

HEADQUARTERS
39TH ENGINEER BATTALION (COMBAT) (ARMY)
APO 96316

EGDBA-E

31 January 1967

SUBJECT: Operational Report - Lessons Learned (RCS CSFOR - 65), for
Quarter Period Ending (31 January 1967)

THRU Commanding Officer
45th Engineer Group
APO 96238

Commanding General
18 Engineer Brigade
APO 96377

Commanding General
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TO: Assistant Chief of Staff for Force Development
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Section 1, Significant Organizational Activities:

a. GENERAL:

(1) The 39th Engr Bn Base Camp was located in the TUY HOA South beach cantonment area (CQ 245377) until 10 Dec 1966. Then the battalion moved to TUY HOA North Airfield (CQ 152478) in order to collocate with CP, 1st Bde, 4th Inf Div. The major activities during the reporting period were Operation Geronimo I with the 1st Bde, 101st Abn Div. (1 Nov - 10 Dec) and Operation Adams with the 1st Bde 4th Inf Div (10 Dec - 31 Jan 1967).

(2) Geronimo I was a search and destroy operation in the vicinity of Route 7B and CUNG SON. The 39th Engr Bn was responsible for:

(a) Mine clearing and maintenance of Routes QL #1 and 7B daily in sector.

(b) Providing engineer support for the 1st Bde, 101st Abn Div at TUY HOA and CUNG SON.

(c) Upgrading CUNG SON Airfield to C-123 traffic by lengthening the existing dirt strip to 2500 feet, placing a rock and sand base, covered with a 6" lift of laterite, and finally placing T-17 membrane.

(3) The 1st Bde, 4th Inf Div conducted their first combat operation in-country (Operation Adams) in the vicinity of TUY AN and DONG TRE. The 39th Engr Bn supported the operation by:

(a) Mine clearing and maintenance of Routes QL #1, 6B and TL2D daily in sector.

(b) Improving drainage and maintaining TUY AN and DONG TRE Airstrip.

(c) Upgrading bridges on Routes QL #1 and 6B in sector to take Class 50 track vehicles.

(4) The 9th ROKA Inf Div (minus one (1) Regt) at NINH HOA was preparing to initiate tactical operations to the west as well as continue security of QL #1 from NHA TRANG to VUNG RO. The 39th Engr Bn was responsible for:

(a) Mine clearing and maintenance of Route QL #1 daily and Route 21 on as required basis in sector.

(b) Engineer support in the division base camp area (NINH HOA).

(c) Construction of an 8000 meter all-weather tactical road to a Bn TAC CP position.

(d) Upgrading bridges on QL #1 in sector to MACV standard (2 way Class 35, 1 way Class 50).

(5) On 24 Jan 1967, the 39th Engr Bn assisted in Operation Roadrunner. Roadrunner was the code name for a 34 vehicle convey of the 1st Bde, 101st Abn Div (1/4 and 3/4 ton trucks) that went from KONTUM to PLEIKU to AUI NHON and South on Route QL #1 to PHAN RANG. This was the first time that the road had been open completely in many years. "A" Company of the 39th Engr Bn furnished two (2) platoons at the Ferry Site at HA YEN, to assist the convey crossing. In addition to an ARVN operated M4T6 raft, a six (6) pontoon reinforced light tactical raft was constructed and operated by the 553d Engr Co (FB). An escort from Bn S-2 and S-3 met the convey at HA YEN and escorted them to PHU HIEP (TUY HOA South Airfield) where they bivouaced over night and the following day escorted the convey to NHA TRANG.

(6) Company "A" On 1 Nov 66, Company "A" CP was located at BQ 955415 and the company cleared and repaired route 7B daily. Company "A", replaced the decking on an bridge vic of BQ 878444. From 3 Nov until 15 Nov, Company "A" conducted platoon size ambushes nightly along route 7B vic CQ 065395 with no appreciable results except that no mines were found on the road during the period. The ambush was not conducted the night of 15-16 Nov, and the following morning two (2) Anti Tank mines were detonated at CQ 080408 damaging two (2) vehicles and injuring 8 EM including three (3) Sergeants. In the next two (2) days three (3) more mines were located, one (1) at CQ 068395 and two (2) at CQ 080408. All mines were blown in place. From 3 Dec to 11 Dec, Company "A" constructed a 2 span Class 50 timber trestle bridge at CQ 116644 on QL #1. Company "A" moved its CP to CQ 154478, TUY HOA North Airfield on 21 Nov and began supporting 1st Bde, 101st Abn Div with security (one (1) platoon) at that location. Unit began constructing timber trestle bridges on QL #1 and built the following bridges:

- (a) Bridge IN3, TUY AN; Single Span, 25 Nov 1966.
- (b) Bridge IN7, TUY AN; Single Span, 25 Nov 1966.
- (c) Bridge IN9, TUY AN; two (2) Span, 11 Dec 1966.
- (d) Bridge IN11, TUY AN; three (3) Span, 24 Dec 1966.
- (e) Bridge IN12, TUY AN; Replaced decking, 15 Dec 1966.

On 6 Dec 1966, Company "A" CP moved to CQ 113665 vic of TUY AN, and remained in this area through the end of the reporting period. Company "A" began replacement of existing bridges on route 6B and TL2D.

- (a) Bridge 6B4 LA HAI; placed 5 each 36" culverts completed 25 Jan 1967.
- (b) Bridge 6B5, LA HAI; Single Span timber trestle, 22 Jan 1967.
- (c) Bridges 6B2 & 6B4, LA HAI; widened and strengthened balk bridges to Class 50, 17 Jan 1967. On 17 Dec 1966, a squad from "A" Company was ambushed while working on route QL #1 vic CQ 115647. Three (3) EM were wounded.

On 20 Dec 1966, one (1) platoon began repairing TL2D and on 26 Dec 1966, began working on drainage and maintenance of DONG TRE Airstrip at the end of TL2D. On 28 Dec 1966, the 5 ton dump truck with the mine sweeping team on route 6B struck a mine killing the driver and injuring another member of the clearing party. From 16-17 Jan 1967, Company "A" constructed a 141' Class 50, M4T6 float bridge at site 6B3, (CQ 038723). The M4T6 dry span was removed due to high water. On 22 Jan 1967, the platoon at DONG TRE was moved to LA HAI, which is at the junction of TL2D and route 6B, and continued to maintain TL2D. On 30 Jan 1967, the platoon moved to Company "A" CP at CQ 114663. A 5 span timber trestle bridge (6B3) at CQ 038724 was begun on 27 Jan 1967. Existing concrete slabs were pulled out with a tank retriever (VTR) and piles were started on first bent. On 28 Jan 1967, a single span timber trestle bridge was completed on TL2D (BQ 927743).

(7) Company "B": At the beginning of the reporting period, Company "B" was located at CUNG SON Airfield with the mission of lengthening and upgrading the existing Airfield to take C-123 traffic. Rock and cement stabilized sand, covered with a 6" laterite lift were placed on the Airfield and the runway was lengthened to 2200 feet. However, monsoon rains started in late November and severely hampered work on the project. On 15 Dec 1966, the project was temporarily abandoned and the company moved out of CUNG SON to BP 953414, vic of the Catholic Church on route 7B. The T-17 membrane was stored at the CUNG SON Special Forces Camp so that it would be available for emplacement when the monsoon season ends. One (1) platoon of Company "B" moved to the Bn CP area at North TUY HOA Airfield to construct fortifications. The other platoons began recovering tactical bridging on route 7B in preparation to move to a new location. On 24 Dec 1966, the company had closed in vic CQ 135526. All of the tactical bridging on route 7B was removed when Company "B" left and the road is no longer open to traffic. While withdrawing from CUNG SON, one (1) platoon of Infantry and one (1) section of 105 mm Artillery (with a forward observer) from 1st Bde, 4th Inf Div, were attached to "B" Company due to heavy VC activity. On 21 Dec 1966, while accompanying a mine sweeping team, the Lt FO was killed by sniper fire. On 24 Dec 1966, Company "B" assumed the responsibility of sweeping Route QL #1 daily from TUY HOA North Airfield to TUY AN. On 27 Dec 1966, a platoon leader from "B" Company was killed and the platoon Sergeant critically wounded (later died) while checking the Company "B" perimeter. The men were checking for booby traps and mines when a grenade exploded. The area had been previously used by other units and had also been vacant for a period. It is not know if the grenade booby trap was VC or friendly. On 28 Dec 1966, one (1) platoon began maintenance of route QL #1 between VUNG RO and Dialahn. Work consisted of patching potholes and clearing drainage ditches of slide debris. One (1) platoon constructed a 2 span pile bent timber bridge (Class 50, one way) at CQ 083701 from 30 Dec 1966 to 12 Jan 1967. Bridge was planned and partially constructed as 3 span timber bent bridge but rising water and changing bottom conditions necessitated the change to pile bent construction. On 1 Jan 1967, one (1) platoon cleared 3 railroad tunnels from CQ 231191 to CQ 261239 so that Vietnamese railroad construction crews could begin using the tunnels. Also on 1 Jan 1967, one (1) platoon began assisting the 577th Engr Bn (Const) at TUY HOA South Beach cantonment area by beginning construction of 3 each 20x100 DX warehouses. These buildings are the beginning of a Class I facility complex which will

include an ice plant, bakery, laundry and ration breakdown warehouses. On 27 Jan 1967, the DX warehouses were 98% complete. Doors can not be hung because hinges are not available, so the buildings will be turned over to the using unit by the 577th Engr Bn (Const) with the doors listed as a deficiency. A 30' pile bent timber bridge at CQ 115647 was constructed from 19 Jan 1967. The bridge was actually finished on 21 Jan but fill had to be hauled for approaches and wing walls. On 21 Jan 1967, a mine was detonated by the 5 ton dump truck in the mine clearing party route QL #1 injring 7 EM of the party. On 25 Jan 1967, one (1) squad from "B" Company replaced a squad from "C" Company in support of the 572d Engr Co (LE) on the access road to Hill 430. The squad began with demolition and pioneering support. On 30 Jan 1967, one (1) platoon began construction of the Bakery in the Class I facility area. Another platoon began constructing forms to pour four (4) pre-cast concrete stringers (1'x2'x20') for a bridge on TL2D. This is the first time that this unit has attempted to use pre-cast concrete for bridges and the results will be reported in the next ORLL.

