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

31 October  
~~11~~ 1970

EGCC-QP

SUBJECT: Operational Report-Lessons Learned, 84th Engineer Battalion  
(Construction), for the period ending 31 Oct 1970 RCS CSFOR-65

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

Commanding General  
18th Engineer Brigade  
ATTN: GSS  
APO 96377

Commanding General  
United States Army Engineer Command, Vietnam  
ATTN: AVCC-MO-B  
APO 96375

Commanding General  
United States Army, Vietnam  
ATTN: AVHG-C (DST)  
APO 96375

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

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

For OT LT  
704113

(1)

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605-05-009

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31 OCTOBER

SUBJECT: Operational Report-Lessons Learned, 84th Engineer Battalion  
(Construction), for the period ending 31 Oct 1970 RCS CSFOR-65

## 1. Operations

a. Command: Assigned and attached units are listed as Inclosure 1. The 84th Engineer Battalion (Construction) had its normal TO&E companies plus the 536th Engineer Detachment (Port Construction) as its major construction units during the reporting period. The Headquarters, Headquarters Company, A Company and C Company were located in the city of Qui Nhon, Republic of Vietnam. B Company and the 536th Port Construction Detachment were initially located near Bong Son, a city about 50 miles north of Qui Nhon. D Company was located near An Khe, a city in the Central Highlands, about 50 miles west of Qui Nhon. The area of operations of the Battalion extended from Vung Ro Bay along the coast to Bong Son and into the interior as far as An Khe.

During the reporting period, approximately 15 September, the Battalion detached two earth moving platoons (from C Company and B Company); These were attached to the 35th Engineer Group, 589th Engineer Battalion (Construction) at Landing Zone Last Chance below Phan Rang. This detachment is expected to last until 15 January 1971.

The Battalion also received orders to move to Da Nang. The first increment, B Company and the 536th Engineer Detachment, moved to Da Nang on 18 October 1970. The rest of the Battalion was to follow in November. However, other urgent requirements in the form of repair of damage caused by flood producing rains in late October have delayed the expected move.

Additionally, Company D will move south to Khan Dong on L-21 for approximately 2 months where it will be under operational control of a newly activated task force.

With personnel and equipment spread from below Phan Rang about 400 miles up the coast to Qui Nhon and Da Nang there are sufficient challenges to task every member of the Battalion. "Never Daunted", we shall yet reassemble.

## b. Unit Operations:

(1) The Bong Son Bridge: The 84th Engineer Battalion recently completed one of the major construction projects in Vietnam, the Bong Son Bridge. This bridge, 1634 feet long, is the longest in Vietnam constructed by the U. S. Army. During this past reporting period the following tasks were accomplished; paved the bridge and approachways, completed sand blasting and painting the stringers and piles, installed six guard towers under the bridge, installed lighting system, and constructed a pier protection system. Accomplishment of the above tasks completed the construction of the bridge.

(2) Revolutionary Development Roads: The 84th Engineer Battalion upgraded Route 505 to link the coastal villages of the Phu My District with QL-1 as part of the 173rd Airborne Brigade's Pacification Program. The road was completed during this period with the construction of a fording site. The ford, requiring 145 cubic yards of concrete, was required because culverts could not carry the necessary volume of stream water during the monsoons. Completion of this road helped open large areas of the Phu My District to resettlement by the Vietnamese Government.

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(3) Major/Minor Repairs of QL-19: The 84th Engineer Battalion was given the mission of repairing QL-19 from it's intersection with QL-1 to the top of the Miang Giang Pass. This 100 kilometer section of road required repair of shoulders and drainage ditches, repair of pot holes and major rebuild of subbase and resurfacing. The following is a summary of the work accomplished on this project:

- (a) 60.4 KM of shoulders were raised to road height, widened to eight feet, and stabilized with MC-70.
- (b) 350 pot holes were repaired.
- (c) 26 culverts were repaired.
- (d) 17.6 KM of roadway was rebuilt using 14864 tons of asphalt. Approximately 50% of this work was accomplished during this reporting period.

(4) Republic of Korea (ROK) Valley Revetment Construction: Four revetments, 13 feet high, had to be constructed around six generators at ROK Valley near Qui Nhon. Salvaged NSA1 matting was used to contain the earth in these revetments. However, this damaged matting created a problem because the configuration of the matting is such that, when emplaced, gaps occur at the joints between the individual pieces and between the tiers. These gaps allowed leakage of the fill. The solution was to weld steel pickets over the joints, thus eliminating the gaps. As of the first of August, 30% of the project was finished; by 29 August the project was complete.

(5) Camp Humber Dog Kennels: Started last quarter, work was finished in this reporting period on a kennel complex that would accommodate 70 dogs. This complex is a self-sufficient unit within Camp Humber, having it's own dispensary, water supply system, sewage lagoon, and kitchen. The building itself was completed with the erection of the interior walls, the roof, and exterior caging. The sewage lagoon was finished and a 5,000 gallon water tank was erected to complete the project. The addition of an exercise yard was approved and this work is presently nearing completion.

(6) Aircraft Maintenance Hangars and Upgrade of 9 Pascoe Buildings: D Co, 84th Engineer Battalion, with the 614th Engineer Detachment (Power Distribution), was tasked to install the interior and exterior electrical facilities for two maintenance hangars and 9 Pascoe Buildings. The following work was accomplished during this quarter to provide the facilities with the proper lighting:

- (a) Installation of 60 high bay lighting fixtures.
- (b) Installation of 132 low bay fixtures.
- (c) Wiring to the new circuits.

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(d) Connection to the central power source of the new circuits.

On 28 October, all the required tasks were completed and the lighting system was put into operation.

(7) Operational Support, Bridge 19-10, 1L-19: This high priority project, initiated in August, required the repair of an important bridge on 1L-19. Bridge 19-10, heavily damaged by a sapper attack, required the replacement of one concrete pier, the repair of a monotube pier, and the placement of 82 feet of superstructure. Initially plans were prepared for the replacement of the monotube pier with a pile bent. However, upon investigation of the site, it was discovered that parts of previously destroyed piers were buried where the two pile bents were to be driven. Two piles for the first pier could be driven down to a depth of only eight feet. To date, the monotube pier has been repaired, the pile pier completed, and all deck slabs have been precast.

(8) Hieu Xuong Well and pump House for MACV Team 28: The objective of this project was to drill a water well and link the well to a water storage tank. By 31 October, the pump house had been prefabricated and the well drilled. Further work on the project is being delayed pending the arrival of a pump and in-line chlorinator.

(9) II CTM MACV Facilities, An Khe District: This project also required the drilling of a well and construction of a pump house to provide potable water to the MACV Team. The 23rd Engineer Detachment (Well Drilling) drilled a well to a depth of 55 feet. A pump house was constructed and the pump was installed by D Co, 84th. Pipe was laid from the pump to the storage tank and the in-line chlorinator was installed. This project was finished on 17 October 1970.

(10) POL Jetty Repair: The Qui Nhon POL Jetty is the only POL discharge facility in the northern II Corps area capable of handling T2-A2 tankers that resupply POL products. The jetty was becoming unsound due to wave action and deterioration. The 84th Engr Bn was tasked to replace structural members as required to insure the jetty would not collapse. Initially, 370 walrus treads were replaced; then work was halted due to a lack of properly sized lumber to do the job. At present the project is 10% complete, and is expected to continue in the next reporting period.

(11) Sea Wall Construction, Qui Nhon: The 84th Engr Bn was given the task of constructing a 300 foot long seawall to prevent the erosion of the shoreline in the vicinity of the Qui Nhon POL Jetty. This was accomplished by driving 205 vibro piles to form the seawall. Fill was then compacted behind it to raise the surrounding bank height to the height of the jetty. This will prevent future erosion from endangering the POL Jetty.



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(12) The Bong Son Railroad Bridge: The 84th Engr Bn, in conjunction with the 299th Engr Bn, was directed to repair a damaged pier on the Bong Son Railroad Bridge. The 84th Engr Bn and 299th Engr Bn constructed a causeway, using 7200 CY of laterite, to allow access to the damaged pier. The 299th Engr Bn built two Bailey piers and raised the bridge off the damaged pier. The damaged pier was then removed by the 84th using demolitions and a new concrete pier was constructed in its place. The new pier, requiring 100 cubic yards of concrete, was constructed in the same configuration as the old pier. The bearing plates and rollers were replaced and the bridge was lowered onto the new pier. The Bailey piers were removed and the 299th began the task of installing wood decking to allow passage of traffic on the bridge.

(13) Dummage Yard Bank Stabilization, Qui Nhon: This project originally called for the capping of 7000 square yards of hardstand with laterite. Upon investigation it was found the yard had been built satisfactorily; but the side next to the sea washed out every year during the heavy monsoon rains. The 84th then stabilized the bank from the dummage yard to the sea, and installed ~~concrete~~ drainage ditches to cut off sheet flow from the yard over the bank, channeling the water directly to the sea.

(14) Wung Chua Mountain Road Repair, Qui Nhon: The 84th Engr Bn was directed to upgrade the road to the signal relay station on Wung Chua Mountain. This is the only road to the site and it must stay open during the monsoon season in order to resupply the personnel on top of the mountain. The work accomplished, included clearing and deepening of the ditches, installing two culverts, and regrading and crowning the entire road. Because of the extremely steep grade of the road safety was major concern.

(15) Port Access Road Upgrade, Qui Nhon: The access road into Qui Nhon Port deteriorated due to surface and subbase failures. The 84th Engr Bn was assigned the task of upgrading this road. This upgrading was accomplished by scarifying and removing the existing surface, scarifying the subbase, recompacting, applying a four inch lift of asphaltic black base and a three inch lift of asphaltic surface course. Drainage ditches were enlarged and stabilized with concrete in order to protect against future damage.

(16) Disassembly of Billboard Antennae, Qui Nhon: Four tropospheric scatter antennae of the 361st Signal Battalion were to be disassembled by specialists of the 1st Signal Brigade. Because of their size, 60' x 65', it was time consuming and dangerous for them to perform the disassembly with the equipment available. The 84th Engineer Battalion provided a 20 ton crane (with 50 foot boom) and the operator to assist in the accomplishment of the project.



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(17) LOC Maintenance and Repair, QL-1, Binh Dinh Province:  
The 84th Engineer Battalion paved three separate sections of QL-1 south of Bong Son during the week of 8 to 15 October 1970. The total length of these sections was 1600 meters. This area was prepared by the 299th Engr Bn and paved by the 84th Engr Bn.

(18) Runway Taxiway, Lane Army Airfield, Qui Nhon: The 84th Engr Bn undertook the construction of eight taxiways to extend the approaches to the north side of the existing CH47 revetments. 750 linear feet of culvert were installed to carry the drainage water under the taxiways. Masonry headwalls were also constructed. Fill was then placed over the culvert and compacted; penconcrete was sprayed over each taxiway to facilitate dust control. Finally MSA1 matting was placed on each taxiway. The project, consisting of 1700 square yards of taxiway, took 17 days to complete.

c. Intelligence and Counterintelligence: During this reporting period enemy activity has been light. There have been 6 scattered incidents reported involving engineers: four convoy ambushes, one work site incident, and one Viet Cong ground attack. In all, one man was killed in action, two received serious wounds, and four received minor injuries. There was one blown culvert and one slightly damaged barracks. One 10 ton tractor was slightly damaged and a 3/4 ton truck was destroyed. Principle sources of intelligence information were the Capitol FOK Infantry Division, 22nd ARVN Division, 173rd Airborne Brigade, 12CV Advisors of Binh Dinh, and the IFFORCEV.

d. Plans and Training: Plans and schedules were drawn up in detail for all projects started in this quarter. This included the preparation of Gantt Charts, Progress Schedule Charts, and Critical Path Charts. Sunday morning Command Information classes included discussions of venereal disease, first aid, drug abuse, weapons familiarization, and maintenance procedures.

e. Personnel Administration, Morale, and Discipline: 114 Enlisted Men were promoted to the next higher grade. The number of voluntary extensions of tours of duty in Vietnam amounted to 67. 47% of the Battalion's personnel are enrolled in the Savings Bond Program. There also were 131 Article 15s and 4 Special Courts Martial.

f. Logistics: During the past quarter, the S-4 section gave the following logistical support to organic companies and attached units of the 84th Engineer Battalion.

