ENGME-RM

Operational Report - Lessons Learned, HQ, 589th Engineer Battalion, Period Ending 30 April 1970

DCSLOG
ATTN: LOG-C-PEB

CofEngrs

10 February 1971
Mr. Hill/37420

1. Reference DCSLOG Referral Slip dated 3 February 1971, subject as above (Inclosure).

2. We have reviewed the subject report and we concur with the early introduction of satisfactory dust suppressors to curb pollution. We offer the following comments regarding dust suppression on rock crushers:

a. Wet process dust suppressor modification kits may be purchased commercially for about $3,000 per kit.

b. The USAMERDC is preparing a product improvement program for rock crushers which is designed to completely evaluate all dust suppression processes and modify most suitable process. With proper priority and funding this evaluation could be ready in a few months.

c. USAMERDC reports that all commercial dust suppressors and processes are not completely satisfactory and prior to purchase should be evaluated.

3. Recommend that project be assigned to USAMC for implementation. Knowledge gained may be applied to equipment used in LOC Program.

4. Referenced referral slip and correspondence is returned herewith.

FOR THE CHIEF OF ENGINEERS:

1 Incl
as

JOHN J. McCULLOCH
Colonel, Corps of Engineers
Chief, Resource Development Division
Directorate of Military Engineering

MFR:
1. Information on proposed product improvement program obtained from Mr. Jim Yeardley, USAMERDC, 192 x 44220. Analysis to date reveals wet process has merit. Mr. Yeardley plans to submit program soon and request FY 72 and 73 funds. Entire comprehensive program including modifications for 24 CONUS crushers estimated at $230,000.

2. This action required four manhours. Coordinated with Mr. Owen, ENGME-PO

HILL

ME

P

DISPOSITION FORM

For use of this form, see AR 340-15; the proponent agency is The Adjutant General's Office.

REFERENCE OR OFFICE SYMBOL	SUBJECT
FOR OT UT	Operational Reports - Lessons Learned, HQ, 589th Engineer Battalion, Period Ending 30 April 1970 (702102)

TO CofEngrs FROM ACSFOR DATE MAR 16 1971 CMT 1

MAJ Thompson/cbd/77682

1. References:

a. AR 525-15, 20 Nov 70, Operational Reports - Lessons Learned.

b. CMT 1, FOR OT, 8 Jan 71, subject as above, with CMT 2, FOR DS, 13 Jan 71 (Incl 1).

c. Letter, DCSLOG, LOG-MED, 9 Feb 71, subject as above, with 1st Indorsement, USAMC, 8 Mar 71 (Incl 2).

2. The attached correspondence pertaining to dust suppression systems for rock crushing plants is forwarded for your information.

FOR THE ASSISTANT CHIEF OF STAFF FOR FORCE DEVELOPMENT:

2 Incl
as

Copy furnished:
FOR DC w incl

/s/ John E Bell

WILLIAM E. McLEOD
Major General, GS
Director of Organization,
Unit Training and Readiness, OACSFOR
JOHN E. BELL
LTC, GS
CHIEF, Unit TNG & RDY DIV, OT

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FOR OT UT

Operational Reports - Lessons Learned, HQ, 589th Engineer Battalion, Period Ending 30 April 1970 (702102)

CofEngrs

ACSFOR

MAR 16 '71

MAJ Thompson/cbd/77682

1. References:

a. AR 525-15, 20 Nov 70, Operational Reports - Lessons Learned.

b. CMT 1, FOR OT, 8 Jan 71, subject as above, with CMT 2, FOR DS, 13 Jan 71 (Incl 1).

c. Letter, DCSLOG, LOG-MED, 9 Feb 71, subject as above, with 1st Indorsement, USAMC, 8 Mar 71 (Incl 2).

2. The attached correspondence pertaining to dust suppression systems for rock crushing plants is forwarded for your information.