(8) Company "C": At the beginning of the reporting period Company "C" was located at VUNG RO (FORT LANE, CQ 275229) with the mission of clearing 10,000 square meters of jungle for a hardstand at PORT LANE, and maintaining the access road from QL #1 to PORT LANE. The work on the access road consisted of clearing away mudslides and opening drainage ditches. Most of the work was done with a crane (clam shell) and front loader as dozers tended to dig up the road. Company "C" was also responsible for sweeping Route QL #1 from PORT LANE north to the SONG GLANG River (CG 285233 to CQ 175448) and the access road from QL #1 to the TUY HOA South Beach cantonment area (CQ 195366 to CQ 251347). On 10 Nov 1966, Company "C" moved back to the 39th Engr Bn area (TUY HOA south beach) to begin work on extending the 6" POL line from the bladder from at HAO SON (CQ 243273) to TUY HOA South Airfield (CQ 202416). The pipeline will provide JP-4 fuel to the TUY HOA Air Force Base. The project started on 12 Nov 1966, and was completed on 2 Dec 1966. In addition, Company "C" installed a pumping station (4 each 6" centrifugal pumps) at PORT LANE to provide additional capacity for pumping the fuel through the new section of pipe. Work began on 13 Nov 1966, and the station was completed on 15 Nov 1966. The pipeline was installed using a 2 shift operation and indigenous labor. The work done at light was hampered by a lack of adequate lighting and much of the coupling had to be redone the following day. In addition, there was an excessive amount of dirt, roots and debris found in the pipe, couplings were removed and broken and some sections of pipe were removed, which indicating Viet Cong sabotage. On 29 Nov 1966, Company "C" began construction of a Signal facility on Hill 430 (CQ 282218) at VUNG RO. The top of the Hill was covered with large boulders and dense jungle foliage, so the foliage was cleared away and 50'x50' helicopter pad was constructed from blast rock. Construction of a 2000 meter one way, dry weather 1/4 ton capacity access road from Route QL #1 to the top of the Hill was begun on 24 Nov 1966. On 12 Dec 1966, the mission was transferred to the 572 Engr Co (LE), but Company "C" continued to support the project with a demolition squad. On 21 Dec 1966, work was began on the Signal facilities on the top of Hill 430. This was accomplished by one (1) platoon of Company "C" being placed in support of the 572 Engr Co (LE). The project consisted of four (4) concrete footer blocks for a Signal tower, 2 each

6'x10' timber generator pads, 1 each 10'x15' timber base for 45 KW generators, a heavy duty floor for a Jamesway commo building, a latrine and a shower. The materials for this construction had to be back packed up the Hill as there was no helicopter lift available at that time. The portage was accomplished by indigenous labor. The signal facility was completed on 8 Jan 1967 and turned over to the TUY HOA Sub-Area Installation engineer on 18 Jan 1967. Company "C" departed from their location on TUY HOA south beach on 12 Dec 1966, and moved south to NINH HOA (BP 992832) closing at their new CP at 1415 hours. Their mission was to provide engineer support to the 9th ROKA Inf Div. and maintain at QL #1 from NINH HOA north to VUNG RO. On 16 Dec 1966, Company "C" made a reconnaissance of route QL #1 from BP 969816 to CQ 233194 to determine what work was necessary. Work consisted of repairing mudslide damage, filling potholes and clearing drainage ditches. Company "C" began road maintenance of the 9th ROKA Inf Div cantonment area (BP 998447 to CP 005856) on 19 Dec 1966. They also began construction of a 4,000 meter one way all weather tactical road from route QL #1 to the TAC CP of the 2 Bn, 29th Inf Regt (ROKA). The company CP was moved again on 21 Dec 1966, to BP 992632 (same area) where it is now located. Maintenance of a 1200 foot airfield (vic BP 987830) was begun on 28 Dec 1966. The work consisted of repairing drainage ditches and filling holes in the sod runway. On 4 Jan 1967, one (1) platoon began replacing an existing PSP decked bridge (CP 011873) with timber decking. Work consisted of prefabricating U bolts to place the timber on an existing steel truses. The prefabrication was completed on 14 Jan 1967 and the following day the PSP decking was removed and the bridge was finishing on 19 Jan 1967. On 13 Jan 1967, Company "C" began construction of 20 helipads an a maintenance area for a US Ambl Lt Avn Co at NINH HOA. The project also includes a mess hall, latrine, shower facilities, and tent floors. The helicopter landing area is 200'x1200' and the 20 individual pads are 75'x75' with a 60'x60' PSP mat; however, PSP is not yet available. The entire landing area is treated with penepime using 1 gallon per square yard. A 100'x300' maintenance area is treated with penepime and will be covered with PSP. Penepime and lumber for the project were obtained through US Military Channels and the PSP will be obtained through ROK Army channels. At the close of the reporting period the helipads were 90% complete with the exception of the PSP which had not yet been obtained by the ROK Army. On 25 Jan 1967, one (1) platoon began construction of a timber pile bridge along side an existing damaged concrete bridge at CQ 148119. At the end of the reporting period the bridge was 30% complete.

(9) The 553 Engr Co (FB) was re-attached to the 39th Engr Bn on 10 Nov 1966. The company began supplying 5 ton bridge trucks to the 39th Engr Bn for hauling construction materials from PORT LANE to the Battalion area, to project sites and to the TUY HOA Sub-Area Class II, IV yard. On 30 Nov 1966, the 553 Engr Co (FB) began constructing a 60' Single Single Bailey Bridge at Dialahn Crossing (CQ 232194). The company also continued the mission of grading the approaches and maintaining the float bridge on QL #1 South of TUY HOA (CQ 201350). On 12 Dec 1966, the Bailey Bridge was changed to a Double Single (Class 50), 80 feet long but construction was delayed because of nonavailability of transom clamps and end ramps which had to be obtained from CAM RANH BAY DEPOT. Due to the monsoon rains, the water began rising rapidly at the float bridge (CQ 201350) and 90 feet of floats were added

on 3 & 4 Dec 1966. On 3 Dec 1966, the 553 Engr Co (FB) began laying a 6" POL spur line from CQ 230367 to the Class III yard at TUY HOA south beach cantonment area. The 4,000 feet of POL line was completed on 11 Dec 1966. During the reporting period the 553 Engr Co (FB) also furnished bridge trucks for hauling construction materials from CAM RANH BAY DEPOT to the Bn S-4 yard. These were materials that could not be obtained at the TUY HOA Sub-Area Class II & IV yard. On 5 Jan 1967, an additional 30 feet of bridging was added to the float bridge at CQ 201350 due to high water. On 12 Jan 1967, the 553 Engr Co (FB) began prefabricating cribbing vents to replace the Class 50 trestles on the float bridge (CQ 201350) and on 17 Jan 1967, the trestles were replaced. On 15 Jan 1967, 60' of M4T6 balk and 8 Class 60 inflated rafts were delivered to "A" Company to construct a 141 foot bridge on route 6B (CQ 038724). The float bridge was finished on 16 Jan 1967. On 21 Jan 1967, the 553 Engr Co (FB) furnished two (2) officers and 13 EM to perform a special recon vic of CQ 065735 to determine best method of improving tactical crossing site SONG CAI River. The following day one (1) NCO and 14 EM delivered a 6 float reinforced LTR to CQ 066735 and emplaced it in the SONG CAI River on 24 Jan 1967, to ferry a convey from the 1/101st Abn Div across the river. This was the intial road opening of QL #1 from QUI NHON south to TUY AN. On 27 Jan 1967, the 553 Engr Co (FB) furnished one (1) officer and ten (10) EM as security for a convey from the 577th Engr Bn (Const) from TUY HOA to QUI NHON.

(10) The 572 Engr Co (LE) was reattached to the 39th Engr Bn on 10 Nov 1966, and began supporting the battalion with heavy equipment. On 29 Nov 1966, the 572 Engr Co (LE) began construction of an access road from QL #1 to the new battalion CP at TUY HOA North Airfield. The road, 1,000 meters long, was dug through sand and covered with 4" (-) rock. It was completed on 16 Dec 1966. One (1) crane with pile driving attachment was sent to Dialahn Crossing in support of the 553 Engr Co (FB) to drive piles for wing walls to construct a 100' DS Bailey Bridge. The 572 Engr Co (LE) assume the responsibility from Company "C" for completing the signal Hill project (Hill 430), including the access road from Route QL #1 to the top of the Hill. One (1) platoon from "C" Company supported the 572 Engr Co (LE) with a demolition squad and two (2) squads for constructing the timber structures on the top of the Hill. The access road was cleared through dense jungle and numerous granite boulders has to be ~~blasted~~ out of the way. The Hill consists of eroded granite and basalt lying on clay and silt; the rock cannot be used as a road surface. Heavy monsoon rains hampered the road work but the pioneer road was completed on 24 Jan 1967. The monsoon rains ended and as of the end of the reporting period the road was dry enough to begin work on widening, shaping and drainage. As of 31 Jan 1967 the road was 28% widened and was passing 3/4 ton traffic. During the entire reporting period the 572 Engr Co (LE) supported the 577th Engr Bn (Const) with quarry equipment including one (1) 20 ton truck mounted crane, one (1) front loader, two (2) D7E dozers, two (2) 600 CFM compressor, four (4) wagon drills, one (1) 100 KW generator, and a primary and secondary crusher unit.

b. Training: During the reporting period the Battalion worked 6½ or 7 days a week. When operational requirements permitted, the companies scheduled training and maintenance on Sunday morning in addition to religious services. Mandatory subjects and review of combat engineering subjects are included in the training.

c. MOVEMENT: The 3 line companies moved during this period as covered in paragraph a. The two (2) attached companies did not move during this period. The Battalion headquarters moved from TUY HOA South Airfield to TUY HOA North Airfield, a distance of 16 kilometers. There were no problems encountered with the move except that of moving the Battalions CONEX containers which proved to be a time consuming process. The Battalion is presently carefully examining the contents of all CONEX containers to insure that only essential spare parts and supplies are contained therein. As many CONEX's as possible will be turned in.

d. SUPPLY:

(1) During the reporting period, support was received from the following organizations:

(a) TUY HOA SUB-AREA COMMAND (THSAC) - All Class I, III and V supplies and limited Class IV construction and barrier materials.