(1) Procurement and distribution of Class A rations for 700 personnel daily.

(2) Operation of two water points producing 55,000 gallons of potable water daily.

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(3) Supply of Class II TONE Equipment: An average of 20 equipment requisitions were processed weekly by the Property Book Officer. During the quarter, 50 pieces of TONE and MCA equipment were required.

(4) Supply of Class IV Construction Materials to all units for MCA funded projects. An average of 50 requisitions for construction materials were processed weekly by the S-4 section.

(5) Supply material for the construction of Bridge QL-241, a steel and concrete highway bridge, was accomplished by the S-4 section. This bridge is being built by the 201st ARVN Engr Bn at Tuy Hoa.

g. Civic Action: The emphasis in the 84th Engr Bn has shifted from Civic Action to ARVN Affiliation because of the Vietnamization program. Even with the shift in emphasis, voluntary donations to orphanages and community projects have totaled \$VN 27,740 in this quarter.

h. ARVN Affiliation: A liaison team has been working with the 201st ARVN Engineer Battalion in the construction of Bridge 241 where QL-1 crosses the Son Da Rang River to Tuy Hoa. Originally, the main purpose of this team was to provide technical assistance to the ARVN Engineers in the construction of this 3600 foot bridge. All work is being done by the ARVN Engineers, but problem areas were worked out in cooperation with the team. However, as construction proceeded there was less need for this advisory team. At the present time, the only assistance that the team provides is that of requisitioning the required material in cooperation with our supply section.

The 84th Engineer Battalion has just completed a training program to train equipment operators of the 62nd ARVN Engineer Battalion. This program was begun following initial organizational meetings held with the ARVN Engineers last quarter. The Battalion gave C Co the task of conducting this training. Training was completed for ARVN grader operators and begun for D7-E operators. The classes on dozer operation were suspended when C Co's earth moving platoon was sent to Phan Rang.

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

a. Personnel:

(1) Item: Lack of Key NCO Personnel:

OBSERVATIONS: During the quarter, there continued to be a lack of key NCO supervisory personnel, particularly in the MOS categories 51H and 62N.

EVALUATION: The lack of NCO supervisory personnel, when coupled with the inexperience of most assigned officers creates a difficult leadership situation and a need for more centralized control by supervisors. However, centralized control was actually reduced by the fragmentation of the battalion to many remote areas.

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RECOMMENDATION: Since fragmentation and dispersion of unit resources will undoubtedly continue due to current unalterable policies, a renewed effort to supply experienced NCO supervisors in quantities required by TO&E must be made.

(2) Item: Lack of key maintenance personnel.

OBSERVATION: During the quarter, key maintenance officers were lost, via rotation, and not replaced.

EVALUATION: This lack of key maintenance personnel will seriously affect maintenance capabilities. When coupled with the current reduction in spare parts availability, this factor could seriously affect overall operations of the battalion.

RECOMMENDATION: Immediate action must be taken to secure and provide adequate maintenance officers to this organization.

b. Intelligence: None

c. Operations:

(1) Item: Expedient Stringer Welding Table.

OBSERVATION: During the reconstruction of Bridge 19-10, it was necessary to weld together a small number of stringers. Normally, when welding stringers it is necessary to have a "Stringer Table" which holds the stringers level and even. These tables are difficult and time consuming to construct and it would not be practical to construct one just for a small number of stringers. The problem, then, was to find a way to level the stringers with a minimum of time and effort.

EVALUATION: An attempt was made to weld these stringers on the asphalt surface of the road, but this method was difficult and time consuming due to the fact that the pavement is not even and level. Some other method had to be developed.

RECOMMENDATION: It was found that if one of the stringers was laid on it's side, and used as a table, the webbing could be used as a level surface upon which to work. The stringer to be welded can be blocked up on the webbing and requires very little adjustment.

(2) Item: Damaged MSA1 Matting for Revetments:

OBSERVATION: Engineers are often faced with the problem of using the materials on hand to do the job. A recent problem that faced the 84th Engr Bn was the use of damaged MSA1 matting to build revetments.

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EVALUATION: Since much of the MSA1 matting was damaged, the sections could not be properly joined. This resulted in seams that were not sufficiently tight to prevent the seepage of fill material (sand).

RECOMMENDATION: In order to remedy the situation, steel pickets were welded over all vertical and horizontal seams. In addition, laterite was substituted for sand as the fill material. The change in fill material results in better compaction and less leakage. Before the revetments were filled, sandbags, filled with sand-cement, were placed in areas likely to leak. These sandbags molded themselves to the irregular shape of the matting and acted as an additional sealer.

(3) Item: Bridge Painting:

OBSERVATION: In planning for this task, it was assumed that the stringers would be easy to paint after placement. However, difficulties were experienced in maneuvering the 5 ton dump truck with scaffold and towing the air compressor. The problem was that the working area was too small to permit the truck the ability to maneuver.

EVALUATION: There had to be a better way of painting bridge stringers.

RECOMMENDATION: Paint the stringers and piers after they are spliced, but prior to their placement on the bridge.

(4) Item: Zorbis Piling Alignment.

OBSERVATION: Problems arose in keeping the pile plumb while driving, due to the unbalanced forces between the free and interlocking sides of the 2-38 Zorbis Pile. Moreover, it was difficult to keep the sheet pile going in the surveyed direction horizontally without some type of constraint.

EVALUATION: For the vertical direction, the first pile was driven plumb because this unbalanced force did not exist. As successive piles were driven, they began to lean away from the wall. Piles could not be driven in multiple interlocking sheets to balance this force because the leads and the 7500 foot pound hammer would not fit between the pile sections. For the horizontal alignment, a template had to be made to guide the sheet pile, as the interlocking joint allowed the piles to rotate approximately 8 degrees.

RECOMMENDATION: For the vertical alignment, a winch cable had to be placed on the pile to balance the friction force. A flat section of Zorbis Pile was cut so a clevis could be attached to it, in order to act as an adapter-connection plate between the pile being driven and the cable attached to a bulldozer winch. This adapter plate insured even tension on the plate being driven. At first, a winch from a 5 ton dump truck was



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used for this purpose, but proved to be too light to constrain the pile. It was found that either a dozer chain or a winch from a 10 ton tractor was sufficient to hold the pile in the desired vertical alignment. Horizontal alignment; two pieces of 15 inch channel iron properly braced and secured made a sturdy template. A pile is partially driven along the surveyed course to secure one end of the channel and the other end was secured to the pile already driven. A steel yoke was placed close to the pile being driven to keep the channel from bowing in the middle. The pile was driven along this template until the end secured by the partially driven pile was reached. This guide pile was then moved and the process was repeated.

(5) Item: Liquid asphalt Dedrugging Vat:

OBSERVATION: The loss of the standard 2500 gallon kettle used for dedrugging MC-70 and other forms of liquid created the need for an expedient dedrugging facility.

EVALUATION: A suitable vat of large capacity was needed to replace the kettle:

RECOMMENDATION: A retrograde 5,000 gallon tanker with the top cut out and a rebar grate placed over this cut for support, can serve as an excellent vat in which liquid asphalt can be dedrugged.

(6) Item: Gradall Type Equipment:

OBSERVATION: During the development of road drainage ditches in mountain pass areas and even soggy rolling terrain, normal TO&E equipment such as graders, dozers, and scoop loaders were inefficient and sometimes ineffective. The problem is to find a piece of equipment that can do the job better.

EVALUATION: A piece of equipment is required that is versatile enough to dig, scoop, and ditch from many angles. The equipment must often have the ability to stand off from it's work due to terrain requirements of soft adjacent areas.

RECOMMENDATION: It was found that a gradall was an effective piece of equipment for the job. The gradall used was an MCA item of equipment authorized for Line of Communications work. It was effective in mountain passes and soggy rolling terrain. It performed drainage jobs that other TO&E equipment simply could not handle. Since drainage is key to engineer work, it is recommended that two gradalls be added to the TO&E of an Engineer construction battalion (in the equipment section of A Company).

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(Construction), for the period ending 31 Oct 1970 MCS CSFOR-65

(7) Item: Self-propelled compaction equipment:

OBSERVATION: Many of the missions assigned engineer battalions involve horizontal effort. In underdeveloped areas where the Army has recently been, and will most likely continue operating, line of communications upgrade and extension are of the highest importance. Compaction of earth material is a key step in this work. The Army's current stock of towed rollers is an archaic answer to compaction. Towed rollers are inefficient, particularly due to need for turn around room. In underdeveloped areas, road widths are often such that special turn around areas must be constructed. Also compaction in restricted areas cannot often be performed due to the extra space required by the towing vehicle.

EVALUATION: A self propelled compactor that can move forwards and backwards eliminating the need for turn around would solve the problem. This compactor could also be effective in restricted areas.

RECOMMENDATION: Off-the-shelf models of civilian compactors, pneumatic, segmented, and vibratory, be added to the TO&E of an engineer construction battalion.

*Melvin D. Jones*

MELVIN D. JONES  
LTC, CE  
Commanding

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31 OCTOBER 1970

ASSIGNED AND ATTACHED UNITS OF THE 84TH ENGINEER BATTALION (CONSTRUCTION)

1. Headquarters and Headquarters Company, APO 96238
2. Company A, APO 96226
3. Company B, APO 96381
4. Company C, APO 96238
5. Company D, APO 96294
6. 536th Engr Det (PC), APO 96241

Inclosure #1

(12)

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DDO-009 (31 Oct 70) 1st Ind

SUBJECT: Operational Report - Lessons Learned, 84th Engineer Battalion (Const), for the period ending 31 October 1970 RCS CSFOR-65

PA Headquarters, 937th Engineer Group (Combat), APO 96226, 23 November 70

TO: Assistant Chief of Staff for Force Development, Department of the Army (ACSFOR-DA), Washington, D.C. 20310  
Major General, 18th Engineer Brigade, ATTN: AVBC-CG APO 96226

1. The Operational Report - Lessons Learned from the 84th Engineer Battalion (Const) is forwarded IAW 18th Engineer Brigade Regulation 18-1. Reporting period 1 August through 31 October 1970.
2. This headquarters has reviewed paragraph 1, Operations: Significant Activities and considers it to be an accurate account of 84th Engineer Battalion (Const) activities for the reporting period.
3. This headquarters concurs with all recommendations in paragraph 2.
4. The contents of this indorsement have been brought to the attention of the 84th Engineer Battalion (Const).

*William J. Schuder*  
WILLIAM J. SCHUDER  
COL, CE  
Commanding

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GPOP-DT (31 Oct 70) 5th Ind

SUBJECT: Operational Report of HQ, 84th Engineer Battalion (Const) for  
Period Ending 31 October 1970, RCS CSFOR-65 (R2)

HQ, US Army, Pacific, APO San Francisco 96558

5 MAR 1971

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

30.6 This headquarters concurs in subject report as indorsed with the  
following comment: Reference paragraph 2c(6), page 10 and paragraph 2c(7),  
page 11: These items of equipment have been included in the recommenda-  
tions made by the CDC Engineer Agency for commercial construction equip-  
ment to be used in engineer construction battalions.

FOR THE COMMANDER IN CHIEF:



D.D. CLINE

1LT, AGC

Asst AG

Cy furn:  
CG USARV

AVHDO-DO (31 Oct 70) 4th Ind

SUBJECT: Operational Report-Lessons Learned, 84th Engineer Battalion  
(Construction), for the period ending 31 Oct 70 RCS CSFOR-65

Headquarters, United States Army Vietnam, APO San Francisco 96375 18 FEB 1971

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

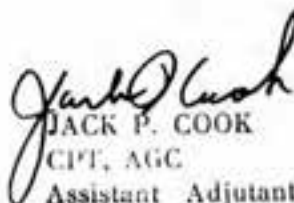
1. This Headquarters has reviewed the Operational Report-Lessons Learned for the quarterly period ending 31 October 1970 from Headquarters, 84th Engineer Battalion and comments of indorsing headquarters.