FOR THE ASSISTANT CHIEF OF STAFF FOR FORCE DEVELOPMENT:

2 Incl
as

Copy furnished:
FOR DC w incl

WILLIAM H. McCLAIN
Major General, GS
Director of Organization,
Unit Training and Readiness, OACSFOR

JOHN E. BELL
LTC, GS
CHIEF, Unit TNG & RDY DIV, OT

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FOR DS

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REFERENCE OR OFFICE SYMBOL	SUBJECT
FOR OT UT	Operational Report - Lessons Learned, HQ, 589th Engineer Battalion, Period Ending 30 April 1970 (702102)

TO FOR DS FROM FOR OT DATE JAN 71 CMT 1

MAJ THOMPSON/cbd/77682

1. Reference, AR 525-15, subject: Operational Reports - Lessons Learned, 25 September 1969.

2. The inclosed Operational Report - Lessons Learned, subject as above, is provided for your information and appropriate action. This report should be reviewed in accord with AR 525-15 to insure that the lessons learned during current operations are used to the benefit of future operations and training.

3. It is requested that you evaluate the comment cited at Page 18, para 2c(1) and para 3 of 4th Indorsement, pertaining to "Rock Crusher Dust Suppressive System" and, if appropriate, initiate action to resolve the problem described. Your evaluation should consider implications for similar type units in future operations as well as the immediate application. Please advise this office NLT COB 1 February 1971 of your evaluation and action taken.

1 Incl
as

John E Bell

ALEXANDER P. BOLLING, JR.
Major General, GS
Director of Organization,
Unit Training & Readiness, OACSFOR

JOHN E. BELL
LTC, GS
CHIEF, Unit TNG & RDY DIV, OT

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INCL 1

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DA FORM 2496 REPLACES DD FORM 96, EXISTING SUPPLIES OF WHICH WILL BE

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FOR DS CSS(8 Jan 71)
SUBJECT: Operational Report - Lessons Learned, HQ, 589th Engineer Battalion, Period Ending 30 April 1970 (702102)

TO: FOR OT UT

FROM: FOR DS

DATE: 13 JAN 1971

CMT 2
MAJ Carson/55488/jvf

1. Future procurements of large capacity rock crushing plants will be made under the Commercial Construction Equipment System Plan (CCE Plan). This plan provides for the procurement of the latest model construction equipment which is in general use by commercial industry. Provided dust suppressive systems prove to be effective in commercial use, the Army will consider their procurement along with future rock crushing equipment.

2. The requirement stated in paragraph 3 of 4th indorsement to the referenced report that USAMC investigate cost and feasibility of providing these devices for equipment in use should be passed to DCSLOG for action. The requirement should be further identified as a proposed add-on to the MCA-funded Line of Communication (LOC) Program engineer equipment.

FOR THE DIRECTOR:

1 Incl
nc

LLOYD J. PETTY
COL, GS
Chief, Combat Support Systems Division

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DEPARTMENT OF THE ARMY
OFFICE OF THE DEPUTY CHIEF OF STAFF FOR LOGISTICS
WASHINGTON, D.C. 20310

15576

LOG-MED

9 FEB 1971

SUBJECT: Operational Report - Lessons Learned, HQ, 589th Engineer Battalion, Period Ending 30 April 1970 (702102)

Commanding General
U. S. Army Materiel Command
ATTN: AMCMA-VS
Washington, D. C. 20315

1. Reference is made to:

a. AR 525-15, Subject: Operational Report - Lessons Learned, dated 26 January 1968.

b. LOG-MED Cmt 2 to LOG-LDSDO, dated 9 February 1971, subject as above.

2. It is requested that your command investigate cost and feasibility of comment in paragraph 2c(1) page 18 of subject report and paragraph 3 of the 4th Ind to report, at Incl 1. Please advise DA, ATTN: ACSFOR/OT UT with info copy to LOG-MED and LOG-LDSDO of action taken NLT 5 March 1971.

