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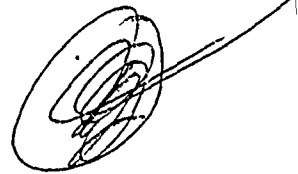
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DEPARTMENT OF THE ARMY
HEADQUARTERS, 35TH ENGINEER GROUP (CONST)
APO 96312



EGA-CG

15 February 1967

SUBJECT: Operational Report on Lessons Learned for Period 1 November
1966 Thru 31 January 1967

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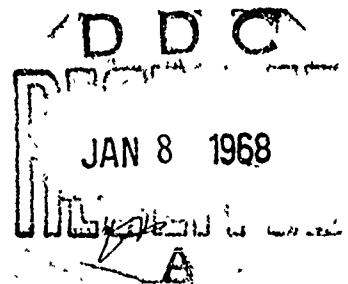
THRU: Commanding General
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APO 96491

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



Section I, Significant Organization or Unit Activities

1. During the period 1 November 1966 until November 1966, the 35th Engineer Group (Construction) was responsible for all non-divisional construction in the area bounded by the South China Sea, and the line formed by the western boundary of the Binh Thuan Province, the western and northern boundary of Lam Don Province, the northern boundary of Tuyen Duc Province, the northeastern boundary of Ninh Thuan Province to 12° north latitude and thence eastward to the South China Sea.

2. During the period 10 November 1966 until 14 December 1966, the area of responsibility was bounded on the west by the Phuyen-Khan Hoa Province boundary from BQ 9208, a straight line south west to junction of the boundaries of Darlac, Khanh Hoa, and Tuyen Duc Provinces vicinity BP 4802, thence along southern boundaries of Darlac and Quang Duc Province to intersection with the II-III CTZ boundary. The northern limitation was the Phuyen-Khahn Hoa Province boundary east to CQ 1820, then Southeast to the South China Sea. The southern limitation was the II-III CTZ boundary and the eastern limitation the South China Sea.

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3. During the period 14 December 1966 until 31 January 1967, the area had boundaries as in b) with the exception of the northern boundary which shifted south to a straight line along the east-west grid line BP 1580.

4. The main construction effort continued to be concentrated at Cam Ranh Bay for the development of the Cam Ranh Bay Logistics Area, Depot and Port Facilities. Additional effort was expended in Phan Rang, Dong Ba Thin, and Nha Trang. Nha Trang construction centered around Hon Tre Island. Effort began to shift from depot construction to lines of communication and Operational Support Missions. Airfields were constructed at Bao Loc and Song Mae. Construction forces were also employed at Phan Thiet, Preline Mountain, Long Bien Mountain and Dalat.

5. During the period 1 November 1966 to 10 November 1966, the following units were attached to and under the operational control of 35th Engineer Group.

| <u>Unit</u> | <u>Location</u> |
|--|-----------------|
| 62nd Engineer Battalion (Const) | Phan Rang |
| 87th Engineer Battalion (Const) | Cam Ranh Bay |
| 864th Engineer Battalion (Const) | Cam Ranh Bay |
| 497th Engineer Company (PC) | Cam Ranh Bay |
| 102nd Engineer Company (CS) | Cam Ranh Bay |
| 553rd Engineer Company (Float Bridge) 1 Platoon | Cam Ranh Bay |
| 588th Engineer Detachment (Drilling) | Nha Trang |
| 171st Engineer Detachment (Drilling) | Nha Trang |

On 10 November 1966 the 14th Engineer Battalion (Combat) (Army) was assigned to 35th Group and was stationed in Dong Ba Thin. On 12 October 1966 the 39th Engineer Detachment (Concrete) arrived in country and was stationed at Cam Ranh Bay. On 10 December 1966 the 62nd Engineer Battalion (Const) was detached from 35th Group and departed from Phan Rang.

The 102nd Engineer Company, 588th Engineer Detachment, 171st Engineer Detachment, 39th Engineer Detachment, and the platoon of the 553rd Engineer Company were attached to and under operational control of the 864th Engineer Battalion.

6. This report will include only activities of Headquarters, 35th Engineer Group, and the 497th Engineer Company (PC), since the assigned battalions prepare individual reports. A special section is submitted on the Bao Loc Airfield.