2. Comments follow:

10-12  
10-03 a. Reference item concerning "Item: Lack of Key NCO Personnel," page 7, paragraph 2a(1). The 84th Engineer Battalion falls under the 18th Engineer Brigade for requisition and assignment of senior enlisted personnel. The 18th Engineer Brigade currently has on requisition sufficient personnel to cover current and future losses in MOSC 51H and 62N. No action by USARPAC is recommended. Action is required by DA to ensure fill of senior enlisted personnel requisitioned. Unit has been so advised.

b. Reference item concerning "Item: Lack of key maintenance personnel," page 8, paragraph 2a(2). The 84th Engineer Battalion receives officer replacements from the 18th Engineer Brigade. In January 1971, the 18th Engineer Brigade was at 107 percent of authorized strength in commissioned officers and at 98 percent of authorized strength in maintenance warrant officers. This Headquarters will continue to assign officer replacements to cover losses in the 18th Engineer Brigade. No action by USARPAC is recommended. Action is required by DA to ensure fill of warrant officers requisitioned in MOSC 631A and 632A. Unit has been so advised.

FOR THE COMMANDER:

  
JACK P. COOK  
CPT, AGC  
Assistant Adjutant General

Cy furn:  
USAECV  
84th Engr Bn

DEPARTMENT OF THE ARMY  
Headquarters, 18th Engineer Brigade  
APO San Francisco 96377

GENERAL ORDERS  
NUMBER 93  
EXTRACT

1 February 1971

1. TO 015. Following organization/unit ATTACHED/RELIEVED FROM ATTACHED as indicated.

D Company 299th Engineer Battalion (WMOFDO-AA) APO 96226

Relieved from attached: NA  
Attached to: 35th Engineer Group (WOWLA) APO 96312  
Purpose: NA  
Will proceed date: 1 February 1971  
Effective date: 1 February 1971  
Period: Indef  
Accounting classification: NA  
Authority: VOGG  
Special Instructions: Unit attached for all purposes

C Company 589th Engineer Battalion (WDFLCO-A) APO 96321

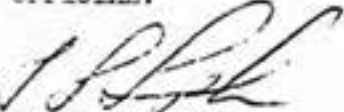
Relieved from attached: NA  
Attached to: Task Force Sierra (P) APO 96297  
Purpose: NA  
Will proceed date: 1 February 1971  
Effective date: 1 February 1971  
Period: Through 20 March 1971  
Accounting classification: NA  
Authority: VOGG  
Special Instructions: Unit attached for all purposes

D Company 34th Engineer Battalion (WELFDO-A) APO 96297

Relieved from attached: Task Force Sierra (P) APO 96297  
Attached to: 589th Engineer Battalion (WDFLMA) APO 96321  
Purpose: NA  
Will proceed date: 1 February 1971  
Effective date: 1 February 1971  
Period: Indef  
Accounting classification: NA  
Authority: VOGG  
Special Instructions: Unit attached for all purposes

FOR THE COMMANDER:

OFFICIAL:



F. L. LEPHERE  
CIB, USA  
Asst Adjutant General

R. C. BALDWIN  
Major, AGC  
Adjutant General



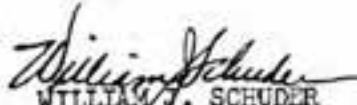
EGC-OP (31 Oct 70) 1st Ind

SUBJECT: Operational Report - Lessons Learned, 84th Engineer Battalion  
(Const), for the period ending 31 October 1970 RCS CSFOR-65

DA, Headquarters, 937th Engineer Group (Combat), APO 96226, 23 November  
1970

TO: Assistant Chief of Staff for Force Development, Department of the  
Army (ACSFOR-DA), Washington, D.C. 20310  
Commanding General, 18th Engineer Brigade, ATTN: AVBC-CG APO  
96377

1. The Operational Report - Lessons Learned from the 84th Engineer Battalion (Const) is forwarded IAW 18th Engineer Brigade Regulation 525-15. Reporting period 1 August through 31 October 1970.
2. This headquarters has reviewed paragraph 1, Operations: Significant Activities and considers it to be an accurate account of 84th Engineer Battalion (Const) activities for the reporting period.
3. This headquarters concurs with all recommendations in paragraph 2.
4. The contents of this indorsement have been brought to the attention of the 84th Engineer Battalion (Const).

  
WILLIAM J. SCHUDER  
COL, CE  
Commanding





AVBC-OS (31 October 1970) 2nd Ind  
SUBJECT: Operational Report - Lessons Learned, 84th Engineer Battalion  
(Construction), Period Ending 31 October 1970, RCS CSFOR-65 (R2)

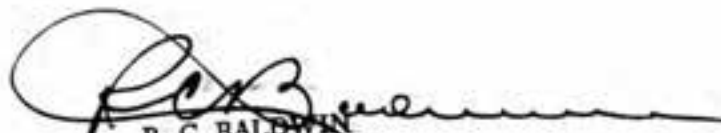
DA, HEADQUARTERS, 18TH ENGINEER BRIGADE, APO 96377 12 December 1970

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

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

2. This headquarters concurs with the observations and recommendations of the Battalion and Group Commanders.

FOR THE COMMANDER:

  
R. C. BALDWIN  
Major, AGC  
Adjutant General

CF:

- 1 - CO, 937th Engr Gp
- 1 - CO, 84th Engr Bn

AVCC-MO (31 Oct 70) 3rd Ind

SUBJECT: Operational Reports - Lessons Learned for the 84th Engineer  
Battalion, Period Ending 31 October 1970, RCS CSFOR-65 (R2)

03 JAN 1971

Headquarters, United States Army Engineer Command Vietnam, APO 96491

TO: Commanding General, United States Army Vietnam, ATTN: AVHDO-DO,  
APO 96375

- 50-06
1. The significant activities and lessons learned have been reviewed and are an adequate reflection of the unit's operations during this period.
  - 2.. Reference item concerning "Gradall Type Equipment", page 10, para 2c(6), and "Self Propelled Compaction Equipment", page 11, para 2c(7). Concur. This type of equipment would greatly enhance the capability of Engineer Construction Battalions engaged in any type of horizontal construction. Recommend approval by USARPAC and DA and that DA take action required to include items in TO&E.

FOR THE COMMANDER:



R. P. SPENCER JR.  
1LT, CE  
Assistant Adjutant

CF:  
CG, 18th Engineer Brigade  
CO, 84th Engineer Battalion

~~TOP SECRET~~ **USE ONLY**

DEPARTMENT OF THE ARMY  
HEADQUARTERS, 84TH ENGINEER BATTALION (CONSTRUCTION)  
APO SAN FRANCISCO 96349

EGD-BD-CP

16 May 1971

SUBJECT: Operational Report - Lessons Learned, 84th Engineer Battalion  
(Construction) APO San Francisco 96349

Period Ending 30 April 1971, RCS CSFOR - 65 (r3)

THRU: COMMANDING OFFICER  
45TH Engineer Group (Construction)  
APO San Francisco 96317

COMMANDING GENERAL  
United States Army Engineer Command, Vietnam  
ATTN: AVCC-MO  
APO San Francisco 96375

COMMANDING GENERAL  
United States Army Vietnam  
ATTN: AVDO-DO  
APO San Francisco 96375

COMMANDER IN CHIEF  
United States Army, Pacific  
ATTN: GPCP-DT  
APO San Francisco 96558

TO: ASSISTANT CHIEF OF STAFF FOR FORCE DEVELOPMENT  
Department of the Army (ACSFOR-DA)  
Washington, D.C. 20310

60-50-009

For OT UT  
71117



3/D-7D-OP

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SUBJECT: Operational Report - Lessons Learned, 64th Engineer Battalion  
(Construction) APO San Francisco 96349

# 1. Operations

## A. Command:

(1) The 64th Engineer Battalion (Construction) underwent a series of attachments, detachments, and unit exchanges during the reporting period. The assigned and attached units at the end of the reporting period are listed in inclosure 1. At the beginning of the reporting period the 64th Engineer Battalion (Construction) was assigned to the 937th Engineer Group (Combat) and had its normal TO&E companies plus the 536th Engineer Detachment (Port Construction) and the 23d Engineer Detachment (Well Drilling). The battalion and all of its units were located in Military Region 1 and Military Region 2, Republic of Vietnam. The Headquarters and Headquarters Company, and C Company were located in the city of Qui Nhon; A Company was located in Phu Tai near Qui Nhon. B Company and the 536th Port Construction Detachment were located in Da Nang, D Company was located near An Khe. The Earth Moving platoons of B and C Companies were attached to the 589th Engineer Battalion and were located near Phong Rang.

(2) On 30 November 1970 the battalion placed Company D, under the operational control of Task Force Sierra for what was planned to be a two month period to work on QL 21 near Khanh Ducng.

(3) On 15 November 1970 B Company and the 536th Engineer Detachment (PC) located in Da Nang were attached to the 45th Engineer Group (Construction). During the period 1 - 9 January 1971 the Headquarters and Headquarters Company, and A Company moved from Qui Nhon to Da Nang. The Battalion was detached from the 937th Engineer Group (Combat) and attached to the 45th Engineer Group (Construction) on 1 January 1971. At the same time the battalion resumed control of Company B, and the 536th Engineer Detachment (PC). Company C, moved to Da Nang on 17 January 1971. At the end of the two month period which Company D, was to be assigned to Task Force Sierra, the continued requirement for a Company still existed in Task Force Sierra. As a result, on February 1st, 1971 a retrograde unit, Company C, 589th Engineer Battalion (Construction), was redesignated Company D, 64th Engineer Battalion (Construction) by 18th Engineer Brigade General Order Number 93. The newly designated Company D moved to Phu Bai by land and sea completing the move on 25 February 1971.

(4) The 23d Engineer Detachment (Well Drilling) was detached from the Battalion before its departure from Qui Nhon. In February 1971 a large Military Region 1 water development program for MACV advisor sites was assigned to the Battalion. Four well drilling detachments, (40th, 49th, 171st, and 917th Engineer Detachments) were assigned to the battalion for the purpose of accomplishing the program. Thus at the end of the reporting period the Battalion was located entirely in Military Region 1, Republic of Vietnam. The Headquarters and Headquarters Company, A Company, B Company, C Company, the 536th Engineer Detachment Port Construction and the 40th, 49th, 171st and 917th Engineer Detachments (Well Drilling) were located in Camp Hoa Long, East Da Nang. Company D was located at Camp Hochmuth, Phu Bai, Republic of Vietnam. In addition, preparations were

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EGD-BD-OF

SUBJECT: Operational Report - Lessons Learned, 84th Engineer Battalion  
(Construction) APO 96349

being made for the Battalion to operate the Phu Lon Quarry and assume operational control of the quarry sections of the 591st and 630th Engineer Light Equipment Companies.

b. Significant Activities:

(1) QL1 Bridge #385: Work continued into this reporting period on Bridge QL1-385 (Bong Son Bridge). Final work on handrails, painting of the steel substructure and repair of flood damage caused by typhoon Kate, in late October of 1970, caused work to continue until 10 January 1971.

(2) QL19 Bridge #10: Company C was tasked with completing the rebuilding of section of bridge 19-10 which had been destroyed by sappers. Ten 30WF8 stringers and 52 pre-casted deck slabs were placed, curbing and handrails were erected, and 4" of asphalt was applied to the roadway. The project was started during the previous reporting period and completed on 15 January 1971.

(3) Repair of flood damage to QL1: Company C was tasked with shoulder repair on QL1 from the intersection of QL1 and QL19 to Bridge #329. The shoulders were upgraded to road height and widened to eight feet. In addition to shoulder repair, two bridges on QL1 were repaired. The deck on bridge #317 had failed in three places. The existing asphalt and concrete were cut away, the reinforcement bar was replaced, the holes were formed and an eight inch thickness of concrete was poured to replace the deteriorated sections. The wing wall on the south end of bridge #329 had failed allowing erosion around the bridge abutment. The eroded area was filled and the wing wall was repaired. The project was started on 2 November 1970 and completed on 11 January 1971.