FOR THE DEPUTY CHIEF OF STAFF FOR LOGISTICS:

KARL A. LANTZKY
COL GS
Acting Director of Maintenance

2 Incl
1. ORLL
2. LOG-MED Cmt 2, dated 9 Feb 71

Copy furnished:
ACSFOR/OT RD
ACSFOR/OT UT

Incl 2

AMCRD-GM (9 February 1971) 1st Ind
SUBJECT: Operational Report - Lessons Learned, HQ, 589th Engineer Battalion, Period Ending 30 April 1970 (702102)

Headquarters, US Army Materiel Command, Washington, D. C. 20315 8 MAR 1971

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

1. In response to the request contained in paragraph 2 of the basic letter, a US Army Mobility Equipment Command (USAMECOM) proposed product improvement project for the suppression of dust resulting from rock crushing and screening operations is attached at inclosure 3. The present scope and timetable of the project limits modification to those plants operated within the Continental United States. Since similar plants are used overseas, modification kits could be installed by direct support maintenance or by the user as required.

2. A dust suppression system can be designed and engineered to meet any minimum dust level; however, guidance is required from Deputy Chief of Staff for Logistics regarding what this level should be from an operational and health standpoint. For example, there is now a profusion of standards, codes, and laws being created by various Government agencies concerning dust pollution. The New York State Dust Code has a limit, in terms of parts per million (ppm) of dust particles depending on the silica content of the rock, which is accepted and met by the rock drill manufacturers. However, there is no similar agreement among manufacturers of rock crushing equipment.

3. LTC Don A. Ramsey, the originator of the subject report, was contacted and indicated that, while health aspects of dust were formidable, extremely high engine wear was causing plant shutdowns due to engine repair and replacement. It is assumed that dust suppression to within health limits would be sufficient to eliminate this excess engine wear. The subject report confirms the need for a thoroughly engineered modification which would be furnished to the user as a complete kit. The users do not have access to the materials required to fabricate a totally effective dust suppression system.

AMCRD-GM 8 MAR 1971

SUBJECT: Operational Report - Lessons Learned, HQ, 589th Engineer Battalion, Period Ending 30 April 1970 (702102)

4. For your ready reference one copy each of page 18 of subject report and of 4th Indorsement to subject report is furnished at Inclosure 4 and Inclosure 5, respectively.

FOR THE COMMANDER:

F. A. RICHTER
Colonel, GS
Chief, Ground Mobility Division

3 Incl
wd Incl 1 & 2
Added 3 Incl
3, 4, & 5. as

CF:
DCSLOG, ATTN: LOG-MED
DCSLOG, ATTN: LOG-LDSDO
CG, USAMECOM, ATTN: AMSME-RZK-HK
Fort Belvoir, Va.

[ ] Configuration – Engineering Change Program [ ] MODIFICATION PROGRAM (RCS AMCMA 101) [XX]

1. Submitted By: USAMERDC
2. DATE: 19 Feb 70
3. TYPE: X Preliminary ___ Formal
4. SYSTEM EQUIPMENT NOMENCLATURE: Crusher, Rock
   Rep Model: ___
5. P–L LINE NO. ___
   PIP/RMD NO. ___
6. MAJOR COMPONENTS/SUBASSY AFFECTED:
   Incl 1, note 2
7. PRIORITY: ___ Urgent ___ Urgent w/limit X Normal
8. STATUS: Std A Type Classification ___ Quantity Production
   ___ Initial Production X Out of Production
9. DESCRIPTION: (Statement of Need) (Use additional sheets as necessary)

To control dust emission from rock crushing plants (see attached).

10. PROPOSED METHOD OF APPLICATION: ___ FY; ___ In Production
    X MOD/RETRO; 73–75 FY; ___ Depot; ___ Contractor; X DS/GS; ___ Other
11. QUANTITY TO BE PROCURED:
    0 In. Prod. MWO Kits 62
12. UNIT COST
    ___ In Prod; 1500 Kit; 1000 Appl.