(b) CAM RANH DEPOT (CRD) - All Class II supplies and Class IV construction materials not available at THSAC.

(2) At the beginning of the reporting period the line companies of the battalion were supported as follows:

(a) Company "A", located on route 7B at Catholic Church (BQ 953415), approximately 45 kilometers distant, was supported in the following manner:

(1) Class I - Supply point pickup

(2) Class II, III, IV and V - Unit delivery by Battalion

(b) Company "B", located at CUNG SON on (BQ 808422), approximately 65 kilometers distant, was supported in all classes of supply with unit delivery by Battalion.

(c) Company "C", located at PORT LANE, VUNG RO (CQ 287233), approximately 25 kilometers distant, was supported in the following manner:

(1) Class I and III - Unit delivery by THSAC

(2) Class II, IV and V - Unit delivery by Battalion

(3) On 10 Nov 1966, the 553 Engr Co (FB) and the 572 Engr Co (LE) were reattached to the Battalion for all purposes. Both units were located vic of the Battalion Headquarters (CQ 247376) and were supported by unit distribution of Classes II, IV and V. Classes I and III were obtained from THSAC supply point.

(4) On 11 Nov 1966, Company "C" moved to vic Battalion Headquarters (CQ 247376) and began to pick up Class I rations at the supply point. Classes II, IV and V continued to be supplied by Battalion. Class III was supplied by the THSAC Class III supply point.

(5) During the latter part of November, Company "A" moved its CP to TUY HOA North Airfield (CQ 154476). This location was approximately 20 kilometers distance from the Battalion. Logistic support continued without any changes. On 9 Dec 1966, the unit displaced to TUY AN (CQ 112677). This move did not increase the distance from the Battalion Headquarters because on 11 Dec 1966, the Battalion Headquarters moved to TUY HOA North Airfield. After Company A's move to TUY AN, all resupply was delivered to the unit by Battalion.

(6) On 23 Dec 1966, Company "B" moved to vic (CQ 135523), approximately 5 kilometers North of the Battalion's new location at TUY HOA North Airfield. Logistic support continued to be supplied by Battalion without any changes. At the same time Company "C" deployed to NINH HOA (CQ 990832), approximately 80 kilometers South of TUY HOA. This required the unit to be attached to the 63rd Maintenance Battalion for logistic support, with the exception of Classes II and IV. Battalion continued to provide this support. Both unit and supply point distribution were used for resupply.

(7) The Battalion obtained its supplies during this period by supply point pick-up with the exception of Class III. MOGAS and diesel were supplied to a retail point in the Battalion area by the THSAC, but oils, lubricants, and bulk MOGAS and diesel for the line companies was picked up at the Class III supply point by the Battalion. This system was used by the Battalion at both locations.

(8) All unit's locations remained the same during the month of January 1967 and the logistical support continued unchanged.

(9) Availability of all classes of supply improved considerably during this reporting period. This occurred because of the following reasons:

(a) Opening of PORT LANE at VUNG RO in September made possible increased tonnage to be shipped into the TUY HOA area.

(b) Opening of Route QL #1 from NHA TRANG to TUY HOA. This enabled the battalion to convey to CAM RANH DEPOT to obtain supplies and construction materials. During this reporting period the Battalion ran six (6) conveys to CAM RANH DEPOT with a total of seventy (70) vehicles. Tonnage transported by type were: Class II 47 tons, Class III 20 tons, Class IV 240 tons.

This improvement in availability of Class II/IV supplies considerably aided the Battalion accomplishing its missions. This will decrease during the next reporting period due to the fact of increased tonnage through PORT LANE and the expansion of the supply facilities of the TUY HOA SUB-AREA COMMAND.

(10) A number of major equipment shortages existed in this battalion on 31 Jan 1967. The lack of these items affects the operational capability of the unit. These shortages are as follows:

(a) 1/4 ton trks	4 ea
(b) 3/4 ton trks	4 ea
(c) 5 ton dump trks	4 ea (2 ea combat loss)
(d) 5 ton wrecker	1 ea (combat loss)
(e) 5 ton tractor	1 ea (combat loss)
(f) Grader	1 ea
(g) Leader Scoop	1 ea
(h) Grane shovel	1 ea
(i) Water Purification Set	1 ea
(j) 250 CFM compressor	3 ea
(k) Generators 3 KW	8 ea
5 KW	1 ea
10 KW	5 ea

(11) Of special note during this reporting period was the support of Company "B" at CUNG SON. From 31 Oct to 21 Dec, the following supplies were delivered:

(a) Class I - Rations were delivered practically everyday by truck to enable the unit to serve two (2) A rations and one (1) MIC ration a day. On 20 Nov an emergency resupply was delivered by CH-47 due to the road not being opened for two (2) days. Approximately 5,000 pounds of rations were delivered by this aerial mission.

(b) Class II - Unit was issued one (1) 1/4 ton trk and one (1) 5 ton dump trk.

(c) Class III - POL delivered was 43,700 gallons of diesel, 20,400 gallons of MOGAS and assorted POL products.

(d) Class IV - Construction materials delivered were 5,000 bags of cement, 43 boxes of T-17 membrane, 600 feet of CMP, 156 rolls of concertina, and miscellaneous supplies.

(e) Class V - Unit was issued 6,000 pounds of ammunition and demolitions during this period.

e. SUMMARY OF ACTIVITIES:

	<u>Training Days</u>	<u>Total Days</u>	<u>Movement</u>	<u>Operations</u>
HHC	9½	92	2	80½
"A" Co	9	92	5	78
"B" Co	9½	92	5	77½
"C" Co	9½	92	5	77½
553 Co	8½	82	0	73½
572 Co	9	82	0	73

f. MAINTENANCE:

(1) During the reporting period the Bn Maint section continued to provide backup organizational support for the assigned companies.

(2) The significant feature of this reporting period was the sharp rise in the automotive deadline rate for the Bn, especially for 5 ton dump trucks. This rise can be attributed to several factors; these are length of time that this equipment has been in service in Vietnam, the terrain conditions over which the equipment is operated, the monsoon weather conditions which were encountered during this period and the departure of all companies to locations removed from support available at the Bn base camp.

(a) Almost all of the automotive equipment presently assigned to the Bn has been in operation in RVN since the Bn arrived in Jan 1966. During most of this year in country the equipment has been operated on an around-the-clock basis, allowing only a minimum amount of time for maintenance operations. This factor coupled with the rough roads and difficult terrain conditions over which the equipment is operated has placed tremendous demands on the equipment.

(b) The start of the rainy season unfortunately coincided with the movement of the line companies away from the Bn base camp. During the rainy period the Bn Hq which was located on the coastal sands found the soil conditions fairly dry and firm, but the companies found that the terrential rains turned the roads, job sites, and motor parks into deep, thick mud. The constantly wet and muddy conditions were the major cause for a sharp increase in the number of brake failures experienced within the Bn. It was found that the brake drums of vehicles became so packed with mud that they lost all braking ability. In addition, the mud in the drums and around the shoes caused a rapid deterioration of the various components of the vehicle service brakes (shoes, springs, anchor pins, etc).

(c) The departure of the companies also increased the difficulty Bn Maint experienced in supporting the companies with repairs parts and maintenance support. To alleviate the repair parts problem Bn Maint consolidated all PLL records at Bn base camp and issuing parts to the companies on an as required basis. This change in Bn operations has resulted in an increased flexibility in the supply of parts to the companies as well as removing a great administrative burden from the shoulders of the Company Commander and his motor Sergeant. To further improve this system Bn Maint is presently developing a "boxed" load which the companies will take with them when they leave the Bn base camp and replenish on a DX basis. This load will consist of high mortality parts and will eliminate the present short delay caused by waiting for the parts to be delivered to the company.

(3) During this period the 136 Maint Co arrived in the TUY HOA area. Since its arrival in Mid-December there has been a steady increase in the availability of repair parts and maintenance supplies, as well as improvement in the direct support maintenance for all equipment in this area.

Section 2, Commanders Recommendations, Observations and Lessons Learned:

1. Personnel:

Item: Rotation of Personnel:

Discussion: This unit was deployed intact in December 1965 and as a result approximately 50% of its personnel rotated during the month of December. Although a four point personnel program (increasing the battalion to 10% overstrength, curtailing 10%, of personnel interchanging 10% of the personnel in other units, and seeking voluntary 6 month extensions of 10%) softened the impact, many problems remained. The Battalion lost all 9 of its 12B40 E7 Platoon Sergeants and quite a few of it's squad loaders. As a result many junior NCO's stepped forward and in some cases did an impressive job of filling these positions. During January, replacements arrived and forced these younger NCO's to step down after holding these positions for a month or longer.