(4) Qui Nhon POL Jetty Repair: Company C continued to work on the repair of the Qui Nhon POL Jetty, a project started on 1 September 1970. During the reporting period three hundred seventy walkway treads were replaced, and horizontal bracing was reconstructed. Company C was not able to complete the entire project due to the impending move to Military Region I. Cross bracing was prefabricated and on 8 February 1971, the project was transferred to the 299th Engineer Battalion.

(5) QL1 Construction: The earthmoving platoons of Company B and C were detached to the Phan Rang area to work with the 589th Engineer Battalion. The Earthmoving platoons constructed several miles of elevated roadway. The roadway was so constructed that the final elevation was 11 feet above the surrounding rice paddies, the base of the roadway was 80' wide and the travelled way and the shoulders were 39 feet wide. The project was started on 26 September 1970 and was finished on 10 January 1971.

(6) Vung Chua Mountain Road: Company C began making repairs to the Vung Chua Mountain Road on 5 December 1970. The project consisted of restoring original grade and bearing capacity to the road where torrential rains had caused large washouts. The project was completed on 23 December 1970.



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(7) Movement to Da Nang: During the months of December, January, and February, considerable time and effort were expended on moving portions of the Battalion from Military Region II to Military Region I. Company A began the preparations for the move on 27 December 1970 and completed the move on 5 January 1971. The Headquarters and Headquarters Company began preparations on 1 January 1971 and completed the move on 9 January 1971. Company C began preparations on 14 January 1971 and completed the move on 17 January 1971. Company D began preparations on 5 February 1971 and completed the move on 25 February 1971.

(8) Support of Task Force Sierra: On 30 November 1970, Company D was placed under the operational control of Task Force Sierra for the purpose of completing the upgrading of QL21. The support continued until 1 February 1971 when the company was redesignated as Company C of the 589th Engineer Battalion. At the same time, the former C Company of the 589th Engineer Battalion was redesignated as Company D of the 84th Engineer Battalion and the newly designated unit commenced movement from Song Pha and Phan Rang to Phu Bai to complete the Battalion TO&E.

(9) Renovation of Camp Hoa Long: Since arriving at Camp Hoa Long, Da Nang, RVN, the battalion barracks have been repaired, rescreened and repainted. Personnel bunkers have been rebuilt and ammo bunkers have been constructed. Existing shower and latrine facilities have been improved and new facilities have been constructed. Fire barrels have been prepared and placed in the company areas. Company bulletin boards have been constructed and new gun racks have been built. A four bay maintenance building was built along with a 400,000 square foot motor park. In addition, work is continuing on Battalion TOC renovation, P.V. repair, messhall improvements, shower facilities, and Orderly Rooms remodeled.

(10) 45th Group Helipad: On 14 December 1970, B Company started construction of the 45th Engineer Group Heliport. A 300' x 200' area was graded and sprayed with surface treatment asphalt. Within this area a 180' x 180' area was covered with M8A1 matting. From this area a 100' x 22' running way was constructed with M8A1 matting. One culvert, 30' long, was placed under the runway to enhance drainage in the area. To protect the parked helicopters, A-frame revetments were built with M8A1 matting: two large stalls for UH-1, and five for HO-58 helicopters. The project was completed on 8 February 1971.

(11) 95th Evacuation Hospital Security Fence: Company B began work on this project on 5 January 1971. The project consisted of improving the existing fence at the hospital. Fifteen hundred feet of new barb wire fence was installed and 49 rolls of old concertina wire was removed. 254 rolls of new concertina were used in the project. The project was completed on 13 March 1971.

(12) BNQ Renovation, Camp Horn, Da Nang: A crash project to provide billets for Red Cross and Special Services women in the Da Nang area was started by Company B on 16 December 1970. The project required that a tropical male BOQ be remodeled to make it suitable for female occupancy. The interior of the building had to be removed, leaving only the plumbing and the wiring. A lounge, twenty-four separate living quarters and separate shower facilities were then constructed. Each room was painted and rewired for fluorescent fixtures. The rooms were ready for occupancy on 17 January 1971.

(13) Da Nang Deep Water Pier Repair: The 536th Engineer Detachment (Port Construction) began repairing the Da Nang Deep Water Pier on 20 December 1970. The job consisted of repairing damages to fenders, decking and sub-structure. The damage was caused by normal wear, Typhoon Kate, and ship and tug operators' errors. As of the end of the reporting period the project is 60% complete but it has proven to be an almost continuous job due to recurrent damage to repaired areas.

(14) POL Ship Caissons: The 536th Engineer Detachment (port Construction) constructed five caissons for use as buffers between POL ships in Da Nang Bay. Construction consisted of rectangular layers of 12 x 12 timber, cross-braced with 6 x 12 timber between each layer. The project was completed on 22 March 1971.

(15) 37th Signal Battalion Revetment Removal: On 10 February 1971, Company A began a two day project to remove collapsed and deteriorated bunkers and revetment from the 37th Signal Battalion area on Da Nang Air Base.

(16) Construction of ML 130: On 1 February 1971, the earthmoving platoons of B and C Companies began the major task of constructing a 130M road from south of Marble Mountain to Hoi An. The road, which was 55% complete at the end of the reporting period, is a 4 meter wide (1 meter shoulders) sand-cement based road, with a double surface treatment. There are 13 Drainage structures on the low profile road. The cement ratio used is 15% by weight which yields more than the minimum design strength of 250 PSI.

(17) Guard Towers: Construction of guard towers at Camp Hoa Long, Camp Horn, Camp Carter, 92 Composite Service Battalion Compound, 37th Signal Battalion Compound, and MACV Advisor Compounds, all located in Da Nang, were accomplished by all companies within the battalion throughout the time the battalion has been in Da Nang.

(18) Northern Artillery Contonment Firing Area Rehabilitation: On 9 February 1971, Company C began a project to rehabilitate the firing positions at Northern Artillery Contonment, Da Nang. The project was scheduled to include rebuilding the protective berms, firing platforms, and ammunition storage bunkers. However, after rehabilitation of the berms and one pad, the artillery unit stationed at the Contonment departed and the project was cancelled on 22 April 1971.

(19) Retrograde Wash Ramps, Tien Sha Peninsula, Da Nang: Company B was tasked to build one class 60' wash rack to facilitate the normal retrograde vehicle processing in Military Region I. The First Construction Platoon spent one month from 23 February 1971 to 26 March 1971 working on the project. The wash ramp has a 40' long midsection with two 25' approach ramps; the midsection was designed to accommodate two 2' Ton trucks simultaneously. The basic construction material, 12 x 12 timbers, were used on the stringers, columns, caps, and diaphragms. The decking is 12" x 12" on edge with 12" x 2" treadway. Four stairways, one at each corner, provide easy access to the midsection walkway.

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(20) Deep Water Pier Warehouse: The winds from Typhoon Kate collapsed a large 200' x 600' warehouse at the Deep Water Pier Warehouse in Da Nang during late October 1970. The restoration of this important facility was accomplished in two phases by Company B. The first phase consisted of removal of the damaged section of the old warehouse. On 4 March 1971, Company B began phase 2 which consisted of building three adjoining pre-fabricated metal warehouses (each 40' x 98' x 8') on the site of the old warehouse. The project was completed on 8 May 1971, two weeks ahead of schedule.

(21) Preparation for Construction of Highway HL 537: The battalion has been tasked to construct a 14 KM length of HL 537 to connect the district headquarters of Duc Duc to QL1. Although the projected construction start date is after the end of the reporting period, preliminary activities occurred during the reporting period. A combined S-3/Company C reconnaissance and survey was conducted from 19 March 1971 to 22 March 1971. During the period 20 February 1971 to 6 March 1971 a C Company contingent was at Duc Duc preparing a billeting area for the anticipated arrival of the remainder of the company. The contingent was withdrawn to await finalization of the concept of the construction support activities. Several days after the C Company element returned to Da Nang, the town of Duc Duc was overrun, to include the area of the proposed C Company Camp. Plans call for re-entry into the area, during the summer of 1971, to begin the construction of HL 537.

(22) Marble Mountain Airfield Repairs: Company A and C Company had several repair jobs underway at Marble Mountain Airfield. The projects developed after the USMC transferred responsibility for the airfield to the US Army. At the end of the reporting period dust palliative was being applied along a 1000 linear feet of taxiway, loose setting was being staked down, and a communications van hardstand was being prepared.

(23) Support of Operation Lam Son 719: During the period 15 February 1971 to 8 March 1971 the equipment platoon of A Company supported the allied movement into Laos with a commitment of eight 5 ton dump trucks. The vehicles were used extensively to haul materials to the forward support areas, covering a total of 25,000 miles without an accident.

(24) Military Region I Well Drilling Program: In early February 1971, responsibility was given to the 84th Engineer Battalion for completing 25 water systems throughout Military Region I. Four well drilling detachments were assigned to the Battalion during March. The 49th Engineer Detachment (Well Drilling) was assigned on 1 March 1971 and completed a well at Hawk Hill and was drilling at Tre Bong at the end of the reporting period. The 40th Engineer Detachment (Well Drilling) was assigned on 15 March 1971 and commenced drilling at LZ Dragon on 26 March 1971. The 17th Engineer Detachment (Well Drilling) was assigned on 1 April 1971 and began drilling at Hieu Duc on 10 April 1971. The 917th Engineer Detachment (Well Drilling) was assigned on 1 March 1971 without personnel or equipment and did not reach operational status during the reporting period.



(25) Anchor Buoy Construction: During the period 12-19 March 1971, the 536th Engineer Detachment (Port Construction) constructed a buoy for use in the Cua Viet River near Dong Ha. The buoy was used as an anchor point for rock barges being hauled from Da Nang.

(26) Helicopter Refuel Pad, Phu Bai: On 15 March 1971, Company D began construction of a large 12 point helicopter refuel pad. The project consisted of placing approximately 12,000 CY of fill to develop a 210,000 SF hardstand, treating with penepreme, and constructing 6800 SF of M8A1 matting helicopter pads. At the end of the reporting period, the project was 90% complete.

(27) XXIV Corps TCC Revetments: Company B began rehabilitation of the revetments around the XXIV Corps TCC on 16 March 1971. The project included repairing, reinforcing, and replacing as necessary the walers, studs, and sheathing. At the end of the reporting period the project was 90% complete.

(28) ML1A Bridge, Da Nang: On 30 March 1971, Company B began to construct a ramp for the bypass bridge around the construction site for the new ML1A bridge. The bridge calls for a class 60, concrete and steel, two-lane bridge. The bridge is to have two 20FT spans, a common center pier, and precast concrete decking. By the end of the reporting period, the by-pass had been finished and the decking on the old bridge removed. The estimated date of completion for the project is 15 July 1971.

(29) Task Force I MACV Advisor Facilities: On 1 April 1971 Company C began initial land excavation for construction of a 70 man MACV cantonment. The project was delayed by a temporary hold placed on construction by the user until it was determined that the proposed construction site was the final location of the ARVN Task Force I. At the end of the reporting period, plans were underway to resume construction.

(30) Camp Horn Trailer Park Perimeter Wall and Fence: Company B began work on 1 April 1971 on constructing a perimeter fence around a newly constructed trailer park adjacent to Camp Horn, Da Nang. To accomplish the mission, 400 feet of old chain link fence was removed, and a 7,000 SF area was graded. Three hundred feet of new fence was erected. To accommodate the new fence two buildings and one generator had to be removed. At the end of the reporting period the project was approximately 50% complete and was held up awaiting the arrival of the trailer houses. Once they arrive and are connected by the utilities contractor, a masonry wall will be built around the perimeter.