13. CONFIG – ENG CHGE PROGRAM	RDT&E	PEMA BASE	PEMA OTHER	O&MA (22?.3.)	STOCK FUND	OTHER
A. COST DATA BY FISCAL PROGRAM						
(1) Engr & Testing				155K		
(2) Facilities						
(3) Increases in Item Prod.						
B. TOTAL BY FISCAL PROGRAM				155K		

C. COST DATA BY FISCAL YEAR	This FY	Budget FY	FY 73	FY 74	FY 75	FY
(1) RDT&E						
(2) PEMA (Prod. Base)						
(3) PEMA Prod. Improvement						
(4) O&MA						
(5) STOCK FUND (or Other)			155K			
D. TOTAL BY FISCAL YEAR			155K			

14. MODIFICATION PROGRAM ITEMS		PEMA BASE	PEMA OTHER	O&MA	STOCK FUND	OTHER
A. COST DATA BY FISCAL PROGRAM						
(1) Cost of MOD Kits	X		93K			
(2) Application of Kits			62K			
(3) Stock Replenishment						
(4) Other Log Sup Costs				30K		
TOTAL BY FISCAL PROGRAM			155K	30K		

COST DATA BY FISCAL YEAR	This FY	Budget FY	FY 73	FY 74	FY 75	FY
(1) PEMA (MOD Kits)				93K		
(2) PEMA (Application)				31K	31K	
(3) O&MA (Reimb of Stk Fund)						
(4) O&MA (Application)				10K	10K	
(5) Stock Fund						
(6) Other O&MA (Engr, etc.)				10K		
TOTAL BY FISCAL YEAR				144K	41K	

15. TYPED NAME AND TITLE OF AUTHORIZING OFFICIAL
J. H. YEARDLEY, CH, MECH ENGRG DIV, MECH TECH LAB

16. SIGNATURE
J H Yeardley

GRAND TOTAL (13B & 14B) $340 K
GRAND TOTAL (13D & 14D) $340K

19. REMARKS

Encl 3

9. Statement of Need.

a. The normal operation of crushing and screening equipment results in large quantities of dust being released into the atmosphere. Military plants are not presently equipped for suppression of this dust whereas growing numbers of commercial operators are being forced by Federal and local codes to control dust emission. Thus the 62 Army plants used within the Continental United States for engineer troop training may be restricted in operation because of excessive dust.

In addition, the following three factors are equally important and should be considered in the overall benefits to be derived from this product improvement.

b. Safety. An obvious problem created by dust in a construction area. Firstly, plant and maintenance personnel, truck drivers, etc., are exposed to this particularly irritating dust. Respiratory and other physiological damage will occur, depending on the degree of exposure.

c. Excessive Wear. The dust cloud is composed of particularly sharp and abrasive mineral particles which cause rapid wear to mechanical components and engines, thus increasing maintenance and reducing reliability.

d. Product Loss. A large percentage of the dust which is "lost" and and must be compensated for later in asphalt production with special fines.

A. Engineering Cost Breakdown.

1. Problem definition, develop alternatives, criteria for selection of best alternative, and test procedures. - 50K (in-house)

2. Design and fabricate prototype modification kit. - 30K (Contract).

B. Testing Cost Breakdown.

1. Install prototype modification kit - 20K (Contract)

2. Run test. -55K (Contract)

C. O&MA Engr & MWO Application — 92K (Depot)

D. MWO Kit Total. — 93K (Contract)

E. Total Engineering & MWO — 340K

Incl 1 to Incl 3

Engineering Approach

Industry has been active in dust control for many years and particularly in the recent past due to Federal and local laws. The approach for this task will be to use commercially available equipment and information to the maximum extent. Manufacturers of rock crushing and dust control equipment will be contacted to determine what is readily available and what might be adapted to military equipment. Federal and local agencies which have control over environmental pollution and health standards will be surveyed to assure that US Army Mobility Equipment Research and Development Center's (USAMERDC's) efforts will comply when the crushing equipment is operated within the Continental United States. Alternative approaches such as wet spray suppression, complete enclosure, and dust collection will be considered. Criteria for selection will be based on modification cost and effectiveness in meeting standards.

It is anticipated that engineering will be initiated immediately and will be completed within 1 year. Retrofitting will begin within 1 year after approval of this product improvement and will be completed within 2 years.

It is estimated that the Government in-house manpower requirement will be 1 year each for an engineer and engineering technician.

Improvement Description

The normal operation of rock crushing equipment releases large quantities of airborne dust. Dust suppression or collection equipment will be added at critical points within the crushing plant (see Inclosure 1) to reduce total emission to acceptable levels. The necessary equipment will be developed into a modification kit for installation first on 62 plants used for training and related purposes within Continental United States.