Observation: Soon after arrival in-country the unit should prepare for the rotational hump by exchanging personnel with other units. However, reasonable success would be obtained by making sure that losses among the key NCO's and officers are evenly spread out.

2. Operations:

Item: Mine Clearing Procedures:

Discussion: A report on Viet Cong Land Mines and Mine Clearing procedures including action taken by the Battalion is included in this report as Inclosure 1.

Observation: See Inclosure 1

Item: Indigenous Labor:

Discussion: Aid-In-Kind (AIK) laborers were used effectively in 2 Battalion projects during the reporting period; construction of a Signal facility site on Hill 430 and the 6" POL line from HAO SON to TUY HOA South Airfield. On the Signal facility project, the AIK's were utilized to portage construction materials 2000 meters up a 25% slope. On one day 8000 pounds of construction lumber were portaged in 8 hours by 80 laborers. On the POL pipeline project, the AIK laborers were used in carrying, laying, and coupling the pipe.

Observation: Laborers are effectively utilized carrying materiel in terrain not traversable by mechnized equipment. In the case of the pipeline, the carrying of the pipe by AIK laborers was efficient, but laying coupling was marginally efficient, and required much supervision to preclude sloppy or incorrect coupling.

Item: Bank Erosion Protection:

Discussion: Construction and repair of bridges not intended to be permanent often requires bank protection that is rapid and effective, but does not include elaborate wing wall and formed concrete embankment walls. Send cement concrete (soil cement could be used) utilizing 3 bags/sack, was shoveled into sandbags, and a sandbag revetment built. In one case this method effectively prevented erosion of a bridge abutment that was being eroded by exceptionally high ocean waves.

Observation: Concrete filled sandbags can be effectively utilized to provide erosion protection better than ordinary soil filled sandbags, and as effective as rip rap. Natural fiber bags are better than synthatic bags for this purpose, since the natural fiber bags allow more cement paste through the bag to bond with adjacent bags.

Item: Bridge Construction:

Discussion: The battalion has found that construction of pile bent, pile abutment bridges, is normally the most economical and structurally feasible design for streams in rice paddy areas. The bridge can be built as rapidly as a timber trestle and no foundation problems arise. Bent capacity is determined by dynamic formulas as piles are driven, and soil capacity estimation and concern over uneven settlement are eliminated. Using 12" diameter piles, 15 to 20 ton capacity columns are readily obtained. The critical feature is the availability of a properly functioning crane with pile driving attachments, and an experience crane operator. Where timber piles are of insufficient length to obtain required friction resistance, fluted hollow steal piles have been used effectively, although they are too large (18" diameter by 40 ft length) for easy handling with a 20 ton crane.

Observation: A combat engineer battalion can effectively construct short span, pile substructure bridges. Availability of a properly functioning crane and experienced operator is the obvious critical consideration.

3. Training and Organization:

Item: Shortage of Automatic weapons:

Discussion: Under existing operating conditions, engineer unit are often required to set up bivouac areas removed from any other friendly tactical units. The engineers must furnish their own perimeter security as well as their job site security. Under the Delta series TOE each line company has 6 each 7.62 mm machine guns and 4 each 50 Cal machine guns which are marginally adequate if all are operational. Under the Echo series TOE only 3 each 7.62 mm machine guns and 0 each 50 Cal machine guns are provided, which is inadequate for perimeter security and job site. The 50 Cal machine gun is the engineers only counter-metar weapon as no metars are now authorized.

Observation: Removal of the 50 Cal machine gun and reduction of the number of 7.62 mm machine guns leaves the companies without adequate fire support. The combat battalion also needs one (1) 81 mm mortar per company for illumination and counter mortar firing.

Item: Authorization for TOE 5-35E:

Discussion: This battalion is currently operating under TOE-5-35D, dated 22 July 1958. This TOE is outdated with respect to present army equipment, and requirements placed on the unit as a result of it's mission. The Maintenance and supply capability of the current TOE is not sufficient to properly support the battalion and still meet the requirements of higher Headquarters for reports and information. Equipment is not adequate, radio communication is not adequate, and personnel authorized are inadequate.

Observation: This organization will, during this month, receive a fourth letter company. To date, we have not received authority for the battalion to reorganize under TOE 5-35E. To insure effective operation of the battalion, immediate reorganization under the new TOE is required.

Item: Lack of Aviation Support:

Discussion: This battalion is performing combat engineer support for 1st Brigade, 4th Inf Div. Presently the road distance (within our area of responsibility) between our northern most element and southern most element is 150 kilometers. Communication with all line companies is by FM radio only. The combat support missions being performed by all companies required that resupply often be accomplished over unsecure roads by armed conveyes. Command control & staff coordination must be done over the same roads. It takes three (3) days for the battalion to visit the three (3) line companies, and this time does not permit lengthy visits to all platoon projects.

Observation: Infantry units which we support are provided aircraft (minimum of one command ship per day for each battalion) by supporting aviation organizations. Occasionally we receive support in the form of a few hour flight for a particular mission. This is not satisfactory. For maximum efficiency of command functions, rapid emergency resupply, expediting critical equipment repair parts, and simplifying staff and personnel activity, the battalion requires a minimum of one UH1 aircraft assigned or attached.

4. Logistics

Item: Lack of Power Generation Equipment:

Discussion: The power generation equipment available to the unit's of this battalion is not adequate for their operating environment. The current TOE 5-35D authorizes 1 each 5 KW generator in Headquarters Company and 1 each 3 KW generator in each line company. These TOE generators cannot meet the electrical power requirements for lighting and refrigeration. In order to provide sufficient electrical power for storage of Class A rations and lighting the administrative offices and living quarters, additional power generation equipment needs to be authorized to those unit's not able to use electrical power provided by R & U facilities.

Observation: Additional generators should be authorized those unit's operating and living in isolated areas.

Item: Theater Table of Allowances:

Discussion: A theater table of allowances should be established to allow unit's to have on hand certain items of equipment not authorized on it's TOE. Examples of these items are:

- a. Additional power generation equipment
- b. Water pumps for each unit so as to obtain shower water for personnel and fill tank trucks hauling water for construction tasks.
- c. Authority to draw additional weapons, such as mortars, when operating independently in isolated areas.

A MTOE submission is not the answer to this problem because the requirements would change from location to location and mission to mission.

Observation: A procedure should be available to units to obtain equipment necessary because of its mission and current location. Submission of a MTOE is too unwieldy and inflexible.

5. Maintenance:

Item: Handset Deadline for AN/VRC-46 and AN/PRC-25

Discussion: The handset for the above radios has a tendency to acquire condensation during the raining season, causing the handset to short. With the handset inoperable the radio is deadlined.

Observation: The majority of radios deadlined in this unit are deadlined for handsets. Either these handsets should be improved or replacements handsets included in PLL.

Item: Shelter Halves:

Discussion: The regular issue shelter halves have not proved satisfactory for continued use. Due to the nature of the tactical situation, squad tents cannot be used. The shelter halves do not repel rain satisfactory, especially during the monsoon season. The size of the tent is inadequate for two men who are required to live in it for long periods of time, and the shelter halves are unnecessarily bulky and heavy considering their usefulness.

Observation: The poncho is light weight and compact and repels rain satisfactory. Tents made out of similar material and made larger would improve the living conditions in the field.

Item: Towing of 5 ton Dump Trucks:

Discussion: TM 9-2320-211-10 paragraph 18, figure 31, step one, shows that the 5 ton will be towed by wrapping a tow chain around the central portion of the front bumper. This causes considerable damage to the bumper, usually causing it to be bent into a "V" shape.

Observation: All drivers in this unit are instructed to attach the tow-chain to the towing shackles. In the preceding months, this technique has been used successfully and no damage has been noted to the bumper, bumper supports, or towing shackles.

Item: Vehicle Brake System Failures:

Discussion: This unit experienced a significant increase in the number of vehicle brake system failures after the start of the rainy season. The continual rain turns the roads, job sites, and motor parks into a sea of thick, heavy mud. Continuous operation under these conditions causes the brake drums to become packed with mud. The drum and shoes eventually become so packed with mud that the brakes fail to function. The mud in the drums also causes unusually rapid wear to the linings of the brake shoes and to the facing of the drum.

Observation: During operations in extremely muddy conditions the vehicle brake systems must be cleaned at least once a week. Even with periodic cleaning brake shoes and brake drums will wear out much more rapidly than during the dry season.

Item: Quarry Operation with 600 CFM Compressor:

Discussion: The under carriage of the 600 CFM Inger Sol - Hand Rotary Compressor has not proved heavy enough to withstand movement round the floor of a quarry. The tie - rod bends or the gonue cracks or becomes loose; these failures causes considerable lost time, especially when equipment is being moved prior to blasting. As a temporary measure, the air compressor was removed from its under carriage and attached to the undercarriage of a water trailer, the towing hitch was modified so that the trailer could be pulled by a dozer, and a stand was added to the rear to give the trailer stability when detached from the prime mover. This modification has proven to stand up well under the conditions found on the floor of a quarry.

Observation: The undercarriage of the 600 CFM Inger Sol-Hand Compressor should be redesigned to withstand the conditions found on the floor of quarries

Item: Replacement of Equipment:

Discussion: The equipment that this unit brought to Vietnam over a year ago is becoming increasingly difficult to maintain. This is caused by the combined effects of long work hours, minimum time allotted for maintenance and difficult road, terrain, and weather conditions. Due to these conditions like equipment tends to become unserviceable at about the same reasons; examples of these failures are; engines, clutches, and injector pumps, in addition, most of the seals in the power train also begin to leak. This excessive rate of failure results in an unusually high deadline rate, and unreasonable maintenance workload, and unrealistic demand on the repair parts supply system, and drastically effects the ability of the unit to accomplish its operational mission.