7. The 35th Engineer Group has been commanded throughout the period by Colonel William L. Starnes.

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8. The current strength of the 35th Engineer Group (Const) is 2969 out of 3082 authorized. Other than units lost by detachment, the 35th Engineer Group (Const) had 519 persons rotate, which is approximately 17% of the command.

9. The S-1 section processed, hired, and controlled an average of 195 daily hire laborers and 590 direct hire laborers.

10. 497th Engineer Company (PC) Projects.

A. Design and Construct Sheet Pile Bulkhead (Bde 65-42DC-35)

Construction of the 550 IF of sheet pile bulkhead between Piers 2 and 3 was completed as of 15 December 1966. 400 IF of the wall were constructed during this reporting period. The anchorage system was set, completed, and the wall inspected for material leaks during the period 15 December 1966 through 15 January 1967. One section of 875 IF between Pier 4 and the POL Jetty now remains to be completed.

B. Design and Construct Sheet Pile Bulkhead (Bde 66-182DC-35)

Progress on this project has been intermittent due to a series of higher priority delays, and some uncertainty as to the final location of the bulkhead on phase II. As soon as a final location is determined work will continue. Phase II and Phase III remain to be completed.

C. Sunken Barge (Bde 66-229DC-35)

Last quarter this directive was issued to assist in design and location, and with equipment, in the construction of a sunken barge facility at Phan Rang. Due to the complexity of construction, and damages incurred during severe weather the scope was altered and the entire project assigned to the 497th Engineer Company. The barge has been repositioned, secured to the bulkhead, and dolphins will be placed around the facility to secure it.

D. Pontoon Pier (Bde 66-229DC-35)

Construction on the pier has been intermittent, due to construction material shortages (P5M and P5F cubes) and higher priorities elsewhere. Two (2) 3x15 cube sections have been completed and launched. The site location and the configuration of the pier have been altered, and both changes are now being evaluated.

E. Port Facility Repair (Bde 66-200C-35)

During this reporting period a majority of effort has been expended on repair of various port facilities. This has been necessitated by extremely severe weather in late November and, at times, flagrant

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abuse of the facility. The primary repair tasks accomplished are as follows:

a. Barge Off-Loading Facility - The original directive issued on 16 October 1966 specified replacement of bracing and other necessary repairs. During this reporting period 20,185 man hours have been used in making the necessary repairs. Heavy seas and barges using the facility caused extensive damage during the period 20 November 1966 through 3 December 1966. Five (5) twelve pile dolphins failed in shear at the mud line, and both approaches suffered severe erosion, the Western approach washing completely out. New types of sheet pile dolphins have now been designed and installed. (Note later discussion in this report). Both timber bulkheads have been replaced with sheet pile bulkheads, and extensive repairs made on the facility itself, to include decking and bracing.

b. POL Breasting Dolphin - On 10 December 1966 a twenty seven (27) pile breasting dolphin at the Cam Ranh Bay POL Jetty failed in shear when a T-5 tanker left the jetty. After a careful study, it was determined that a twenty seven pile dolphin was insufficient to accommodate T-5 tankers, particularly under the abusive conditions encountered. A new sixteen inch circular steel pile mooring platform was constructed using sixteen inch circular steel pile, with a concrete cap. This design is also new, and is discussed more completely later in this report.

c. Vung Ro Bay - The same storm conditions that caused extensive damage at Cam Ranh Bay also snapped the anchor system on the Floating Pier at Vung Ro Bay. Over a period of six weeks the pier was repositioned, two 15,000 pound anchors were used to reanchor the pier, and five (5) twelve pile dolphins were driven as a protective system for the facility. Bad weather forced an estimated three week project into an extended one of six weeks, a condition true for all projects engaged in during this period.

d. South Beach Deadmen and Pilings - A system of twenty two circular steel pile were driven and filled with concrete to provide anchorage for LCU's and LST's on South Beach, Cam Ranh Bay.