(31) 138th Aviation Aircraft Parking Facility, Phu Bai: Company D began initial earthwork on preparing and aircraft parking area for 9 U-2 aircraft on 21 April 1971. The project consisted of removing 2000 cubic yards of unsuitable soil, placing and compacting 2000 cubic yards of select fill, treating the area with penepreme, placing 55,000 SF of M8A1 matting and constructing 900 LF of aircraft revetments. At the end of the reporting period the unsuitable material was being removed and the project was 10% complete.

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(32) XXIV Corps Helipad, Camp Horn, Da Nang: Construction began on 23 February 1971 on a concrete helipad 20 FT by 30 FT by 8 IN. The B Company project also included new markings on the existing pads. Construction was completed on 26 February 1971. The company again did an outstanding job in meeting a tight schedule. Time constraints were placed on the project since the helipad could be closed to helicopter operations for only a few days.

(33) Underwater Diver Support The diving section of the 536th Engineer Detachment (Port Construction) has the only diving capability in MRI. As a result, they are frequently called upon to retrieve drowned personnel, unfoul ship rudders and propellers, attach lines to sunken vehicles, and repair underwater POL lines, etc.

(34) Phu Loc Quarry: At the end of the reporting period, preparations were underway for the 84th Engineer Battalion (Construction) to assume responsibility for the operation of the Phu Loc Quarry. A 225 Ton Per Hour Crushing and Screening Plant is to be added to the two 75 TPH units already on site. The 84th Engineer Battalion will assume operational control of the quarry sections of the 591st and 630th Engineer Light Equipment Companies.

(35) Pachyderm Helipad Repairs, Phu Bai: On 12 April 1971, Company D began rehabilitation of the 159th Aviation Battalion (Pachyderm) helipad. The project consists of removing 227,00 SF of deteriorated M&A matting, removing 8500 CY of unsuitable soil, placing 8500 CY of select fill, treating the area with penepreme, and placing 169,000 SF of M&A matting. At the end of the reporting period, the project was 10% complete.

(36) 11th Combat Group Bunker: On 12 April 1971, Company G began modification of an existing bunker for use by the newly arrived 11 CAG. The 70 FT by 25 FT bunker was modified for use as a operational TOC. The main support columns were replaced with columns of greater length. The existing caps were of insufficient strength and were replaced with 10 IN by 12 IN caps. Stringers were installed and a double deck roof laid. The bunker was inclosed with provisions for four air conditioners. The project was completed on 23 April 1971.

(37) Keystone Retrograde Facility: As the reporting period ended, Company G was constructing the first phase of a three phase Keystone Retrograde Complex in East Da Nang. Classification areas, vehicle wash areas, and storage areas are to be included in the project which is to have Phase III completed by 1 July 1971.

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c. Intelligence and Counterintelligence: During the reporting period enemy activity has been generally light. No direct ground attacks have been directed against the 84th Engineer Battalion. However, several indirect fire attacks in the vicinity of the battalion base camps and numerous mine incidents have confirmed the nearby presence of the enemy. Two men were medically evacuated on 23 February 1971 for injuries received when a mine exploded under their truck on Route 130. Repeated mine incidents along this road construction project destroyed a 5 Ton dump Truck and damaged a wrecker on 25 February 1971 and damaged a D-7 Dozer and destroyed a motor grader, both on 9 March 1971. In addition, a 10 Ton Tractor and 25 Ton lorry were destroyed on 5 March 1971 while traveling on HL 540 between Liberty Bridge and Duc Duc. Principle sources of intelligence and information were the 1st Marine Division, the ROK Marine Brigade, and MACV Advisors for Quang Nam Province and ARVN Task Force I.

d. Plans and training: Project management plans and schedules were published for all major projects undertaken during the reporting period. The most widely used technique is the project progress chart which makes use of a projected versus actual progress "s" curves. Formal training was largely accomplished on Sunday mornings and included discussions on drug abuse, first aid, venereal disease, weapons familiarization, and maintenance procedures.

e. Personnel Administration, Morale, and Discipline: During the six months of the report 287 men were promoted to the next higher grade. The number of voluntary extensions of tours of duty in Vietnam was 56. Battalion participation in the US Savings Bond Program totalled 56%. There were 149 Article 15's and 16 Special Courts Martial.

f. Logistics: During the past six months the S-4 Section gave the following logistical support to the organic companies and attached units of the 84th Engineer Battalion:

(1) Procurement and distribution of Class A rations for 750 personnel, daily.

(2) Operation of 1 water point to produce 20,000 gallons of potable water daily.

(3) Acquisition of TO&E Equipment: An average of 5 equipment requisitions were processed weekly by the Property Book Officer.

(4) Supply of Class IV Construction Materials: During the reporting period, an average of 40 requisitions for construction materials were processed every week by the S-4 Section.

(5) Acquisition of cement for sand-cement treatment of the base of HL130. Treatment of in-place sand along route 130 with cement created a demand for 120,000 bags of cement over a three month period, a portion of which occurs after the reporting period. Considerable supply effort was expended on requisitioning, picking up and transporting the cement.

g. Civic action: Because of the move from BRII to BRI during the reporting period, all previous civic action contacts were lost. The built up nature of the Da Nang area and US Troop concentration does not show the ready need for civic action work that is more apparent in rural sections.

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h. ARVN Affiliation: The movement from MR II to IRI also dissolved previous RVN Affiliations. At the end of the reporting period the battalion was taking steps to get the 81st RVN Engineer Battalion (Construction) designated as an affiliation battalion.

2. LESSONS LEARNED: Commander's Comments, Observations, Evaluations and Recommendations

a. Personnel: None

b. Intelligence: None

c. Operations:

(1) Item: Repairing concrete bridge deck.

(a) OBSERVATION: Holes in concrete bridge deck are difficult to repair in such a manner as to retain the original strength.

(b) EVALUATION: A method was needed to expedite the form work, to provide an easy method of support from the underside of the bridge. The original reinforcing is often weakened and must be replaced.

(c) RECOMMENDATIONS: The first step was to widen the existing hole to expose the undamaged reinforcing bar. New re-bar was spliced across the damaged space. The weld length on the splice must be 5 times the diameter of the re-bar. Next, bolts are welded onto the re-bar such that they hang below the bottom of the bridge deck. Plywood or steel plate can then be bolted into place to complete the forming.

(d) COMMAND ACTION: None

(2) Item: Bunkers Underdesigned.

(a) OBSERVATION: In recent months incidents have occurred where bunkers have been inspected which, according to proper design, should have collapsed under their own weight.

(b) EVALUATION: Bunker failures can be traced to basic weakness in support members, or poor design. Examples of this are apparent in the use of sandbags for supporting members and timber stringers of insufficient strength to support a heavy layer of sandbags and earth.

(c) RECOMMENDATION: That increased emphasis be placed on proper design of bunkers and the design of bunkers and sizing of load carrying members. In addition to this, quality control is essential in the fabrication of bunkers. To assist units, wide dissemination should be made of explicit and detailed designs of various size bunkers which make use of a variety of materials.

(d) COMMAND ACTION: A small booklet should be developed which contains a variety of bunker designs which can be built readily by non-engineers troops using a variety of materials.



(3) Item: Low Strength of Sand Cement

(a) OBSERVATION: While constructing a road using sand cement it was observed that certain sections failed to reach the design strength.

(b) EVALUATION: An investigation revealed the sand being used had a heavy concentration of chemicals which inhibited the sand cement from attaining the design strength. The contaminated sand had been obtained from the bottom of a borrow pit very near the local water table. The water filtering through the upper layer of sand had leached out salt and other compounds which had concentrated near the water table.

(c) RECOMMENDATION: During the earthwork phases of chemically stabilized base roads it is important that the soil being used for final grade be checked for unwanted chemicals and salt deposits. Borrow pit samples should be taken to determine chemical properties of the soil on the final grade.

(d) CORRECTIVE ACTION: None

(4) Item: Reaching the optimum moisture control (OMC) in sand cement.

(a) OBSERVATION: When adding the predetermined volume of compaction and hydration water to a sand cement mixture the preparation becomes saturated and as a result unusable.

(b) EVALUATION: The technique for determining the total water required was to add the percent of moisture required for compaction and the percent required for hydration. After a review of this method it was concluded that the moisture for hydration would be drawn from that used for compacting the mixture.

(c) RECOMMENDATION: When determining the water needed there is no need to add additional moisture for hydration. Experience has shown that the sand cement base course constructed using the lower water content reaches the design strength.

(d) CORRECTIVE ACTION: None

(5) Item: Excavating footers in a fill area.

(a) OBSERVATION: When building guard towers, water towers, etc., the terrain often requires an excavation to place the foundation. After completion of a project excessive settling of the footers may occur.

(b) EVALUATION: When constructing footers which require an excavation the lower levels of soil may lack the bearing capacity the footer requires. This can be especially true when a fill area is excavated.

(c) RECOMMENDATION: Deep excavations should be avoided whenever possible, especially in fill areas. The bearing capacity of the soil at the depth of the proposed footer should be investigated as well as that at the surface level.

(d) COMMAND ACTION: None

(6) Item: Joining Chain Link Fence

(a) OBSERVATION: Fence made from chain link fence often requires splicing when the end of a role is reached or short sections are used.

(b) EVALUATION: An often used splicing method is to cut the fence at the last vertical post reached before the end of the wire. This method wastes the cut off piece. Other useful techniques make use of tie wires to fasten two ends, or make the connection by welding the fence together.

(c) RECOMMENDATION: An extremely simple and by far the most desirable method of splicing cyclone fence stems from the very nature of the woven pattern. By twisting the last vertical wire at the end of a section the wire can be "unwoven". Then by placing two ends of the cyclone fence together the wire can be "revoven" back into place forming a perfect splice.

(d) COMMAND ACTION: None

(7) Item: Jammed Auger Bits

(a) OBSERVATION: When drilling extremely long holes with auger bits a recurring problem is the sudden seizing of the bit in the hole. This forces the work progress to stop while the bit is freed, and can result in losing or damaging the bit.

(b) EVALUATION: When drilling with a long (greater than 12") bit, the chips do not rise to the surface unless the bit is raised part way out of the hole every inch. This action allows chips to be cleared from the hole. If the chips are not cleared they often will pack around the bit thereby locking it in place.

(c) RECOMMENDATION: When using auger bits the chips should be cleared from the hole as progress is made. The clearing process becomes more critical with deeper holes.

(d) COMMAND ACTION: None

(8) Item: Proof Roll in a Minesweep Operation

(a) OBSERVATION: During a proof roll, using a five ton dump truck, a mine was hit destroying the vehicle and wounding two men.

(b) EVALUATION: The five ton dump was loaded with sand and was backing down the road. The mine was detonated, the fuel tanks were ruptured spraying fuel over the truck. The driver was leaning out the door looking backwards and the assistant driver was standing on the running board on the passenger side. Both men were sprayed with fuel and burned.

(c) RECOMMENDATIONS: The proof roll vehicle should not have an assistant driver. The driver should have the door shut and make use of the mirror when backing up. This will protect him from the blast as well as any sprayed fuel. The floor of the cab should be lined with steel plate and sand bags to include the area under the seat. Sand bags should be placed on top of the saddle tanks. Finally, the fuel tanks should contain minimum essential fuel to reduce the fire hazard.

(d) COMMAND ACTION: None

(9) Item: Seldom Used Equipment

(a) OBSERVATION: When a unit uses a truck mounted piece of equipment which may operate in one location for a long period (such as a communications van or truck mounted water purification units) the basic truck unit may not be used for an extended length of time. When the unit is eventually placed on the road, the basic vehicle often malfunctions during the trip.

(b) EVALUATION: When a truck mounted piece of equipment is used for an extended time on one site, the general reliability of the prime mover declines. This loss of reliability is due to deterioration of engine components from corrosion, drying of seals, hardening of rubber boots, decay of grease in various joints, and loosening of nuts and bolts from the vibration of the mounted equipment.

(c) RECOMMENDATION: Periodic maintenance of the prime mover is absolutely essential. Cannibalization should never be allowed and if it is due to operational necessity, the replacement part must be obtained, often the unused vehicle is forgotten until it is needed. Prior to operating the vehicle after a long period, a complete inspection, servicing and test drive must be performed. The inspection should include such things as brake cylinders, wheel bearings, steering, suspension, electrical system, fuel system and other necessary accessories.