Observation: A program should be established to determine criteria for removal of equipment from service replacement by a like item, and return of the old equipment to depot for rebuild.

Section 2, Part II, Recommendations

1. Personnel: Organizations could plan to eliminate rotational humps by early personnel actions.

2. Operations:

a. Mine Clearing: See inclosure 1

b. AIK Laborers: An effective use of AIK laborers is carrying bulky material into areas not trafficable by vehicle. Avoid operations that require skilled personnel.

c. Bridge Construction: Pile bridge construction is recommended as the most normally feasible and most economic bridge for rice paddy streams.

d. Bank Erosion: Concrete filled sandbags are recommended as effective expedient rip rap material for bank erosion.

3. Training and Organization:

a. Automatic Weapons: Recommend that upon conversion to the "L" series TOE this battalion be authorized to retain the 4 each 50 Cal machine guns and 6 each M-60 machine guns, now authorized per line company in the "D" series TOE. Additionally, one each 81 mm mortar is required per line company.

d. TOE 5-35E: Recommend that this battalion be given priority in receiving authority to comment to TOE 5-35E.

e. Aviation: Recommend that this battalion be provided with one UH1 aircraft.

4. Logistics:

a. Generators: Recommend that one each 10 KW generator be authorized each line company of this battalion.

b. Theater TA: Recommend that a theater TA be established to allow items of special equipment and weapons to be issued to units whose mission so requires.

5. Maintenance:

a. Radio Handset: Recommend that handsets for ANVRC 46 and ANPRC 25 be improved, replaced, or extra handsets included in PLL.

b. Shelter Halves: Recommend that a more effective shelter half be developed that will be more useful in RVN climate.

c. Towing 5 ton Dump Trucks: Recommend that towing procedure shown in TM 9-2320-211-10 be eliminated from the manual as poor practice.

d. 600 CFM Air Compressor: Recommend that the undercarriage of the above air compressor be redesigned to withstand rough conditions normally found on quarry sites.

Replacement of Equipment: Recommend that a program be established for replacement or rotation of critical items of equipment as required.

1 Incl
Viet Cong Land Mines w/6 Incl's

T. R. FULTON
LTC CE
Commanding

DISTRIBUTION:

CO, 45th Engr Gp (Const)	10
CINCUSARPAC	2
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CG, 18th Engr Bde	15

EGD-3 (31 Jan 67) 1st Ind SGM Winter/wdc/QL 131
SUBJECT: Operational Report - Lessons Learned (RCS CSFOR-65), for Quarterly
Period Ending 31 January 1967

HEADQUARTERS, 45th Engineer Group (Construction), APO 96238, 22 Feb 67

THRU: Commanding General, 18th Engineer Brigade, APO 96377
Commanding General, United States Army Engineer Command, Vietnam,
APO 96491
Commanding General, United States Army, Vietnam, ATTN: AVC-DH, APO
96307
Commander in Chief, United States Army, Pacific, ATTN: GPOP-MH,
APO 96558

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

Concur with observations of Commanding Officer, 39th Engineer Battalion
(Combat).

1 Incl
nc

GEORGE M. BUSH
Colonel, CE
Commanding

AVBC-C (31 Jan 67) 2nd Ind Cpt Mills/dlr/DBT-163
SUBJECT: Operational Report - Lessons Learned For the Period
Ending 31 January 1967 (RCS CSFOR-65)

Headquarters, 18th Engineer Brigade, APO US Forces 96377

TO: Commanding General, U.S. Army Engineer Command, Vietnam, (Prov)
ATTN: AVCC-BC, APO US Forces 96491

1. This headquarters has reviewed the Operational Reports - Lessons Learned for the Period Ending 31 January 1967 from Headquarters 39th Engineer Battalion (Combat) (Army), as indorsed, and concurs with the Observations of the Commanding Officer.

2. Following comments are added:

a. Section I, para d (10) - Equipment Shortages - All equipment shortages have been reported. Two (2) 1/4 ton trucks have been issued; no status information is available on other shortage items. Shortages exist in all units for many of these items. Recent action was initiated to cancel requisitions for controlled items and resubmit new ones to update records of 14th ICC.

b. Section I, para f (2) - The deadline rate for 5 ton trucks can be reduced by increased training of operators on proper operation and 1st echelon maintenance. Units are being advised to maintain wash points to reduce damage by mud, sand and dust.

c. Section 2, Part I, para 1 - Rotation of Personnel - Brigade policy to reduce the effects of the personnel rotational hump within units is to determine those critical positions within a unit where rotation of these individuals within a 30 day period would reduce the unit effectiveness. A personnel exchange should be requested from the next higher headquarters listing MOS, grade, and desired DEROS, for these critical positions. This exchange program should be spread over a 3 to 6 month period, to allow a smooth transition of personnel in responsible positions and continuity of operations.

d. Section 2, Part I, para 3 - Bridge Construction - Concur with the advisability of constructing pile bents in rice paddy areas. Fluted steel piles are not normally available to constructing units. When timber piles are not long enough, recommend use of either steel H-pile or smooth circular pile, which are more easily handled and more readily available. It is not considered necessary to add fluted steel pile to the inventory.

e. Section 2, Part I, para 3 - Shortage of Automatic Weapons - This unit has requested grenade launchers, 40mm, M-79, and 81mm mortars, one per company, through MTOE action.

AVBC-C (31 Jan 67)

SUBJECT: Operational Report - Lessons Learned For the Period
Ending 31 January 1967 (RCS CSFOR-65)

f. Section 2, Part I, para 3 - TOE - 5-35E - Most recent status information on conversion of the 39th Engineer Battalion to the "E-Series" TCE, submitted 3 October 1966, is that it departed Hq, USARPAC for DA on 19 December 1966.

g. Section 2, Part I, para 4 - Lack of Power Generation Equipment - Authorization for 10 KW Generators was included in MTOE action recently submitted.

h. Section 2, Part I, para 4 - Theater Table of Allowances - Authorization to obtain equipment necessary for specific missions and location may be obtained by requesting temporary loan under provisions of paragraph 21e, AR-310-34, when inclusion by MTOE would be inappropriate. Unit is being advised.

i. Section 2, Part I, para 5 - Handset Deadline for AN/VRC-46 and AN/PRC-25 - Handsets may be authorized for stockage in unit PLL if a fringe file shows at least 3 demands in a 180 day period. Unit is being advised.

j. Section 2, Part I, para 5 - Quarry Operation with 600 CFM Compressor - Concur, this headquarters has no record of an EIR being submitted for this item. Unit is being advised to submit an EIR if this has not been done.

k. Section 2, Part I, para 5 - Replacement of Equipment - Replacement factors established in AR-750-520 and AR-750-2300-7 are based on usage factors of 1000 hours for Engineer Equipment and 6000 miles for Vehicles per year. Common utilization factors in Vietnam are 6000 hours and 40,000 miles per year. Replacement/rebuild criteria should be established based both on age and utilization rather than on age as currently used. This would not be a new program, but merely a clearer criteria to implement the present one.

HAROLD J. ST. CLAIR
Colonel, CE
Acting Commander

AVCC-MHD (31 Jan 67) 3d Ind MAJ Fowler/ccb?BH 478
SUBJECT: Operational Report-Lessons Learned (RCS CSFOR-65) for Quarterly
Period Ending 31 January 1967

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

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

1. The subject report, submitted by the 39th Engineer Battalion (Cbt), has been reviewed by this headquarters and is considered adequate.

2. The recommendations and comments submitted by the indorsing and submitting commanders have been reviewed and this headquarters concurs with report as indorsed.

FOR THE COMMANDER:

RICHARD J. DUCOTE
Colonel, CE
Chief of Staff

AVHGC-DST (31 Jan 67) 4th Ind
SUBJECT: Operational Report-Lessons Learned for the Period Ending
31 January 1967 (RCS CSFOR-65) (U)

HEADQUARTERS, UNITED STATES ARMY VIETNAM, APO San Francisco 96307

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

1. This headquarters has reviewed the Operational Report-Lessons Learned for the period ending 31 January 1967 from Headquarters, 39th Engineer Battalion (Combat)(Army) as indorsed.

2. Pertinent comments follow:

a. Reference item on rotation of personnel, page 11; paragraph 1, page 16; and paragraph 2c, 2d Indorsement: Concur in the recommendation that organizations should plan early to eliminate rotational humps. USARV Regulation 614-9 prescribes the actions that should be taken. They include requisitioning personnel to arrive up to 30 days early, curtailment of selected personnel up to 45 days prior to their normal DEROS, and infusion between units.

b. Reference items on the shortage of automatic weapons, page 13, and the lack of generators, page 14; paragraphs 3a and 4a, page 17; and paragraphs 2e and g, 2d Indorsement: The procedures for requesting equipment in excess of current TOE allowances are described in USARV Regulation 310-31 and USARV message (U) AVHGC-OT 19073, DTG 251132Z March 1967, subject: Changes in Equipment Authorizations. MTOE 5-36E, currently pending DA approval, includes the requirement for only one 10-KW generator, augmenting the TOE of the combat construction section of Headquarters and Headquarters Company.

c. Reference item on the authorization for TOE 5-35E, page 13; paragraph 3b, page 17; and paragraph 2f, 2d Indorsement: DA message 795798, DTG 012001Z May 1967, grants USARPAC authority to publish General Orders reorganizing the 39th Engineer Battalion under TOE 5-35E. A copy of this message has been furnished US Army Engineer Command Vietnam (Provisional). General Orders have not been received at this headquarters.

d. Reference item concerning the lack of aviation support, pages 13 and 14; and paragraph 3e, page 17: Aviation assets are in short supply in RVN. The priority of issue is to combat units. Those aviation assets which are available to combat support and combat service support units are not normally assigned or attached to battalion size units but are pooled at major headquarters and allocated to battalion and smaller