11. Bao Loc Airfield. See Inclosure 1.

Section 2 Part I, Observations (Lessons Learned)

1. 497th Lessons Learned (Construction)

As a direct result of the extensive damage incurred by part facilities in this theater during the early part of this quarter, (20 November 1966 through 3 December 1966) a comprehensive study of earlier designs was initiated in order to determine:

- a. Adequacy of present designs
- b. New, more durable designs

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The results of this study indicated two areas of concern: one, facilities were designed to accommodate smaller vessels and equipment than that actually used, and also, that a major portion of damages incurred could also be traced to misuse and abuse of the facilities. With these facts in mind, repairs and new construction was planned so that abuse and "overtaxing" of facilities, which was expected, would not cause further damage to the facilities. With these conditions in mind, the following construction lessons are presented:

POL Breasting Dolphin

ITEM: Three (3) dolphins had failed at the POL Jetty.

DISCUSSION: The POL Jetty was designed with twenty seven pile dolphins for use by tankers to breast against. On 10 December 1966 the third dolphin failed when a T-5 class tanker either left the facility with a spring line attached or hit the dolphin while leaving. It is of interest to note that the POL Jetty was designed to accommodate class T-2 tankers.

To prevent future reoccurrences, a new dolphin was designed, using sixteen pile, ninety feet long, (three thirty feet sections welded) driven in this case, a minimum of forty (40) feet; H-beams were used as walers, and a concrete cap placed with a mooring cleat on top.

The new breasting dolphin is giving excellent service, and did not suffer any damage when a T-5 tanker left the facility with a nine inch circumference nylon spring line (tensile strength of 170,000 lbs) attached, but caused tension failure of the line.

OBSERVATION: The new breasting dolphin gives superior results and has proven capable of withstanding severe abuse. It has prevented, on several occasions, the replacing of a conventional dolphin.

Sheet Pile Dolphin

ITEM: Five (5) conventional twelve (12) pile timber dolphins failed in shear during extreme weather conditions. Barges larger than the facility was designed to accommodate were tied off to the dolphins.

DISCUSSION: A radical departure from normal dolphins was decided upon. A sheet pile dolphin 6'7" by 9'3 5/8" was constructed using YSPLII and FSPIII sheet piling, filled with 6" minus, a reinforced concrete cap placed, and circular steel pile positioned in the middle of the dolphin for use as a bitt. Depth of penetration of the sheet pile in this case was twenty feet. The most intricate task performed was the fabrication of four (4) corners for each dolphin, by welding two (2) of the sheet pile at ninety degree angles.

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OBSERVATION: The new design accommodates the largest available barges and can be constructed, except for the concrete cap, in the same time as a conventional nineteen pile timber pile dolphin.

2. 497th Lessons Learned (Equipment)

Modification of Diesel Hammers

ITEM: Modification of diesel hammers is necessary.

DISCUSSION: The diesel hammers in use by this unit (Link Belt 8100 ft lb single acting) have the fuel tanks cap exposed on the top of the hammer. Excessive down time was experienced due to fuel caps and fuel necks damaged during normal operations. CWO/3 Pregler, Unit Maintenance Officer, has designed a guard of one inch diameter steel bar which covers the caps, providing the necessary protection, and yet allowing easy access for refueling.

OBSERVATION: This modification has been submitted through maintenance channels as an Equipment Improvement Recommendation (EIR).

3. Group Lessons Learned (Personnel)

Intelligence Officer

ITEM: Present TOE does not authorize an S-2 Intelligence Officer or Reconnaissance Section in a construction group.

DISCUSSION: Under conditions in Vietnam, construction groups are often given reconnaissance and combat and operational support missions. An S-2 officer with a reconnaissance section at his disposal would be invaluable in gathering and preparing data as to road and bridge conditions, and area enemy activity.

OBSERVATION: The construction group TOE ought to be augmented with an Intelligence (S-2) Officer and a small reconnaissance section.

4. Group Lessons Learned (Operations)

T-17 Membrane Repair

ITEM: Repairing T-17 Membrane on airfields during combat operations.

DISCUSSION: During combat operations, it becomes critical to insure that adequate repair material is available. Repairs must be made to torn and damaged sections immediately to prevent further deterioration. It is difficult to obtain and deliver the glue and membrane necessary after an operation is started.