(d) COMMAND ACTION: Require road tests of long dormant vehicles before road march begins.

(10) Item: Decking on Bunkers

(a) OBSERVATION: When constructing bunkers the roof deck is often made up of laminated timber with two or more layers. An often used pattern for laying the deck is to place the first layer spanning the stringers with the next layer placed at 90 degrees (parallel to the stringers).

~~"TOP SECRET ONLY"~~

(b) EVALUATION: The reason for placing the decking at 90 degrees angles is to promote load distribution. If the strength of the deck is analyzed for a point load it will be found that a more advantageous arrangement will be to have both layers run in the same direction (both layers spanning the stringers) the required load distribution is accomplished by the two to three feet of sand bags which the normal bunker has on the roof.

(c) RECOMMENDATION: When designing a roof deck for a bunker the first layer must span the space between the stringers. If only two layers are used, the second should run parallel to the first. For three or more layers of deck the individual layers should be arranged at 90 degree angles to each other.

(d) COMMAND ACTION: None

(11) Item: Security at a mined culvert site

(a) OBSERVATION: Repair crews dispatched to a sabotaged culvert site are found to operate in a pattern that is nearly impossible to alter, thereby making them highly vulnerable to booby traps and mines placed in the predictable work areas.

(b) EVALUATION: Saboteurs often return to sabotaged culvert sites on isolated stretches of paved highways and place mines in the crater to hinder work efforts. Recently there has been increased incidence of secondary mines placed at some distance from the original site. The secondary mines are placed in the probable area where the road repair equipment will be forced to operate. Indications in Central Military Region I are that the saboteurs may be indicating the location of the secondary mine by a readily noticed but suspicious looking signal device. Such a device might be so suspicious looking that it is given a wide berth by the repair crew, thus retaining its value as a signal. The device may be a can or rock pile placed in the vicinity at the original explosion. Limited experience indicates that the signal may be placed across the road on the opposite side of the interdiction from the secondary mine. The distance of the signal from the interdiction may be some multiple of the distance from the interdiction to the secondary mine.

(c) RECOMMENDATION: When repairing an interdiction, the repair unit should be especially watchful for secondary mines placed in symmetry to suspicious appearing signal devices.

(d) COMMAND ACTION: Inclusion of this information in mine publications

(12) Item: Removal of NSA1 Matting

(a) OBSERVATION: Picking up NSA1 airfield matting is a difficult operation and one of the most time consuming steps is the unlocking of the panels.

~~"TOP SECRET ONLY"~~

(b) EVALUATION: The device for locking panels end to end consists of square bars which slide into the adjoining panel. There is no readily available tool to drive the pin back out to release the panel. One tool which can easily be fabricated makes use of one of the locking pins. The pin is ground down so it will slide easily through the locking hole. A 4 inch piece of bar stock is welded onto the locking pin so as to provide a hammering surface to strike when retracting the locking pins.

(c) RECOMMENDATION: Fabrication of the unlocking tools should be accomplished prior to commencing the removal of M8A1 matting.

(d) COMMAND ACTION: None

- d. ORGANIZATIONS: None
- e. TRAINING: None
- f. LOGISTICS: None
- g. COMMUNICATIONS: None
- h. MATERIEL: None
- i. OTHER: None

STANLEY R. JOHNSON  
MAJ, CE  
Acting Commander

DISTRIBUTION:

- 7 - 45th Engr Gp ATTN: EGD-3
- 3 - USMACV, ATTN: AVCC-MO
- 3 - USARV, ATTN: AVHDC-DO
- 2 - USARPAC, ATTN: GPOP-DT

Assigned and Attached Units of the

84TH ENGINEER BATTALION (CONSTRUCTION)

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as of 30 April 1971

1. Headquarters and Headquarters Company, APO 96349
2. Company A, APO 96349
3. Company B, APO 96349
4. Company C, APO 96349
5. Company D, APO 96349
6. 536TH Engineer Detachment (Port Construction) APO 96349
7. 40TH Engineer Detachment (Well Drilling) APO 96349
8. 49TH Engineer Detachment (Well Drilling) APO 96349
9. 171ST Engineer Detachment (Well Drilling) APO 96349
10. 917TH Engineer Detachment (Well Drilling) APO 96349

Encl 1

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19 FEB 1972

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AVHDO-DO (15 Nov 71) 3rd Ind

SUBJECT: Operational Report - Lessons Learned, 84th Engineer Battalion  
(Construction), Period Ending 31 October 1971, RCS CSFOR-65 (R3)

Headquarters, United States Army Vietnam, APO San Francisco 96375

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

This headquarters has reviewed the Operational Report - Lessons Learned for the period ending 31 October 1971 from Headquarters, 84th Engineer Battalion and considers it an adequate reflection of the unit's activities during the period.

FOR THE COMMANDER:

2 Incl  
nc

I. L. CHILDRESS  
CPT AGC  
ASSISTANT ATTACHMENT GENERAL

Cy furn:  
USARENGRCOND-V  
84th Engr Bn

600-50-509

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R6 472, 84th Engineer Bn, ORCLs



DEPARTMENT OF THE ARMY  
HEADQUARTERS, 84TH ENGINEER BATTALION (CONSTRUCTION)  
APO SAN FRANCISCO 96349

EGD-ED-OF 15

15 November 1971

SUBJECT: Operational Report - Lessons Learned, 84th Engineer Battalion  
(Construction), Period Ending 31 October 1971, RCS CSFOR - 65 (R3)

THRU: CO, 45th Engineer Group (Construction), ATTN: AVEGD-OF  
CO, USARENG/COMDV, ATTN: AVCC-MO  
CG, USARV, ATTN: AVHDO-DO  
CG, USAFAC, ATTN: GPOF-DT

TO: HQDA (DAFD-2A), Washington, D.C. 20310

1. Operations Significant Activities

a. Commands

(1) General: The 84th Engineer Battalion (Construction) underwent a series of attachments, detachments and unit changes during the reporting period. The assigned and attached units at the end of the reporting period are listed in inclosure 1. At the beginning of the reporting period the 84th Engineer Battalion (Construction) had its normal TO&E companies plus the 536th Engineer Detachment (Port Construction) and the 40th, 49th, 171st, and 917th Engineer Detachments (Wall Drilling). All units except "D" Company were located at Camp Hoa Long, Da Nang, Republic of Vietnam. Company "D" was located at Camp Hocknuth, Phu Bai, Republic of Vietnam. The following attachments/detachments occurred:

(a) On 11 May 1971, Task Force Phu Loc was formed and sent to Phu Bai to operate the Phu Loc Quarry. This Task Force was made up of personnel from the "A" Company Quarry Section, the quarry sections from the 991st and 630th Engr Companies (Light Equipment), and selected personnel from Headquarters and Headquarters Company. This operation remained under the control of the battalion until 20 September when it was attached to the 27th Engineer Battalion. Task Force Phu Loc was co-located with "D" Company.

(b) The 99th Engineer Company (Land Clearing) was attached to the battalion on 20 July 1971 and remained throughout the reporting period with a land clearing mission in the Da Nang Rocket Belt. Their base of operations was Camp Haskins in Da Nang, however, due to the nature of their mission, the bulk of the unit operated from various Night Defensive Positions located in the "cut" area.

(c) On 25 August "D" Company was placed under the operational control of the 27th Engineer Battalion and finally attached to the 27th on 20 September 1971. Company "D" was returned to the 84th Engineer Battalion (Construction) on 3 November 1971 and moved from Phu Bai to Camp Bok, Da Nang, RVN.

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(Construction), Period Ending October 1971, RCS CSFUR - 65 (R3)

(d) The 172nd Engineer Detachment (H) was attached to the battalion on 25 August 1971. They remained as the supporting unit for the Da Nang Installation Engineer, but tasks are now done through the battalion. The 172nd has their base of operations at Camp Barker, Da Nang, RVN.

(e) The 520th Engineer Detachment (HG), 525th Engineer Detachment (WT) and 562nd Engineer Detachment (FF) were attached to the battalion on 25 August 1971. These detachments make up the fire fighting unit for Camp Haskins area and are located at Camp Haskins, Da Nang, RVN.

(f) The 60th Engineer Company (LC) was moved to Da Nang from Long Binh and attached to the battalion on 27 August 1971. Their mission was to assist in clearing the Da Nang Rocket Belt. The 60th had its base of operations at Marble Mountain Airfield, Da Nang, RVN, but like the 99th, the bulk of the unit operated from various Night Defensive Positions in the "out" area. At the end of the reporting period, the 60th Engineer Company (LC) was preparing to move back to Long Binh and join its parent unit.

## (2) Missions:

(a) To excavate, haul, compact and grade and to provide stabilized earth subgrades for airfields, roads, helicopters, supply storage areas and similar projects.

(b) To construct and rehabilitate buildings, port facilities, bridges and drainage structures, and to install and repair utilities.

(c) To provide land clearing support as required to deny the enemy access to strategic terrain.

(d) To provide combat/operational support as directed by 45th Engineer Group.

## (3) Commanders and Principal Staff:

84th Engineer Battalion	LTC Daniel L. Lyman
HHC, 84th Engr Bn (Const)	CPT John W. Sasser
Co A, 84th Engr Bn (Const)	CPT Bruce E. Cavan
Co B, 84th Engr Bn (Const)	CPT Ronald L. Weitz
Co C, 84th Engr Bn (Const)	CPT Charles S. Rust
Co D, 84th Engr Bn (Const)	CPT Mark F. Soll
536th Engr Det (FC)	CPT Terrence E. Cooney
172nd Engr Det (Util)	MAJ Raife B. Shover
99th Engr Co. (LC)	CPT Paul W. Rea
562nd, 525th, 520th Engr Dets.	1LT Kermit L. Johnson (CIC)
40th, 49th, 171st, 917th Engr Dets.	CPT Charles A. Joyner, Jr. (CIC)
Battalion Executive Officer	MAJ Robert R. Hartman
S-1	CPT Nikki D. Ferrigo
S-3	MAJ Richard S. Waldrop
S-4	CPT Thomas G. Chambers

SUBJECT: Operational Report - Lessons Learned, 84th Engineer Battalion  
(Construction), Period ending - 31 October 1971, JCS CSFOR - 65 (RS)

(3) Commanders and principal staff:

Communications Officer	C. L. Terry L. Dineen
Battalion Surgeon	CPT Lewis D. Elliston
Chaplain	CPT Pablo Theodore, Jr.
TRCO	CPT Donald E. Smith

b. Administration:

(1) Strength:

	Off	Authorized		Off	Actual	
		WO	BI		WO	BI
May	33	7	918	30	7	821
June	33	7	918	28	7	814
July	37	8	1065	27	4	815
August	41	9	1173	36	6	994
September	36	8	983	41	5	1108
October	36	8	983	41	5	1204

(2) Awards: During the period 1 May - 31 October 1971 there were 289 Army Commendation Medals, 91 Bronze Star Medals and 26 Purple Hearts awarded to members of the 84th Engineer Battalion (Construction).

(3) Discipline: There were a total of 303 Article 15's administered during the reporting period. There were no convictions by court-martials.

c. Construction Operations:

(1) Route ML-130: This high priority project was in progress during the last reporting period. Route ML-130 is 13km in length and connects the cities of Hoi An and Da Nang. It was constructed through poorly graded sand and marsh using current stabilization. The road consists of an 8 inch soil cement base and a Double Bituminous Surface Treatment. Thirteen major culvert sites with reinforced concrete headwalls were constructed along the route. Construction began on 1 February 1971 and ended on 28 August 1971. The importance of this road was very apparent during the recent typhoon and floods. Route ML-130 was the only passable route leading to the Province Capital, Hoi An. All companies of the battalion contributed to this construction. Maintenance of this road is a continuing responsibility.