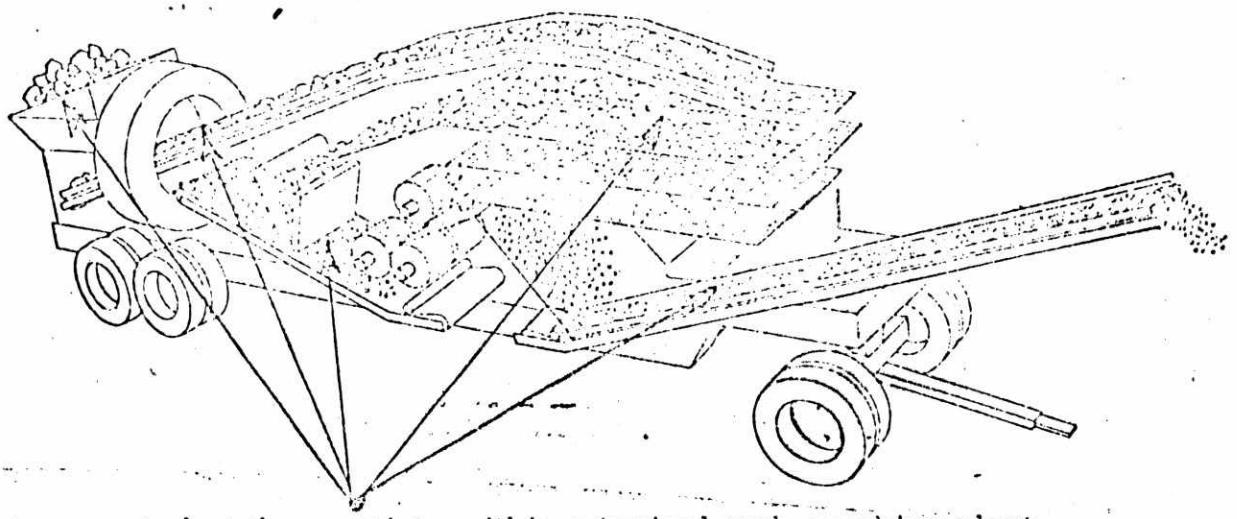
Inclosure 2 details the inventory and disposition of the various Army crushing plants. It is assumed that GFE crushing and screening plants will be made available as required.

Cost Analysis

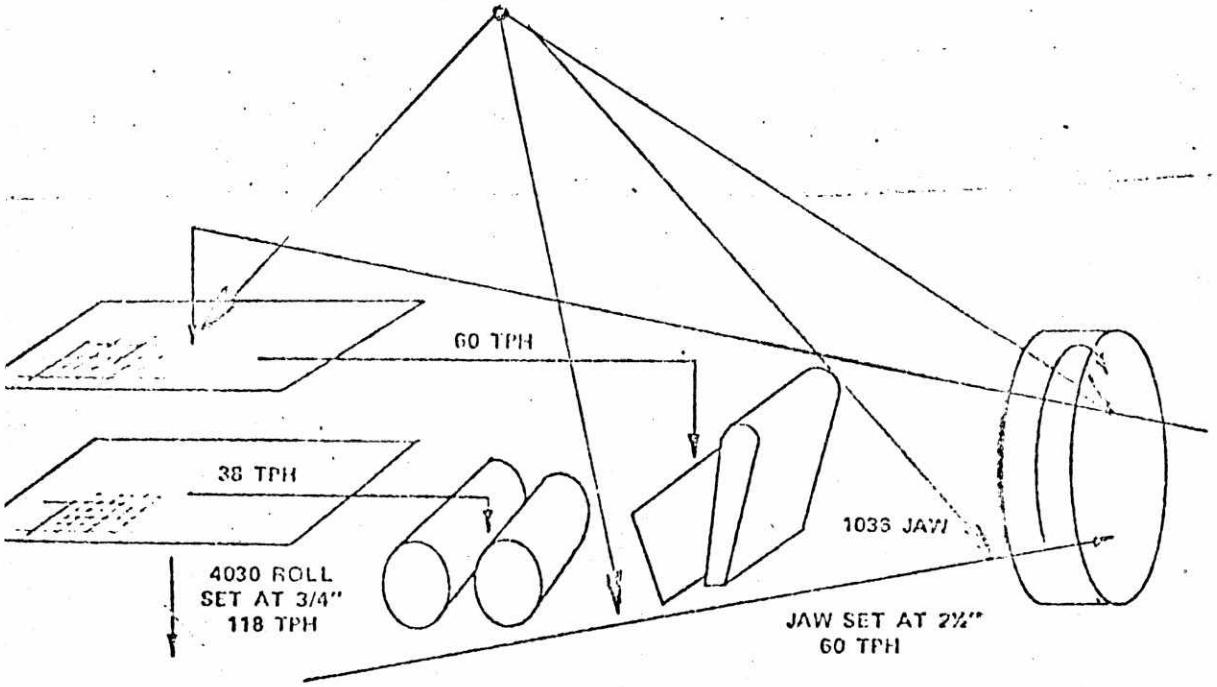
The safety and health aspects of this proposed product improvement cannot be gauged on a cost effectiveness basis. The statistics of accidents and health damage due to exposure of personnel to rock dust are unknown. However, since civilian Government agencies are enacting and enforcing health and safety codes and standards, it is assumed that the military must also protect its personnel to the same extent. The reduction of mechanical wear and product loss is also beneficial but intangible.