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OBSERVATION: Each battalion which is responsible for a T-17 membrane airfield should draw and hold as a minimum 60 gallons of glue, 200 feet of patching strips, and a taxiway set. This would alleviate problems of searching for and transporting materials in an emergency situation.

Materials Testing

ITEM: Lack of Materials Testing Capability.

DISCUSSION: Additional testing equipment is needed at the Group Level to implement proper quality control during construction and to aid in design. The Group needs a capability to perform Marshall Stability both for mix design and testing of the construction mix. A compression testing machine is needed for concrete for the same reasons given above. At the present time the Group is dependent upon the contractor, operating in the area for these services on a cooperative basis. Additionally, soil test sets are incomplete in so far as the field CBR test set is concerned. Attempts to obtain replacement items have been unsuccessful.

OBSERVATION: Capability for performing Marshall Stability and concrete compression testing is required at Group Level. Field CBR test sets are incomplete and replacement items are extremely difficult to obtain.

Construction Materials

ITEM: Requisitioning Critically Short Construction Materials by Red Ball Express.

DISCUSSION: Work stoppage on many critical projects, i.e., communication facilities has been experienced due to the unavailability of certain sophisticated electrical and plumbing items. A demand was placed on the supporting supply activity but critically short items were usually not on the ASL, resulting in a long lead time in responding to the demand. A special project, Red Ball Express, established to expediting supply and movement of repair parts required in RVN, has been altered to allow the expeditious procurement of critical construction materials.

OBSERVATION: Critical construction materials are easily requisitioned by Red Ball Express and a rapid response to the demand would alleviate many problems resulting from construction material shortages.

Supply of Combat Support Missions

ITEM: Loading/Unloading of Cargo Aircraft at Army Airfields.

DISCUSSION: Supply missions for combat operations require expeditious loading of the aircraft transporting the supplies to the demanding

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locations. Army airfields are usually improperly equipped for loading/off-loading heavy loads. In emergency situations the temporary acquisition of a forklift is easily accomplished but neither the 10,000 lb, rough terrain forklift nor the 6,000 lb. warehouse forklift can be utilized to load a CV-2 Cargo Aircraft. The protective roll-bar on the rough terrain forklift and the support column on the 6,000 lb. warehouse forklift will contact the fuselage of the CV-2 before the forks can be positioned in a manner to allow transfer of the load to/from the aircraft. The 6,000 lb. warehouse is inhibited by its basic design from ever being to load/unload a CV-2 and the protective roll bar on the rough terrain forklift should not be removed for safety reasons.

OBSERVATION: A variable height, loading platform with rollers be permanently located at each Army Airfield would allow expeditious loading/unloading of cargo aircraft.

Electrical Supplies

ITEM: Shortage of Electrical Wiring and Electrical Hardware

DISCUSSION: During the period of this report there has been and still exists, a critical shortage of electrical wiring and hardware, i.e., fluorescent fixtures, duplex receptacles, various size entrance caps, splice conductors, circuit breakers, large panel boxes, etc. Valid due outs were in evidence, however, the materials are not available in the depot for issue.

OBSERVATION: Construction standards are becoming more sophisticated and require materials that are in short supply or in some cases not on the ASL. The supply system cannot react fast enough to keep up with the increasing demands. Items which do not appear on the ASL require 6-9 months lead time. In some instances funds are not available to award a contract.

Mess Hall Equipment

ITEMS: Natural gas, diesel, and gasoline equipment.

DISCUSSION: Natural gas, diesel, and gasoline mess hall equipment have been issued to this unit's mess halls. Natural gas equipment has been untried due to the unavailability of natural gas. Problems have developed in the utilization of gasoline equipment. For instance burner units, gasoline model M-2, have a short life expectancy, pressure gauges are blowing out, the tip of the stem in the generator valve, is breaking off, excessive flooding and improper draining during the igniting phase, frequent failure in the front support tube under the fire unit connecting the gas tank and air tank (resulting in a fire hazard), adequate repair parts are not available, a TM 10-7360-204-12 is not available but is required to

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pull proper maintenance. The only problem with the use of diesel equipment is the requirement for trained personnel to properly install the component parts.

OBSERVATION: Diesel mess hall equipment appears to be superior to gasoline equipment.