AVHGC-DST (31 Jan 67)

4th Ind

SUBJECT: Operational Report-Lessons Learned for the Period Ending
31 January 1967 (RCS CSFOR-65) (U)

units on a priority of mission basis. Those aviation units organic to, attached to, or supporting major combat units are under the operational control of those units and are employed as the commander desires. Combat support engineer units must receive required aviation support from either their major headquarters or from the unit they are supporting.

e. Reference item on a theater TA, page 14; paragraph 4b, page 17; and paragraph 2h, 2d Indorsement: Concur with comments of 18th Engineer Brigade in 2d Indorsement.

f. Reference item on handset deadline, page 15; paragraph 5a, page 17; and paragraph 2i, 2d Indorsement: Action taken, as reported in 2d Indorsement, is considered adequate. USAECOM has developed an improved version of the H-138 handset now used with the VRC-12/PRC-25 series radios. The new handset, H-189, will replace unserviceable H-138 handsets on an attrition basis as future stock levels permit. Design changes in the H-189 make it an improved item in regard to cases and water leakage.

g. Reference item on shelter halves, page 15, and paragraph 5b, page 17: A lightweight tent, developed for Australian forces in RVN and areas with similar climatic conditions, was recently evaluated in RVN. The results of the evaluation have not been published. If the report of evaluation so indicates, consideration will be given to limited procurement of the item for US forces under the procedures for expediting non-standard urgent requirements for equipment (ENSURE).

h. Reference item on towing 5-ton dump trucks, page 15, and paragraph 5c, page 17: Concur with unit's observation and recommendation. Unit will be encouraged to submit the suggestion through the incentive awards program, citing tangible and intangible benefits derived.

i. Reference item on quarry operations, page 16; paragraph 5d, page 17; and paragraph 2j, 2d Indorsement: Concur with action taken by 18th Engineer Group, as reported in 2d Indorsement.

j. Reference item concerning the replacement of equipment, page 16; paragraph 5e, page 17; and paragraph 2k, 2d Indorsement: Concur. A closed loop program for construction equipment is currently scheduled to begin in May 1967, and one for tactical vehicles (including dump trucks) is scheduled to begin in late June 1967. These programs provide systematic replacement and/or overhaul of selected items of equipment.

AVHGC-DST (31 Jan 67)

4th Ind

SUBJECT: Operational Report-Lessons Learned for the Period Ending
31 January 1967 (RCS CSFOR-65) (U)

k. Reference paragraph 5a of Inclosure 1, concerning the need for published doctrine and additional training on minefield breaching: Recommend that the comments of unit be forwarded to appropriate CONUS agencies for consideration.

l. Reference paragraphs 5b and c of Inclosure 1, concerning mine detection and clearing equipment: Requirements for vehicular mounted mine detectors and mechanical mine clearing devices were reported under ENSURE procedures in November 1965 and May 1967, respectively. A limited quantity of vehicular mounted mine detectors are scheduled for shipment to RVN in August 1967. The mechanical mine clearing device is currently under study by the Engineer Research and Development Laboratory.

FOR THE COMMANDER:

1 Incl
nc

E. L. KENNEDY
CPT. AGC
Asst Adjutant General

GPOP-DT(31 Jan 67)

5th Ind

SUBJECT: Operational Report-Lessons Learned for the Period Ending
31 January 1967 (RCS CSFOR-65), HQ 39th Engr Bn (Cmbt)(Army)

HQ US ARMY, PACIFIC, APO San Francisco 96558

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

This headquarters concurs in the basic report as indorsed.

FOR THE COMMANDER IN CHIEF:

1 Incl

H. SNYDER
CPT, AGC
Asst AG

EGDBA-E (22 Jan 67)
SUBJECT: Viet Cong Land Mines

1st Ind

HEADQUARTERS, 39TH ENGINEER BATTALION (COMBAT)(ARMY), APO 96316 26 Jan 67

TO: Commanding Officer, 45th Engineer Group (Const), APO 96238

1. Reference letter subject: Investigation of Mine Clearing Operations, dated 5 November 1966.

2. The basic letter is a study on Viet Cong Land Mines encountered in this area of operations which was conducted by my S-2 and S-3 with the objective of improving our mine detection techniques on route clearing missions. The results of the tests conducted are not necessarily conclusive as we have not had the time or the equipment necessary to conduct a thorough detailed test program. However, the results obtained are considered worth forwarding for your information and if appropriate, further evaluation by the proper agencies.

3. The results obtained from the detectability test (Incl 2) would be misleading without further explanation. The VC mines tested were buried in clay soil common to this area and could be detected with a "high" detector setting as deep as 15 inches below the ground surface. All this proved was that the detector will operate well in areas with normal soil conditions. Earlier tests (reference paragraph 1) conducted on route 7B (a gravel all weather road) disclosed that the rock in the base course contained a high iron content, and as a result, such a high background noise emitted from the audio system that mines buried more than 5 inches below the surface could not be detected. The majority of the roads throughout this area contain the same base material, consequently most mines have been discovered by visual inspection or accidental detonation.

4. The following action has been taken at this level to improve our route clearing techniques:

a. The draft SOP for route mine clearing operations (Incl 7) has been approved and published.

b. Within the next thirty (30) days all line companies will conduct intensified refresher training in route mine clearing procedures as well as in operation and maintenance of the standard portable metallic mine detector.

c. Closer coordination has been effected with supported FWM forces to insure better security on continuously traveled MSF's. This includes requests for more frequent ambush patrols and H&I artillery fire at night where appropriate.

d. Better sand bag blast protection is being sought for the driver of the loaded 5 ton dump truck that follows each mine clearing team. A special sand bag well is being constructed under the left front fender and will be tested in hopes that it will block the blast which is directed at the drivers legs when the left front wheel detonates a mine.

Incl 1

EGDBA-E
SUBJECT: Viet Cong Land Mines

1st Ind (Cont'd)

26 January 1967

e. Copies of this report will be included with the next "Operational Lessons Learned" and "Geronimo I After Action Report" when prepared by this battalion.

f. A UER is being prepared on deficiencies experienced with the present mine detector.

4. Recommend that:

a. The Engineer School be advised that added emphasis should be placed on training procedures for route mine clearing during AIT and BUT.

b. Vehicle mounted mine detectors and mechanical mine clearing equipment be obtained for use by units engaged in extensive route mine clearing operations.

c. An adequate float of mine detectors be established at each support maintenance facility in view of the unusually high deadline rate for this piece of equipment.

T. R. FULTON
LTC CE

INFORMATION COPY:
CO, 1st Bde, 4th Inf Div
ATTN: S-2

OPERATIONS SECTION
HEADQUARTERS
39TH ENGINEER BATTALION (COMBAT) (ARMY)
APO 96316

EGDBA-E

24 January 1967

SUBJECT: Viet Cong Land Mines

TO: Commanding Officer
39th Engineer Battalion (C) (A)
APO 96316

1. Situation: This battalion became particularly concerned with detection and removal of V.C. Land mines employed on tactical road nets during October and November 1966. During operations Seward and Geronimo I, conducted in support of the 1st Bde, 101st Abn Div, all line companies were actively engaged in road clearing operations. At present the battalion is responsible for the daily clearing of ninety (90) miles of tactical road net.

2. Background: Of most concern has been a 2½ mile stretch of route 7B from CQ 065395 to CQ 100420. "A" Company of this Battalion began daily clearing operations 21 October 1966 when the second platoon began construction of bridges on route 7B. (See inclosure I)

a. On 22 October 1966 a mine sweeping team discovered by visual inspection the first of numerous mines to be located in the subsequent 27 days. It was an electrically detonated, pressure initiated mine with approximately 12-15 lbs of explosive wrapped in black cloth and bamboo strips. The firing device was wrapped in a plastic material which acted as water proofing for its mechanism.

b. The first platoon "A" Company, on 25 October 1966, moved out route 7B to construct bridges further west toward CUNG SON. Prior to the mine sweep a cow had detonated the second mine on the road since the start of the operation.

c. By 28 October 1966, 48 kilometers of route 7B had been divided into four (4) sections, with sweep teams located at five (5) points. The teams began at first light and swept toward each other. A loaded 5 ton was started at each end, behind the teams, and when they linked up the road was presumed clear.

24 January 1967

SUBJECT: Viet Cong Land Mines (Cont'd)

d. On 30 October 1966, after the road had been swept, a 2½ ton truck in a convoy of transportation trucks hit the third mine. This vehicle was the third or fourth vehicle in the convoy. On 1 November 1966, prior to arrival of the sweep teams, a cow detonated the 4th mine. The fifth mine was set off by a towed howitzer in a convoy on 3 November 1966.

e. On 4 November 1966, it was learned that the section of road where the mine incidents were occurring was not the responsibility of either the 47th ARVN Regiment or the local RF/PF units to secure. "A" Company took over the responsibility by running platoon size night ambushes along this section. On 5 November 1966, in an area further east from the earlier incidents, a 2½ ton truck hit the 6th mine. It was the 11th vehicle in the convoy. The ambush patrols were continued until 15 November when the company was given other commitments, which precluded continuation of the ambush patrols. There were no mine incidents during this period.

f. On 16 November 1966, the loaded 5 ton moving west behind the sweep team hit a mine east of all earlier incidents. The road surface was extremely hard packed rock with no evidence of disturbance. A wrecker was dispatched to recover the 5 ton. It drove up to the disabled vehicle, then backed up about 300 feet to turn around on the narrow road. After turning around, the wrecker began backing toward the 5 ton. When it got to within approximately 100 feet the left forward duals detonated the 8th mine. The road surface here was also hard packed rock with no evidence whatsoever of disturbance.

g. The mine sweep of this section of road became the responsibility of the 1st platoon on the following day. They were instructed to hold the detectors one (1) inch above the road surface and dig up the whole road if necessary. Sweeping in this manner they covered 1 kilometer of road in 4½ hours. One (1) mine was discovered, disarmed and sent to S-2 for testing. (See data). The road was not opened on the 17th of November. On 18 November 1966, the sweep was conducted in the same deliberate manner and two (2) more mines were located. The two (2) mines were 100 feet apart east of the two (2) exploded on 16 November 1966. A different firing mechanism, utilizing a nail and crimp cartridge, was used to activate these mines. The charges were wrapped with a metallic looking plastic material. Wires were located leading into the side of the mine indicating possible booby trapping or command detonation. The charges were blown in place. No evidence of wires could be found after the explosions. The road was opened at 1800 hours, too late for traffic to use it.

h. Requirements for continuous use of the road prevented further deliberate sweeping. From 19 November to 11 December 1966, a hasty sweep was conducted with deliberate checking of suspicious areas. On 12 December 1966, "B" Company assumed responsibility to sweep route 7B on an as required basis.