Inclosure 3 shows the acquisition cost and repair limits for the various sized crushing plants. The estimated date of the MWO application is

1974 to 1975. During that period, repair limits for all crushers indicate that approximately one-half of the useful life remains. The percentages of estimated cost of the MWO compared to the acquisition cost of the end item crushers range from 0.56% for the 225 TPH plant to 2.3% for the 35 TPH plant.



Dust generated at these points within a typical rock crushing plant.



Incl 1 to Incl 1 & Incl 3

Disposition of Crushing Equipment

Size	FSN 3820	Make & Model	Quantity		
			CONUS	Overseas	Depot
35 TPH	-247-9913 -878-4285	Iowa Mdl 2A, 2A2	30	5	7
75 TPH	-725-6462	Eagle Mdl 75TPH	31	42	3
225TPH	-527-8577	Pioneer 225 TPH	1	10	0
250TPH	MCA LOC Program	Iowa 250TPH	0	8	0

Incl 2 to Incl 1 to Incl 3

Incl 3 to Incl 1 to Incl 3

ACQUISITION COST AND REPAIR LIMITS

FOR
ROCK CRUSHING PLANTS

ITEM	Model	Last Year Built	Last Quant.	Repair Limits % 54	55	50	45	35	25	10	Unit Cost Acquisition	MWO Cost/ Acquisition Cost
CRUSHER 35 TPH IOWA	2A2A	1967	32 plants	'70	'72	'74	'76	'78	'80	'82	$110,000	2.3%
CRUSHER 75 TPH EAGLE	75 TPH	1968	23 plants	estimate '71	'73	'75	'77	'79	'81	'83	$128,596	1.9%
CRUSHER 225 TPH PIONEER	225 TPH	1966	8 plants			'72	'74	'77	'80	'86	$441,626	0.56%
CRUSHER 250 TPH IOWA	RVN MCA/LOC	1969	8 plants	estimate '72	'74	'76	'78	'80	'82	'84	$230,307	1.8%

To expedite the requisitioning of the materials, a second expediter remains at Cam Ranh Bay, attached to and quartered by HHC, 35th Engr Gp (Const). The expediter's sole purpose is to speed up the release of ARVN construction materials. These materials are being released from the U.S. Army Depot, Cam Ranh Bay, and are transported to the 61st Bn by TCMD. This was necessitated due to a non-availability of sufficient tractor-trailers from this unit or the 61st Bn. Close coordination is maintained to insure a smooth running operation.

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

a. Personnel: None

b. Intelligence: None

c. Operations:

(1) Rock Crusher Dust Suppressive System

(a) OBSERVATION: Operation of rock crushers generates large volumes of dust. The dust increases maintenance problems, causes safety hazards by limiting visibility, and causes respiratory health problems.