Section 2 Part II, Commanders Comments and Recommendations

1. Morale within the 35th Engineer Group (Const) remains high. All units have access to clubs, canteens, PX's, movies and Special Services activities. An effective and forceful information program remains in effect to keep the men aware of world events and to explain to them the reason for their being in Vietnam.

2. The welfare of the troops, both spiritual and physical is being well taken care of. Ample opportunity is given the men to attend easily accessible chapels. Chaplains within the Group continue an active counselling program. Each battalion has an operating dispensary with a surgeon assigned.

3. Based upon recommendations submitted in previous Operational Reports lessons learned, action is being initiated to modify the present 497th TOE (5-129E) to conform to operational requirements encountered in the Republic of Vietnam.

4. With the arrival of two new port construction companies in this theater, the present requirement for continual use of this Group's divers throughout the theater should be alleviated, allowing adequate diving support for normal operations.

1 Incl
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/s/
WILLIAM L. STARNES
Colonel, CE
Commanding

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DEPARTMENT OF THE ARMY
HEADQUARTERS, 35TH ENGINEER GROUP (CONST)
APO 96312

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SUBJECT: Bao Loc Airfield, Inclosure 1 to Operational Report on Lessons Learned, 1 November 1966 to 31 January 1967

1. The Bao Loc Airfield was started on 17 September 1966 in conjunction with ARVN troops. Prior to arrival of American Engineers, the ARVN Engineers had made a rough cut for the strip. Approximately one-half of the cut and fill required had been accomplished. Work was completed on 30 December 1966.

2. One American Engineer platoon assisted the ARVN Engineers in completion of the field. Equipment utilized, American and ARVN is as follows:

- 3 - graders
- 2 - bulldozers
- 1 - D4 bucket loader
- 1 - front loader
- 1 - air compressor
- 1 - civilian steel wheel roller
- 1 - 35-50 ton roller
- 2 - banks, sheeps foot rollers
- 10 - 5 ton dump trucks
- 6 - 2½ ton dump trucks
- 3 - Lowboys and 5 ton tractors
- 1 - 3/4 ton truck
- 1 - 1/4 ton truck

3. Total hours of troop labor expended were 88,200 (American only)

4. Total equipment hours expended were 26,460.

5. Work accomplished Included the Following:

- a. 30 acres of land were cleared and stripped.
- b. Existing runways, taxiways, turnarounds, and parking aprons were drained, compacted and brought to grade.
- c. T-17 membrane was placed on the 3500 feet of runway, taxiways, turnarounds, and parking aprons.
- d. 3200 feet of the runway was painted with non-skid paint; turnarounds were excluded.

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e. Following areas were completed:

- (1) Class I area with drainage.
- (2) Three helicopter parking areas (500'x200' Each) with drainage and roads.
- (3) Two helicopter maintenance areas (100' x 200' each) with drainage and roads.
- (4) Three helicopter refueling areas (400' x 200' each) with drainage and roads.
- (5) Two helicopter re-arming areas (75' x 200' each) with drainage and roads.
- (6) 100' x 300' of Class III Area.

6. Most work was accomplished after the close of the monsoon season. It is almost impossible to construct a laterite airfield in heavy rains. It is impossible to get an airfield dry enough to place a T-17 matting during a rainy season.

7. The following information has been gathered from building this airfield and is forwarded as lessons learned:

a. The strip met all requirements given in Air Force Manual 86-1.

- (1) Longitudinal grades varied from 0.0% to 3.0%.
- (2) Transverse grade was the same as the entire length of the strip, which was 1.67% from centerline to 30' out and 2.0% for 10' shoulder.
- (3) The base and subgrade material was laterite, which was composed of 50% - 60% rock particles. 2800' of the runway was in a cut section and the final surface was put on rolled undisturbed material. The rest of the runway and turnarounds were built of compacted fill of laterite. The taxiway and parking apron were also on undisturbed materials.

b. After the runway, turnarounds, taxiway, and apron had been graded, the runway was surfaced with T-17 membrane.

- (1) To start the first section in the runway, sharp V ditches were cut on each side of centerline 30' out. The total distance from inside edge of ditch to inside edge of other ditch was 60'. The ditches were 2½' deep and the sides were at approximately 60 degrees to the horizontal.