EGDBA-E

SUBJECT: Viet Cong Land Mines (Cont'd)

3. Discussion:

a. It is noted that route clearing in Vietnam is a very demanding and time consuming task. Where in other less static tactical situations, routes would be swept, units moved forward, and the area secured, this is not always the case in Vietnam. Very few of the supply routes are completely secured from mining. From another viewpoint, all routes are susceptible to mining due to the basic partisan tactics used by the V. C. In addition to this, tactical areas of responsibility are large, and in general the engineer unit organic to a tactical unit is usually one order of magnitude smaller than is required for constant combat support. For example, a brigade size/unit is so spread apart and relies on so many supply routes, that the organic engineer company cannot possibly clear the required roads daily and still allow early passage of traffic.

b. The problem that presents itself then is daily route clearance of an ever increasing road net. As trafficable road net works increase, and ratio of combat support to tactical elements remains constant, consideration must be given to defining what is meant by a "cleared" road.

(1) For roads newly opened as part of a current tactical operation, or roads that are routinely mined, deliberate mine sweeping and clearing operations are necessary every day. In addition, the tactical commander must be aware of his responsibilities in securing this road, to prevent as much as possible, mining and bridge destruction.

(2) For roads that have been open for longer periods, which are in reasonably secure areas, and which are not routinely mined, visual recon, hasty sweeping of potholes, cuts, or other easily mined sections, and checks on bridges and culverts is in order.

(3) For other frequently traveled roads or vital supply routes, it is worthwhile to have at least a routine visual reconnaissance daily, with objective of discovering any obvious attempts at mining or placement of command demolitions at bridges and culverts.

c. The above discussion is of course an over simplification of the problem. The enemy situation, frequency of mining, amount of traffic on the road, type pavement construction, all bear on the problem. Sometimes a calculated risk is necessary because of tactical commanders requirements for rapid movement, and a road is cleared more hastily than would seem desirable. In another instance it is possible to hastily sweep an entire road section and deliberately sweep a fraction of it each day. This serves two purposes: it increases the chance of discovering mines which are buried deep and have been previously undetected and it raises the probability of detecting new mines while staying within the unit's capability of having the road open in a reasonable time.

SUBJECT: Viet Cong Land Mines (Cont'd)

4. Conclusions:

a. The methods of probing taught in school are not wholly applicable to uncovering mines in road beds. Rock and compacted clay have to be chipped and pried away.

b. Problems with metallic content in the rock on the road surface wasted a great deal of time. A reading would be obtained at several points around the edge of the hole being created by the probers. The detector reading would continue to move as the edge of the hole was widened.

c. The intermediate setting on the detector seemed to offer maximum detection of metallic objects and minimum detection of metallic rock.

d. The mines found under the undisturbed rock surface had been in the ground a long time. The mines all exploded under vehicle wheels which would appear to confirm pressure detonation.

e. Potholes and dips are areas to check carefully. After the soil is disturbed by planting the mine, it becomes compacted under wheel loads to create shallow potholes. Continued wheel loads eventually compact the area enough to detonate the mine. As the hole becomes deeper, impact loads would tend to drive the contacts together.

f. All mines were located on the left side of the road with the exception of the one hit by the wrecker. The narrow road forced the vehicles to travel in approximately the same tracks. All mines were under these tracks.

g. In addition to sandbagging floors of vehicles, windshields should be sand bagged down. Sand bags on the hood above the dash cut down on the flying metal or glass.

h. Unless the road is completely secured, the Viet Cong have little trouble planting mines where the road is torn up. Stay behind patrols, dropped off by the sweep teams, night ambush, and night artillery fire over the road with VT fuse will hinder mining activity.

i. Mine detectors are a useful tool with which to search buildings in villages along the road. Operated in conjunction with Infantry surrounding the village, an Engineer search team can do a thorough job in uncovering mines, booby traps, ammunition and weapons hidden in villages.

j. Mine detector faces are extremely fragile and show wear when used for continued deliberate sweeping. Handles break easily. More rugged construction would keep them operational for longer periods of time.

24 January 1967

SUBJECT: Viet Cong Land Mines (Cont'd)

k. Organizations required to clear extensive road networks daily, should be provided with vehicle mounted detectors and special equipment such as the "Larruping Lou" for "proof rolling."

5. Recommendations:

a. That the engineer school be advised of the need for published doctrine and training specifically in route clearance. The emphasis in manuals and schools is on minefield breaching.

b. That action be taken to expedite acquisition of detector system that operates on a density or other non metallic principle.

c. That this organization be provided with special mine clearing equipment as described in paragraph 4k above.

d. That Inclosure 7, a draft SOP for route clearance, be approved as battalion SOP.

7 Incl

1. Sketch Map
2. Test Results - Detecting
Bamboo Firing Device
3. Test Results - Mine Characteristics
4. Sketch - Types of Firing Devices
5. Cross Section of Installed Mine
6. Draft - Mine Clearing Operations SOP

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S3

TEST RESULTS - DETECTING BAMBOO FIRING DEVICE

A detectability test was run by S-2 on a recovered mine with firing device. The mine was buried at different depths and a detector passed over the area. The detector was kept at a distance of 3" above ground level. The following results are submitted.

Depth to top of Firing Device	<u>Detector Reading</u>		
	Low	Inter	High
Ground Level	Loud	Loud	Loud
3" below ground level	Faint	Loud	Loud
6" below ground level	Very Faint	Faint	Loud
9" below ground level	None	Very Faint	Loud
12" below ground level	None	Very Faint	Medium
15" below ground level	None	None	Faint
18" below ground level	None	None	None

Incl 2

TEST RESULTS - MINE CHARACTERISTICS

1. A recovered mines was buried at a depth of 12" in moist sandy loam with a 4" rock/clay surface and detonated. The resulting crater was 3 feet deep and 8 feet in diameter. This crater was similar to those caused by vehicle detonation. The explosive causes extensive damage, and is undoubtedly very high velocity. The normal explosive was a yellow, white powder. The explosive was not identified. A sample has been given to IFFV G-2 for analysis.

2. Conditions affecting pressure required:

a. The firing device is activated by shearing four (4) bamboo pegs of approximately $\frac{1}{4}$ " diameter.

b. Because the pegs are hand carved from bamboo and can vary in thickness, length and length of time cured, they will necessarily vary in strength.

c. The pegs may not break at all, and may shear the holes in which they are inserted, or may become wedged in the oversized top cup.

d. Twenty (20) pounds of water was enough to cause a contact with the device sitting on a hard surface.

e. The device was found buried with the overlapping lip on the top, thus the moving part is forced to crush down the earth and rock filled in around and under it. Therefore depending on the type of soil and length of time buried, it can take from twenty (20) pounds to many hundreds of pounds to set the device off.

f. It is conceivable that the device itself would crush in some instances where rocks would lodge between the upper slide cup and the mine itself.

3. Calculations:

a. Assume the shear strength of bamboo to be 200 psi.

b. Assume same pressure with firing device buried, as with it placed above ground.

Incl 3 (1)

c. Pressure Required to Shear Pins:

$$P = f_a = 200 \left[\pi (1/8)^2 \right] = 200 (0.049) = 9.8 \text{ p.s.i. / pin}$$