(2) Keystone Retrograde Facility, Phase I: The scope of this project was to construct a 30'x30'x15' security cage of cyclone fence and 3" pipe, a timber and asphalt loading ramp for cargo loading and unloading, base preparation and placing of 1681 pieces of MX 19 Matting to provide a work/storage area at the multiple items processing point, Da Nang Sub Com, Da Nang. Construction Began on 30 April 1971 and was completed on 4 May 1971. C/84th was the constructing unit.

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(3) Keystone Retrograde Facility Phase II: This project required the placing of a 60'x 25'x 9" reinforced concrete slab to be used as a track vehicle wash area, a 165'x 25'x 4" reinforced concrete wheel vehicle wash area, and the construction of a 100,000 sq. ft. parking area. The parking area required extensive grading and shaping and the placing, grading and compacting of approximately 1500 cu. yds. of crushed base rock. The final surface was treated with liquid asphalt. A 600 GPM pump was installed and 900 ft. of 6" pipe laid and connected to a twenty outlet manifold to provide a salt water wash area. This project also required the erection of 1400 feet of triple standard concertina fence. Construction began on 4 May and was completed on 11 May 1971. C/84th was the constructing unit.

(4) Keystone Retrograde Facility Phase III: C/84th was tasked with the construction of 5 each 20 ton wash racks and 2 each 60 ton wash racks using reinforced concrete footers, heavy timber bents and M4 balk decking. A 387,000 square foot parking area was prepared by adding approximately 1000 cu yds. of crush base rock and grading. A 3-inch asphalt cement surface was added to this area to provide a suitable post wash parking area. A 200'x 200' concrete wash stand and approach ramp and two track vehicle turning pads requiring 1377 cu. yds. of concrete was constructed in the post wash area. 3,500 feet of chain link fence were erected around the asphalt parking area. Another parking area was constructed in the Da Nang Service Area. This 100,000 square ft area was filled with 1500 cu. yds. of crush base rock, shaped and compacted. A liquid asphalt surface treatment was applied and 1000 feet of chain link fence erected around the area. The 536th Engineer Company (Port Construction) provided the fresh water system. This included laying 1500 feet of 6" pipe and 300 feet of submerged flex hose at Spanish Beach to provide a loading area for the Yard Water Ship. Minor repairs were also made to two existing reservoirs. Another 1500 feet of 6" pipe was laid at the Deep Water Pier from an off loading site to an existing water tank which supplied the wash area with fresh water. A 600 GPM pump was mounted on the YW. Two other 600 GPM pumps were also installed by the 536th Engineers at the salt water wash area as a back up system. B/84th was tasked with the construction of a 250 man camp. This portion of the project included the dismantling of 27 Sea huts at Camp Love. These materials were used to construct 15 Sea huts and a 250 man bath house at Camp Adenir. All plumbing and electrical work was included along with the installation of 5 burn-out latrines and 6 outside urinals. Construction on phase III began on 27 May and was completed on 1 July 1971.

(5) Keystone Retrograde Facility Phase IV: This project consisted of the construction of 1 each 20'x 30' sun shed, 1 each 20'x 40' sun shed 12 each picnic tables, and a tower capable of holding a 5000 gallon water tank. The sun sheds were built at the MIF and SHF areas. The water tower was constructed at Camp Adenir. Construction began on 20 July and was completed on 10 August 1971. C/84th and 536th Engineer Detachment were the constructing units.



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(6) Task Force 1 MACV Facilities: C/84th was given the mission of constructing facilities for a 60 man MACV Team. The required facilities included a 30 man HQ with 2 man rooms, a 30 man HQ with 2 man rooms, 2 each bath houses with water borne sewage, a mess hall, a water well and water distribution systems to include an elevated water storage tank, and a generator shed with necessary power distribution lines. Work commenced on this project on 19 July 1971 and was completed on 4 October 1971.

(7) Bridge ML-1A: This important bridge is located on a heavily travelled route connecting Highway Q-1 and Da Nang. The old bridge went under water during the 1970 Monsoon season. The scope included the construction of an 80 foot, steel pile, steel stringer, concrete pier and concrete deck bridge. One intermediate concrete pier was utilized and set on steel piles. Both concrete abutments were set on steel piles. Concrete deck slabs were pre-cast in our motor pool area and transported to the site when needed. Both approaches were raised 6 feet at the abutment resulting in a 6% slope. The approaches and deck were surfaced with 4 inches of asphalt cement. Construction began on 1 July and was completed on 1 October 1971. B/84th and the 536th Engineers FC Det were the constructing unit.

(8) Road Upgrade LTL 4: This route is located between the village of Dai Lee and FSB Rawhide, the only supply route for Rawhide. It had deteriorated due to subgrade failures. The scope of the project included the scarifying, grading, and recompaction of 8km of road. Approximately 600 cu. yds. of crushed base rock was hauled to help stabilize portions of the road. Culvert sites along the road were widened and headwalls constructed. The route was treated with liquid asphalt to provide water proofing. Construction began on 3 August and was completed on 2 September 1971. C/84th was the constructing unit.

(9) MACV Guard Towers: Two MACV compounds in downtown Da Nang needed guard towers to improve their security posture. One 25foot Timber Tower was constructed at the rear of the main compound to provide vision over a built up area just outside the perimeter wire. A 15 foot Timber Tower was erected on the roof of the HQ which provided excellent vision to include all roof tops in the area. Construction commenced on 2 April and was completed on 15 June 1971. C/84th was the constructing unit.

(10) Repairs to Marble Mountain Air field: MNAF was experiencing dust control problems and several sections of run way and taxi-way were failing due to subgrade failures. An over run area of 400'x 600' was cleared of debris, graded, and penepripped. Two sections of run way 10'x 40' were cut out, the subgrade recompacted, and an asphalt cement patch used to repair the run way failure. Taxi way repairs were fixed using the same method, cutting out the failure, adding selected fill, recompacting, and patching with asphalt cement. Shoulders along a 2000 foot section of taxi-way were treated with penepripping and loose matting was anchored. The construction began on 25 April and was completed on 1 August 1971. C/84th and A/84th were the constructing units.

(11) Bunker Construction, Hill 34: Hill 34 an American Fire Support Base, was in need of extensive upgrade. The scope of the mission included the construction of 5 each 8'x12' bunkers and 2 each 18'x20' powder bunkers. Equipment support was given to A/39th Engr Bn on the same project. A/39th constructed additional bunkers and upgraded roads. All bunkers were heavy timber frame

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constructed from a standard design. C/84th construction on 8 October and completed construction on 15 October 1971.

(12) Ship Transfer Caissons: These caissons are used to float between ships while they are refueling to prevent damage by the ships coming together. Each caisson consists of 4 rectangular layers of 12"x12" timber, cross-braced with 10"x10" timbers between each layer. The layers are then bolted together. The 536th Port Construction Detachment was tasked to build 3 Caissons for Da Nang Sup Con. Construction began on 6 October and was 90% complete at the end of the reporting period.

(13) Miscellaneous Diving missions: With the withdrawal of Navy Diving Teams, the 536th FC Det has been called on to conduct many diving missions for various units in MR1. Recovery jobs for the 23 Inf Div and 101st Air Div are very common. Also inspection of LOL lines and ships hulls have become common. These missions continue on an as needed basis. Shortage of diving equipment severely hampers the 536th FC Det's ability to react to all calls.

(14) Route 537A: Quang Nam Province opened a resettlement village approximately 2km east of QL-1 in Duy Xuyen District. The old road had been completely washed out and the village was accessible to foot traffic only. B/84th was tasked to construct a new road to the resettlement village to open it to traffic and also increase the security of the area. The road was raised approximately 3 feet and widened to 20 feet using lateritic fill. Four culvert sites were constructed along the route. Plans call for a 4" lift of crushed base rock and liquid asphalt and surface treatment. At the end of the reporting period the road was 60% complete. Construction began on 10 September 1971.

(15) Ferry Landing Pier: The Ferry Landing Pier located at XXIV Corps Headquarters was partially destroyed when rammed by a LST. The 536th FC Det was tasked to remove the end 30 feet of decking and stringers and extract the piles. Approximately 55 wooden piles were to be driven to act as a pier protection system. At the end of the reporting period the deck and stringers had been removed. The old piles have been cut off at the river bottom by a demolitions team. The pier protection system has yet to be installed. Because of higher priority jobs, this project has been placed on a temporary hold status. Construction began on 1 July.

(16) Camp Viking Air Control Tower: The air control tower at Camp Viking burned down due to an electrical short. B/84th was tasked to build a twenty-five foot tower with air control house and necessary electrical connections. The tower was relocated to an area on the flight line where visual observation was unobstructed. The M8A1 matting at the base of the tower was cut to allow the pouring of four concrete footers. The tower was constructed of heavy timber, the shed of 2"x4" and plywood. A 360 degree plexi glass window was installed. Construction began on 19 July and was completed on 6 October 1971.

(17) 510th Replacement Center, Da Nang: The 22nd Replacement Battalion was directed to move the 510th to Da Nang to open an In/Out Processing Center. B/84th and A/39th were tasked to complete this mission. B/84th erected a 20'x40' Operational Center with coiling, 20'x40' Air Center with coiling, a 15'x40' Supply Room, and 4 each 4'x8' Currency Conversion cages. A large covered patio was completely enclosed to be used as a Central Issue Facility, this building

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was 40'x 100' and open on four sides. A chain link fence area for personnel and baggage holding was constructed and chain link fence installed. Flashing was installed on a covered area built by 4/37th and a gutter system installed on another covered area constructed by 4/39th. The 172nd Engineer Detachment installed a 5 ton air conditioner and approximately 80 feet of sheet metal duct work to the operations and AIF center. Construction began on 20 September and was completed on 15 October 1971.

(18) Urinalysis Laboratory: As part of the In/Out Processing Center, Med Com was directed to operate a Urinalysis Laboratory commencing on 17 October 1971. The 172nd Engineer Detachment was tasked to run all utilities for the operation. An existing building was used in the 23rd Medical Battalion Area. All wiring and lighting was completely stripped from the building and the 172nd completely rewired the building to accept the medical equipment. A complete new lighting system was installed. A 20,000 BTU air conditioner was installed as a back up air conditioner. A double sink with hot and cold running water was installed. Approximately 390 AMP's electrical capacity were wired into the building. Two concrete pads were poured for a generator and air compressor. A chain link fence was erected around the entire facility. A 20 foot water tower with a 1000 gallon tank was constructed by B/84th and tied into the building as an emergency Water Supply. Construction began on 20 September and was completed on 15 October 1971.

(19) AIF 107 Up Grade: AIF 107 was found to have an undesirable security condition. Guard towers were severely weathered, line of sight visibility was no possible between towers in some cases, perimeter roads were non-existent or in very poor condition. B/84th was tasked to upgrade the perimeter road network to permit all-weather traffic, repair 10 guard towers, and build one 30 man bunker. All towers were approximately 20 foot high. Repair work ranged from minor structural repair to complete rebuild. Over 2,000 cu. yds. of surge rock and crushed base rock were hauled and placed on the perimeter road network. At the end of the reporting period this project was 95% complete and in a hold status because of higher priority projects. Construction began on 15 July 1971.

(20) Helipad 48: Helipad 48 located at the main MACV compound in Da Nang was located to close to Helipad 47 to permit simultaneous use. B/84th was tasked to relocate Helipad 48 approximately 80 feet in a westerly direction. Approximately 40 cu. yds. of crushed base rock was placed and compacted forming a 40'x 40' plateau. The area was graded and E-17 membrane applied to waterproof the CBR. A 30'x30' area was covered with M8A1 matting which was anchored with anchor pickets manufactured from U-bolts and drift pins. Construction began on 23 July and was completed on 17 August 1971.