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(2) The section of membrane was then unfolded from the accordion fold in which it comes from the manufacturer. This can best be done by placing the entire box of membrane on a 25 ton lowbed with the membrane over the rear wheels. A lowbed was used due to the fact that the lower the membrane is to the ground, the easier it is for the emplacement crew to unfold and peel it off as the tractor and lowbed moves slowly down the centerline. A 2½ ton cargo or 5 ton dump may be used, but a lowbedded vehicle such as a 25 ton trailer, facilitates an easier and smoother (less wrinkles) emplacement of the membrane.

NOTE: The sections of membrane used on the runway were standard runway size, 100' x 66' and with a weight of 2200 lbs. The taxiways sections used on the apron, turnarounds, and taxiway were 100' x 36' and weighed 1300 lbs.

(3) After the membrane has been pulled off the truck it is pulled again from an accordion fold to each side and allowed to lap over into the side ditches.

(4) Two graders were used to stretch the membrane transversely after it had been squared up by hand with the centerline and ditches. The graders moved along the ditches with the inside wheels (side toward centerline) about halfway to the inside wall of the ditches. Tacks were spaced about 12'-15' on the end of the membrane running across the runway.

(5) It would be well to note that the surface to be covered be cleaned of all small rocks and then rolled with a 10 ton or any comparable smooth-wheeled roller.

(6) When the membrane has been tacked down on one end, the graders move forward tightening the membrane transversely and tacks are driven in the wall of the ditch just under the scarflier rack of the grader while the material is under tension and all the wrinkles have been pulled out. At the same time that is being done, the membrane is stretched longitudinally. This was tried by manual pulling, sliding graders, and loaded 5 ton dumps on the leading edge of the membrane, all of these failed. It was found that a 5 ton tractor and 25 ton lowbed loaded only with two boxes of membrane when coming to a sliding stop on the leading edge of the membrane, but not going off of the edge, stretched all the wrinkles acquired from being folded, out. The trucks should get a running start and be going at a rate of not more than 15 MPH, when the brakes are applied.

(7) Now, with the membrane tight longitudinally, the graders move up and stop until the tacks have been driven every 10'-15' all the way up the membranes, both sides simultaneously. NOTE: It may take 2-3 repetitions with the 5 ton tractors and lowbeds to get all the wrinkles out.

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c. With the piece of membrane down, another is unloaded in the prescribed manner and then stretched to overlap the 2½' lap sections of the two adjoining pieces. The protective tar paper is removed and both surfaces to be glued are swept to insure a clean watertight joint. 14

(1) A good rule of thumb to follow in putting the glue on the two surfaces, is that 10 gals will cover the lap joint that is to be made. Any more than that will be a waste and any less will give a poor joint. When the two surfaces are covered with glue the lap joint is made, making sure it is square and there are no wrinkles in it. This joint is then tacked with about the same spacing of tacks as the section underneath it.

(2) After the tacks have been placed the tar paper is pulled off the top of the joint. A three foot strip from the roll in each membrane box is then glued to the joint from the bottom of one ditch across the runway to the bottom of the other ditch. This completes a joint and the tacks should be completely covered. Only 10 gallons of glue should be used on this strip also, making the total amount for the joint 4 buckets or twenty gallons.

(3) The membrane is then emplaced as already prescribed.

d. After several sections have been put in place the graders may begin to backfill the ditches in 3-4 inch lifts compacting each lift. The material is brought up to just below the grade of the membrane surface and no higher, to permit good drainage. The shoulder is then graded off to the runway ditch. The shoulder should be rolled with a 10 ton or some other smooth-wheeled roller to insure a near watertight surface. Extreme care should be exercised by the grader operators in back-filling and grading the ditches, so as not to have the grader blade come in contact with the membrane as it will tear it easily.

e. There is no set rule to follow on the turnarounds, taxiways, and aprons, as to pattern of layout, since this will vary due to size and layout and availability of two sizes of membrane, runway and taxiway. All joints on these areas should be flat lap joints since the required tension on the runway sections is not needed.

f. When the runway has been completed it is painted with a rubber base, abrasive, non skid paint. The directions are on the containers as to mixing and applying but extreme care should be used in putting this paint down in that it is toxic and harmful to the eyes if splashed in them while stirring.