(b) EVALUATIONS: Most industrial sites have attempted to design and install dust suppressive systems on their rock crushers. Results indicate that the best suppressive technique is a high pressure water system that will produce a suppressive fog over the dust generating areas. The suppressive systems have not been completely successful due to difficulty in obtaining the storage tanks, pumps, nozzles, valves, and other plumbing fixtures required to build an effective system.

(c) RECOMMENDATION: Current available dust suppressive systems should be evaluated and a system either purchased or designed that can be provided to industrial sites for installation.

GPOP-DT (30 Apr 70), 4th Ind
SUBJECT: Operational Report of HQ, 589th Engineer Battalion (Const) for Period Ending 30 April 1970, RCS CSFOR-65 (R2)

HQ, US Army, Pacific, APO San Francisco 96558 21 AUG 1970

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

1. This headquarters concurs in subject report as indorsed with the following comments.

2. Reference paragraph 1k(4)(a), page 14: Twenty-six engines were released via Red Ball requisitions during June and July 1970. Fifty per month (July - November 1970) are due in from rebuild for a total of 250. A total of 150 is due in from procurement, 100 in October and 50 in November 1970. In regards to injector pumps, quantities on requisitions AT87FV-0148-6601 and AT87FV-0140-6002 were shipped via air freight from CONUS on 2 July 1970.

3. Reference paragraph 2c(1), page 18: Concur. Rock crusher dust suppressive devices are utilized in some commercial operations and should therefore be available for use with Army equipment. Recommend USAMC investigate cost and feasibility of providing these devices both for equipment in use and from procurement.

4. Reference 2c(3), page 19: Concur in the need for additional personnel. It should be noted, however, that actions taken by the 589th Engineer Battalion in providing personnel to operate industrial sites are in consonance with the original USARV plan of operating the MCA LOC equipment. The plan noted that within the existing TOE structure, there are sufficient operators with necessary skills to operate and maintain most of the additional equipment. Assistant operators provided in the TOE for two shift operation of non-LOC critical equipment, skilled vertical construction personnel and/or direct hire local nationals would be trained to be operators on equipment where there is a net increase to TOE amounts.

FOR THE COMMANDER IN CHIEF:

G. R. McLAUGHLIN
COL, AGC
Adjutant General

Cy furn:
CG USARV

26

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Incl 5

EGA-CO (30 April 1970) 1st Ind
SUBJECT: Operational Report-Lessons Learned of the 589th Engineer Battalion (Construction), Period Ending 30 April 1970, RCS CSFOR-65 (R2)

DA, Headquarters, 35th Engineer Group (Const), APO 96312, 23 May 1970

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

1. This Headquarters has reviewed the Operational Report-Lessons Learned for the quarterly period ending 30 April 1970 from the 589th Engineer Battalion (Construction) and concurs with the comments and observations of the commander, with the following comments added:

2c(1) Concur: A dust suppression system to be included as a component of crusher systems would be beneficial from both the maintenance and operational point of view.

2c(2) Concur: Both battalion and group have participated in district and province coordination meetings with fairly good success on the policy level. The actual working level - that of local national civil police and U.S. and Vietnamese military police - however requires continued monitoring on the part of local field units to insure follow through is made by all concerned.

2c(3) Concur: The augmentation of construction units with MCA-LOC equipment has been most beneficial to the LOC program. The failure to augment units with additional personnel either through augmented MTOE or by attachment of TOE 5-500C teams to major pieces of equipment such as crusher complexes has diluted the effectiveness of the MCA buy of construction equipment and has required ad hoc organizational changes. Coordination between various staff sections to provide both equipment and personnel to run the equipment would have enhanced the program considerably and would have provided a much higher return on the investment make in MCA equipment.

2f Concur: Augmentation of a construction unit by addition of a construction material haul capability is a worthwhile consideration. It would be especially valuable where haul requirements are needed for projects which are off of the normally travelled MER convoy routes.

RICHARD A. CHIDLAW
COL, CE
Commanding