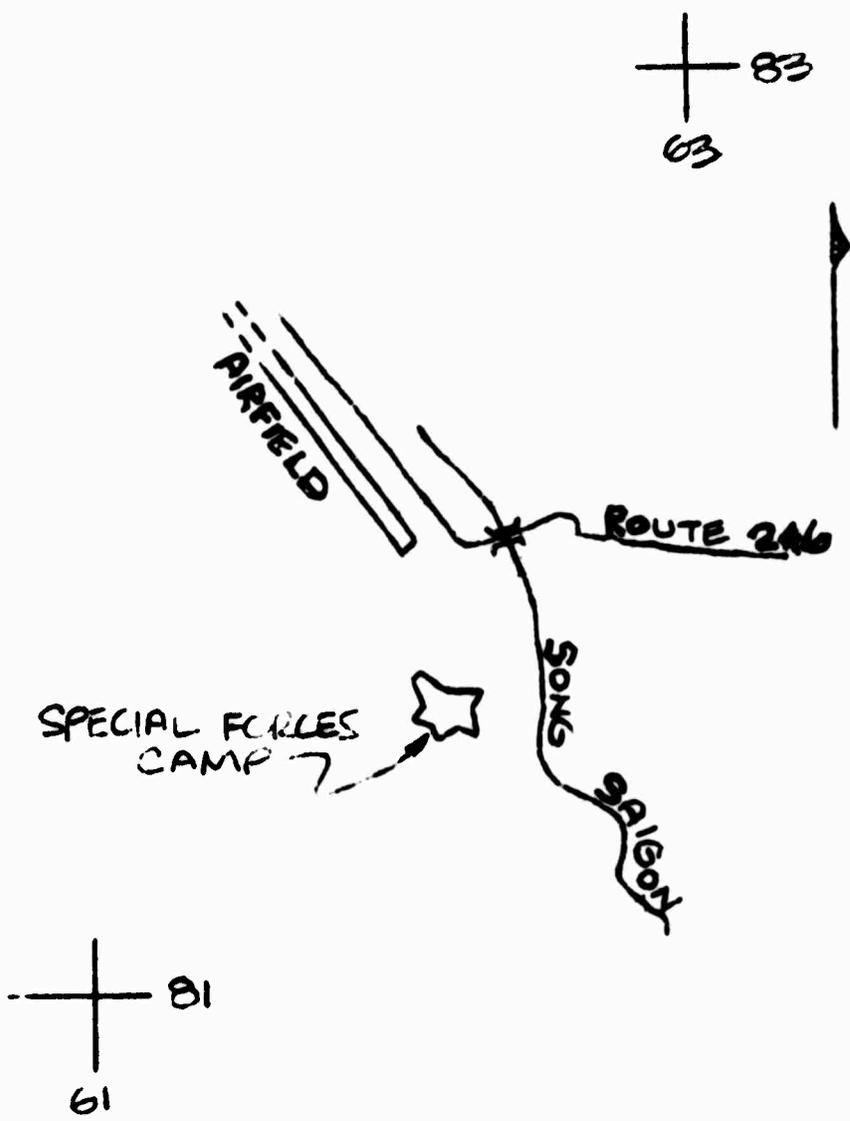
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Reference: Map, VIETNAM, 1:25,000, Special Supplement, Sheet 6232 II S



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