8. Essential points to consider before emplacing T-17 membrane:

a. Have enough personnel to do the job. It takes approximately 45-50 people to make up the crews necessary to do the job without difficulty.

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Get organized before going to work; break the crews down, glueing, tacking, unloading, surveying, etc. A good crew can lay 3 pieces of runway membrane in 2 hours, or about 800-1000 ft a day.

b. Have a 3-4 man surveying party on hand to keep ditches straight and layout of turnarounds and aprons.

c. Personnel should wear Class X clothing and footwear since glue and paint will ruin fatigues and boots.

d. Membrane is stretched and placed best when the sun is not shining and in the cooler part of the day, such as early morning or late afternoon. Material has a tendency to expand when cool and contracts as it warms.

e. An air-compressor can be used to great advantage in cleaning the membrane surface of particles and dust prior to painting.

f. Never attempt to emplace membrane when the wind exceeds "20 MPH". Once the wind gets under a piece that has been unfolded, it is hard to lay back down without air pockets getting under it.

g. Watch personnel putting down glue and paint for any side effects due to inhaling fumes from material they are applying to membrane.

h. A mechanical stirring device made of scrap metal on the bit of an electrical drill should be used to mix the non-skid paint, since it will cut the mixing time down to 80%-90%. It takes a man with a stirring rod approximately 20-30 minutes to get all the abrasive material in solution in a bucket of the paint.

i. Glued joints should be rolled with a 1/4 or 3/4 ton vehicle to insure a watertight seal. There should be no traffic, vehicular or otherwise, on joints for 24 hours after it is put down.

j. It would be well to keep in mind that the glue for making joint dries in 10-15 minutes and speed should be used in its application to make the joint before it begins to set up.

k. If the runway has a gradient, it is well to consider beginning at the high point of the grade or "hump" in the runway when starting to emplace the membrane. This procedure of going from high to low ground with a water proffing or "shingle effect" lapping prevents water from getting under any membrane placed if rain should come before the entire runway surface is covered. The membrane must be placed on a dry surface.

END OF INCLOSURE ONE.

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AVBC-C (15 Feb 67)

1st Ind

Cpt Mills/rsg/DBT-163

SUBJECT: Operational Report - Lessons Learned for the Quarterly 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), APO
US Forces 96491 ATTN: AVCC-BC

1. This Headquarters has reviewed the subject report submitted by the 35th Engineer Group (Construction), and considers that it adequately covers the Group activities for the period reported.

2. This Headquarters concurs with the observations of the Group Commander, with the following comments:

a. Section I, paragraph 10.E Repair of Port Facilities. Information on the failure of the structures have been forwarded to USAECV and the Cam Ranh Support Command; where time and materials allow, heavy duty construction will be used for port facilities. The main cause of these failures have been the result of carelessness during docking and leaving the facilities and improper anchoring practices.

b. Section II, Part I, paragraph 3 - Intelligence Officer - Construction Units are not authorized Intelligence Personnel, Officer or Enlisted, as primary duty positions. The requirements for accurate information and the effort required in collecting and disseminating Intelligence have increased, making this job the primary mission of those involved. Construction Units have had to augment their operations sections to provide this service. Highly recommend augmentation of construction units operating in combat areas with an Intelligence Officer and a Reconnaissance Section through MTOE actions in the future.

c. Section II, Part I (page 7) - Materials Testing - the civilian contractor has been relied upon in the past to furnish support for testing of asphalt and concrete. With the phase out of contractor effort in some areas, the capability to test asphalt and concrete will diminish. The requirement for this capability at Group level will become an absolute necessity and should be included by MTOE when contractor support is no longer available.

d. Section II, Part I, Page 7 - Supply of Combat Support Missions - Suggest a new type loading/unloading device or modification of 6000 LB Forklift to expedite loading/unloading of CV-2 Aircraft.

e. Section II, Part I, Page 8 - Mess Hall Equipment:

(1) Problems with Field Mess Burners appear to rest with replacement parts; an adequate unit PLL and preventative maintenance program appears to be the best solution. The unit should requisition a copy of TM 10-7360-204-12 through AG Publications Channels.

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