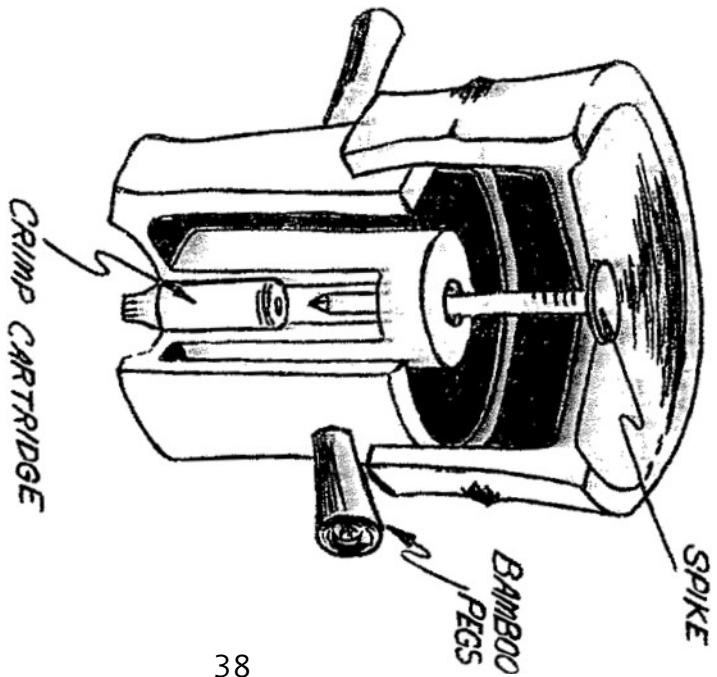
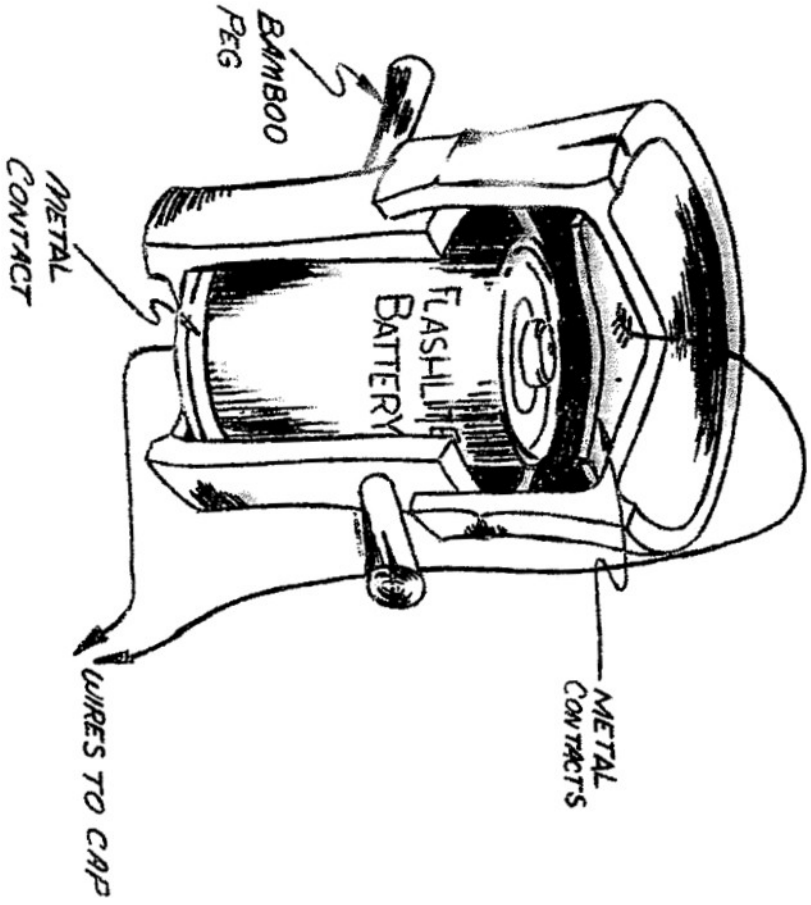
$$P_{\text{tot}} = 9.8 (4) = 39.2 \text{ p.s.i.}$$

d. Tire Pressure required:

$$T_p = \frac{P_{\text{tot}}}{f} = \frac{39.2}{1.1} = 35.6 \text{ p.s.i.}$$

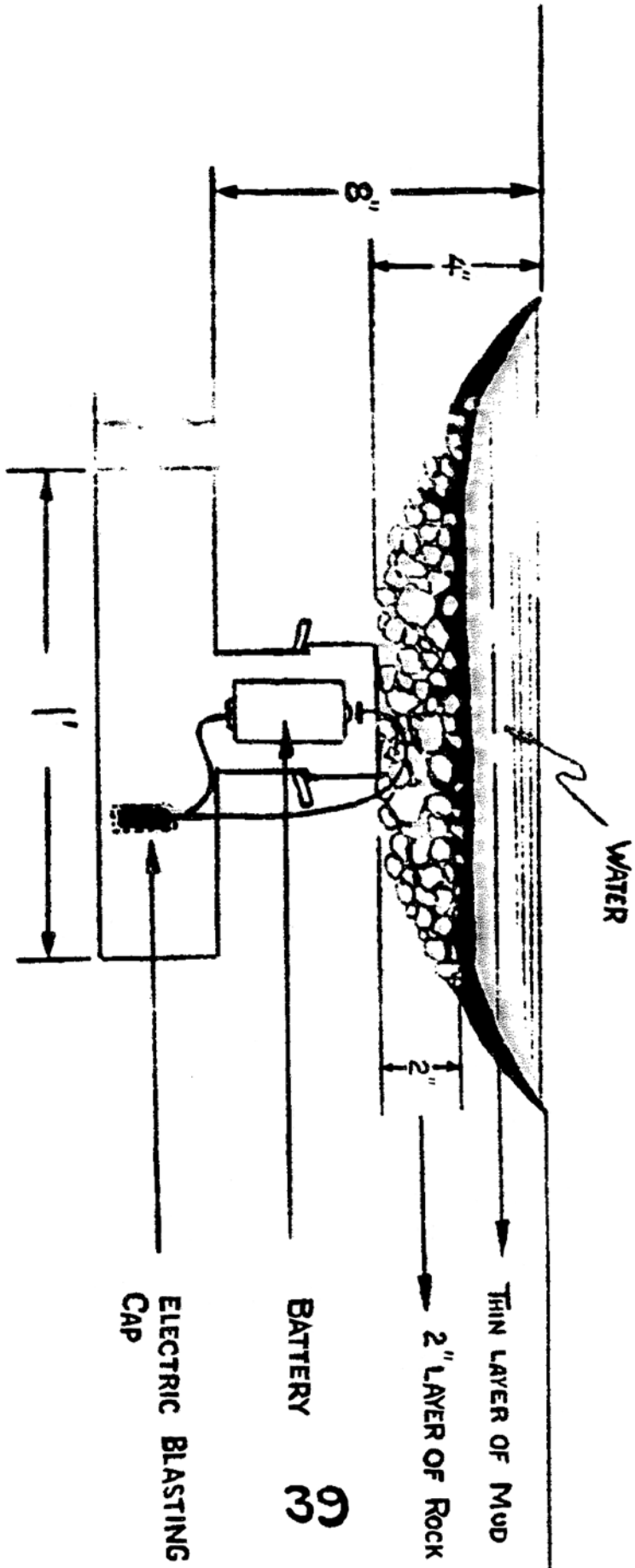
Incl 3 (2)

= TYPES OF FIRING DEVICES =



NOTE:
METAL CONTACTS WEDGED
IN TOP AND BOTTOM OF FIRING
DEVICE

CROSS SECTION OF INSTALLED MINE



Part 6 Mine Clearing Operations

1. Reference:

- a. FM 5-25
- b. FM 20-32
- c. TM 9-1910

2. General: Clearing routes of land mines is a daily mission of this battalion. It is necessary that all engineer troops be fully familiar with procedures outlined in the above references and this SOP. Knowledge of proper doctrine and procedures is necessary for the successful, safe, completion of mine clearing.

3. Definitions:

a. Deliberate Sweep: A deliberate sweep will be conducted by mine clearing teams when a road is opened initially to traffic, if the tactical situation permits. This will ordinarily be conducted in conjunction with an operation. A deliberate sweep will also be conducted over stretches of roads where frequent mine incidents are being reported, after a hasty sweep has been conducted to open the road to traffic. Two (2) operators are assigned the right & left, of the road. When a reading indicates a buried metallic object, one of the probers comes forward and digs for it. The third operator is used to recheck the hole whether anything is found or not. The point men and probers should be particularly observant for wires indicating possible command detonated mines. The detectors are held as close to the ground as possible and every square inch of the road surface is covered with the detector. The high setting on the detector should be used on this type of sweep. Experience has shown it is possible to cover about 1K in 4 hours using this method.

b. Hasty Sweep: A hasty sweep is conducted over roads when it is urgent that traffic use the road. The detector operators walk at a normal pace sweeping back and forth. Any areas that are suspicious such as potholes, dips, etc are thoroughly checked as in the deliberate sweep. The intermediate setting on the detector should be used for the hasty sweep. Here also, the probers or point men should be observing for wires to command detonated mines, particularly around bridges and culverts.

c. Mine Recon: A mine recon is conducted over heavily traveled MSF's that have had no mine incidents for some time, or, that are secured by friendly troops. A small team in a jeep drives over the road, carefully observing for any evidence of mining activity on the road.

Part 6 Mine Clearing Operations (Cont'd)

4. Organization and Equipment of Route Clearing Teams: This organization is typical only. NCOIC must insure that his team is aware of responsibilities, safety, and emergency actions.

- a. Three (3) detectors with operators.
- b. Three (3) probers with bayonets.
- c. One (1) medic (not riding in the vehicle).
- d. One (1) radio operator with radio (not in vehicle).
- e. One (1) driver with sandbagged 5 ton (only person to ride in vehicle, when troops are being transported, they should only be in the rear riding on the sand bags).
- f. One (1) NCOIC with map and wire cutters.
- g. Security depending on the tactical situation.
- h. 150 feet of light line or telephone wire with a small A frame for pulling mines.
- i. Demolitions to include 10# TNT in $\frac{1}{2}$ # blocks, 10 electric caps, blasting wire, battery or blasting machine, and non-electric system if desired.

5. Discovery of Mines, Booby Traps, Demolitions: When an explosive device is discovered, make an attempt to recover it by safe means. Dig carefully around the mine until a grappling hook or wire can be passed through it or under it and attempt to pull it with a line and small A frame. The mine should not be blown in place unless it is determined that it would be too dangerous to touch. Attempt to collect samples of the mine if possible, such as detonators, explosive, etc. Under no circumstances should anyone attempt to disarm the mine or booby trap if the NCOIC does not think it is safe. Do not take unnecessary risks.

6. Reporting:

- a. A spot report to S-2 is required immediately upon discovery or detonation of any mine or demolitions. It is important that the spot report contain an accurate location (coordinates) of the incident. Use spot report format.

Part 6 Mine Clearing Operations (Cont'd)

b. A written report containing all facts and commanders comments will be forwarded to S-3 within 24 hours of the incident. If possible, sketches of the site showing where the mine was located, shoulders, center of road etc and a cross sectional view of the buried mine should be included. Any recovered intelligence materials should be sent to S-3 within 24 hours.