(21) Route Maintenance and Repair: The 84th Engineer Battalion (Construction) has interdiction responsibility approximately 50km of Highway QL1 and Maintenance responsibilities for another 60km of roads in the Da Nang area. Interdiction responsibility includes immediate repair to make the route passable to traffic after enemy or natural interdiction. On 2 May 1971, a culvert site was blown on QL1 in the vicinity of Dien Ben, a team from B/84th was dispatched to make necessary repairs. While working on the site, a booby trap was detonated resulting in 5 KIA including the company commander. The 84th Engineer Battalion



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has located stockpiles at strategic point. Once haul distance when maintenance or repairs are necessary. Typhoon at 12 caused heavy damages to QL1 and other major routes in the area. At the end of the reporting period the entire battalion's haul effort was committed to route repair work. This project is continuous in nature.

(22) Phu Loc Quarry: The 84th Engineer Battalion assumed responsibility for the operation of Phu Loc Quarry on 11 May 1971. The quarry section of A/84th and select personnel from HHC moved to Phu Bai to commence operation. The existing quarry equipment and personnel of the 591st and 630th came under the operational control of the 84th. The mission of the quarry was to supply crushed rock for road construction in Military Region 1. Rock was hauled by the Vietnamese railroad, F&E Corporation, American and Vietnamese Engineer Units for road construction from Phu Bai to the DMZ. The Phu Loc Quarry remained under the control of the 84th Engineer Battalion until 20 September 1971 when it was re-assigned to the 27th Engineer Battalion. Approximately 32,000 cu yds. of rock was produced by the quarry while under the operation of the 84th Engr Bn.

(23) Standard Concrete Revetments: On 20 September B & C Companies each set up industrial sites at FSB Baldy and Camp Haskins respectively, for the production of precast concrete revetments. The 84th Engineer Battalion was originally given the requirement to produce 1700 linear feet of 8'x9' revetments per month; this requirement was changed to 2500 linear feet of 9'x5'6" high revetments on 16 October 1971. The total requirement then became 10,000 linear feet of 5'6" high revetments by 20 February 1972. The 9' high revetments was halted at 1520 linear feet. The revetments are poured in reusable adjustable steel forms and cure in curing tanks filled with water. By rotating the forms during the curing cycle, all curing tanks are fully utilized with one form for two tanks. At the end of the reporting period, B Company was preparing another site at Camp Hoa Long. The revetments presently being produced will be used to provide protection for aircraft and helicopters at Marble Mountain Airfield.

(24) Revetments, Dial Telephone Exchange: The Dial Telephone Exchange in Da Nang was in need of revetments to replace old earth filled revetments which were badly deteriorated. This was the first employment of standard concrete revetments manufactured by the 84th Engineer Battalion. The telephone exchange required the removal of the old revetments and installation of 320 linear feet of 9' high concrete revetments. Difficulties were encountered when placing the wall panels into formers. Tolerances were too close, manufacturing processes were adjusted. Tolerances on all future revetments were increased. Construction began on 22 September and was completed on 1 October 1971. C/84th was the constructing unit.

(25) XXIV Corps Trailer Park: A new trailer was to be constructed at XXIV Corps to provide housing for American Red Cross Workers. B/84th was assigned the mission of preparing the area by removing 300 ft of concertina, 400 ft of barbed wire, 200 ft of cyclone fence, and a 20 ft x 2 ft concrete wall. A 400 sq ft. area was graded and compacted. After the trailers were installed a new fence requiring 800 ft of cyclone fence and 900 ft of barbed wire was erected. Construction began on 1 April and was completed on 15 July.



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(28) Culverts, Lewis Fork River: The 84th Engineer Battalion at Marble Mountain Airfield was experiencing drainage problems. The 84th was tasked to install two each 24" culverts. Slots were cut through the asphalt road and sloped. Two 24"x20" corrugated metal pipes were installed, backfilled and compacted. A new asphalt surface was laid by A/84th. Four 12"x12" timbers were secured to the road shoulder to act as curbs. Construction began on 25 May 1971 and was completed on 28 May 1971.

(29) Helipad 54: The traffic on the R&R Center and In/Out Processing Center helicopter pad exceeded the capacity of the existing pad. C/84th was tasked to double the size of the landing area. The area to the north of the existing pad had to be excavated because of the heavy organic content. The area has been excavated and crushed base rock is being hauled and placed. The final surface will be treated with penepreme. At the end of the reporting period this project was 15% complete.

(30) Deep Water Pier Repair: The 536th Engineer Detachment (Fort Construction) began repairing damages to fenders, decking, and substructure. The damage was caused by normal wear, typhoon Kate, and ship and tug operator errors. Repair work was suspended on 15 May 1971, but conditions at the pier make it apparent that another major effort will be necessary in the very near future.

(31) Covered Walkway XXIV Corps: The walkway at XXIV Corps connecting the administration building to the G2 Conference room was not covered or otherwise protected from the weather. C/84th was tasked to install a corrugated tin covered area. Posts of 4"x4" material were erected and sunk in concrete, 2"x4" trusses were constructed and a tin roof connected. The walkway is approximately 70ft in length. Construction commenced on 27 October and was completed on 30 October 1971.

(32) Military Region 1 Well Drilling Program: The 40th, 49th, 171st and 917th Well Drilling Detachment were assigned to the 84th Engineer Battalion to conduct well drilling operations over the entire Military Region 1. Top priority was given to fire support bases and MACV team compounds at isolated locations and housing American Troops. As the draw down of U.S. Troops continues, many new sites were cancelled because of the withdrawal or anticipated withdrawal of U.S. units. Efforts are now being concentrated on refurbishing existing wells. At the end of reporting period, the following wells are in progress or have been completed:

<u>Location</u>	<u>Drilling Unit</u>	<u>Dates</u>
LZ Dragon	40th Well Drillers	26 Mar - 15 May
Hawk Hill	49th Well Drillers	9 Mar - 10 May
Tra Bong	49th Well Drillers	11 May - 5 Jul
Duc Duc	917th Well Drillers	26 Jul - 9 Aug
Hieu Duc	917th Well Drillers	20 Apr - 19 Jun
FSB C2	40th Well Drillers	11 Jun - 1 Aug
FSB Stinson	40th Well Drillers	11 May - 4 Jul
Tien Phuoc	171st Well Drillers	23 May - 5 Aug
Hoa Veng	40th Well Drillers	10 Jul - 30 Aug
TF1 MACV	917th Well Drillers	1 Jun - 4 Oct
Que Son (Water System)	B Company, 84th Engrs.	4 Sep - 10 Sep

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Dien Ben (Water System)	171st Wall Drillers	10 Sep -
Son Tinh	49th Wall Drillers	1 Sep - 10 Oct
Phu Bai, 85th Evac Hosp.	171st Wall Drillers	13 Sep -
Freedom Hill #1	917th Wall Drillers	18 Sep - 31 Oct
Freedom Hill #2	171st Wall Drillers	18 Sep - 30 Oct
Freedom Hill #3	917th Wall Drillers	20 Oct - 27 Oct
Camp Adenir #1 (Refurbish)	40th Wall Drillers	30 Oct -
Camp Viking (Refurbish)	171st Wall Drillers	21 Oct - 30 Oct
Camp Carter (Refurbish)		27 Oct -

An above ground construction crew is assigned from one of the line company's to complete the water distribution system. Recently priorities have switched to built up areas having a probable long term U.S. commitment.

(33) Refuel Facility, 101st AWN Gp, Phu Bai: A helicopter refuel point was needed at Phu Bai to handle Huey and Chinook aircraft. D/84th was assigned the mission of constructing six UH1D refuel pads and two Chinook refuel pads. This consisted of placing approximately 13,000 cu. yds. of fill to develop 210,000 square feet of hardstand, treating this area with penepine and constructing 6800 square feet of M8A1 helicopter pads. This project was completed on 12 May 1971.

(34) Re arm Facility, 101st AWN Gp, Phu Bai: D/84th was given the mission of constructing a rearm point for gun ships of the 101st Avn Div. Approximately 6000 cu. yds. of fill was placed to develop 80,000 square feet of hardstand, treating the area with penepine, constructing 1600 square feet of M8A1 helicopter pads, construction of 200 linear feet of portable concrete revetments and the construction of 8 ammunition bunkers. The project was completed on 26 May 1971.

(35) Liftmaster Helipad Repair, 159th AWN Bn, Phu Bai: The Liftmaster Helipad was experiencing severe subgrade failures under the M8A1 matting. Approximately 3,920 pieces of M8A1 and 65,000 square feet of T17 membrane had to be removed, 2,070 cu. yds. of select fill hauled in, graded, and compacted, and penepine applied to the surface. New M8A1 and salvaged matting was replaced. This project was 75% completed at the ending of the reporting period and had been turned over to the 27th Engineer Battalion. D/84th was the constructing unit.

(36) Pacydorm Helipad Repair, 159th AWN Bn, Phu Bai: The Pacydorm Helipad was experiencing severe subgrade failures. D/84th was tasked to make repairs. Approximately 3,932 cu yds of fill was placed, graded, compacted and treated with penepine. Approximately 2,325 pieces of M8A1 matting was placed and anchored. At the end of the reporting period this project was 85% completed and turned over to the 27th Engineer Battalion.

(37) 138th Revetment, 138th Avn Bn, Phu Bai: This project was assigned to D/84th and consisted of clearing approximately 65,000 square feet of land, constructing M8A1 parking area for fixed wing aircraft and constructing 960 linear feet of concrete revetments around the parking stalls. At the end of the reporting period this project was 85% complete and turned over to the 27th Engineer Battalion.

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(38) Engineer Support, 27th Engineer Battalion (Cbt), Phu Bai: The 27th EBC was involved in extensive road work projects in their area of operation. D/84th supplied dump trucks and 290's to reinforce their haul capability. This support lasted from August through October when D/84th was moved from Phu Bai to Da Nang.

(39) Typhoon Reclamation: Typhoon Hester hit Da Nang on 23 October 1971, causing widespread destruction. Living quarters, mission essential shops and warehouses, guard towers, perimeter fencing, perimeter lighting and critical roads were all affected by the storm. At the end of the reporting period, the entire battalion was involved with repair work. Highway QL1 was heavily damaged and the battalion haul effort has been diverted to hauling for QL1, all vertical construction platoons are busy doing repairs from Hoi An to Da Nang. Many jobs consist of replacing only roofs, but still others require the complete rebuilding of facilities. The estimated completion date for all repairs is 30 November 1971.

#### d. Combat Support Operations:

(1) Land Clearing Operations: During this reporting period, the 59th Land Clearing Company and the 60th Land Clearing Company were attached to the battalion to conduct operations in the Da Nang area. Their mission was to clear the Da Nang Rocket Belt and aid in the Return to Village Program, a resettlement program. The 59th Land Clearing commenced operations on 20 July 1971. Operations took place in Hoa Vang District, Hieu Duc District, Dien Ban District, Dai Loc District, Duy Xuyen District, and Duc Duc District. The 59th Land Clearing Company cleared approximately 15,747 acres. Much of the clearing was done along river banks. One operation in Hieu Duc District involved a combined American/ARVN River Crossing Operation utilizing MAT6 rafts constructed and operated by ARVN Engineers. The general terrain characteristics ranged from rice paddies with hedge rows to grassy flat lands with timber tracts of 25-75 acres separated by plains of elephant grass 4-6 feet high. Many mines and booby traps were encountered, the majority being anti-personnel devices. The 59th lost a total of 13 D7 Dozers to anti-tank mines during this reporting period. The 60th Land Clearing Company was moved from Long Binh and joined the battalion on 27 August 1971. They operated in Dien Ban District, Duy Xuyen District, and Duc Duc District. They cleared approximately 9,700 acres of land operating in the same type of terrain as the 59th Land Clearing Company. The 60th Land Clearing Company also encountered many mines and booby traps in their area of operations. They lost two dozers to enemy mines. While operating in Duy Xuyen District, the 60th was involved in one enemy initiated ambush. Many enemy bunkers and tunnel complexes were destroyed by the land clearing operations. Numerous enemy weapons, ammunition, documents, and miscellaneous pieces of equipment were captured or destroyed. Both Land Clearing Companies were pulled out of the field on 10 October because of adverse weather conditions. At the end of the reporting period both companies were conducting a maintenance standdown and the 60th was preparing to move by LST to Long Binh.