AD NUMBER
AD502775
CLASSIFICATION CHANGES
TO: unclassified
FROM: confidential
LIMITATION CHANGES
TO: Approved for public release, distribution unlimited
FROM: Distribution authorized to U.S. Gov't. agencies and their contractors; Administrative/Operational Use; DEC 1966. Other requests shall be referred to Office of the Assistant Chief of Staff for Force Development [Army], Attn: FOR-OT-RD, Washington, DC 20310.
AUTHORITY
31 Dec 1978 per DoDD 5200.10 document marking; Adjutant General's Office [Army] ltr dtd 29 Apr 1980

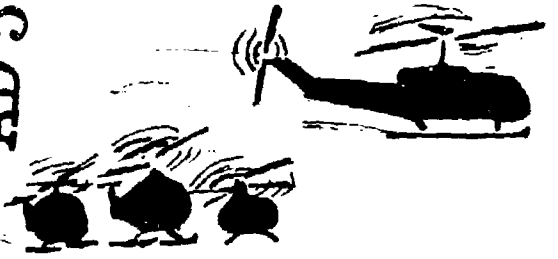
SECURITY MARKING

The classified or limited status of this report applies to each page, unless otherwise marked.
Separate page printouts MUST be marked accordingly.

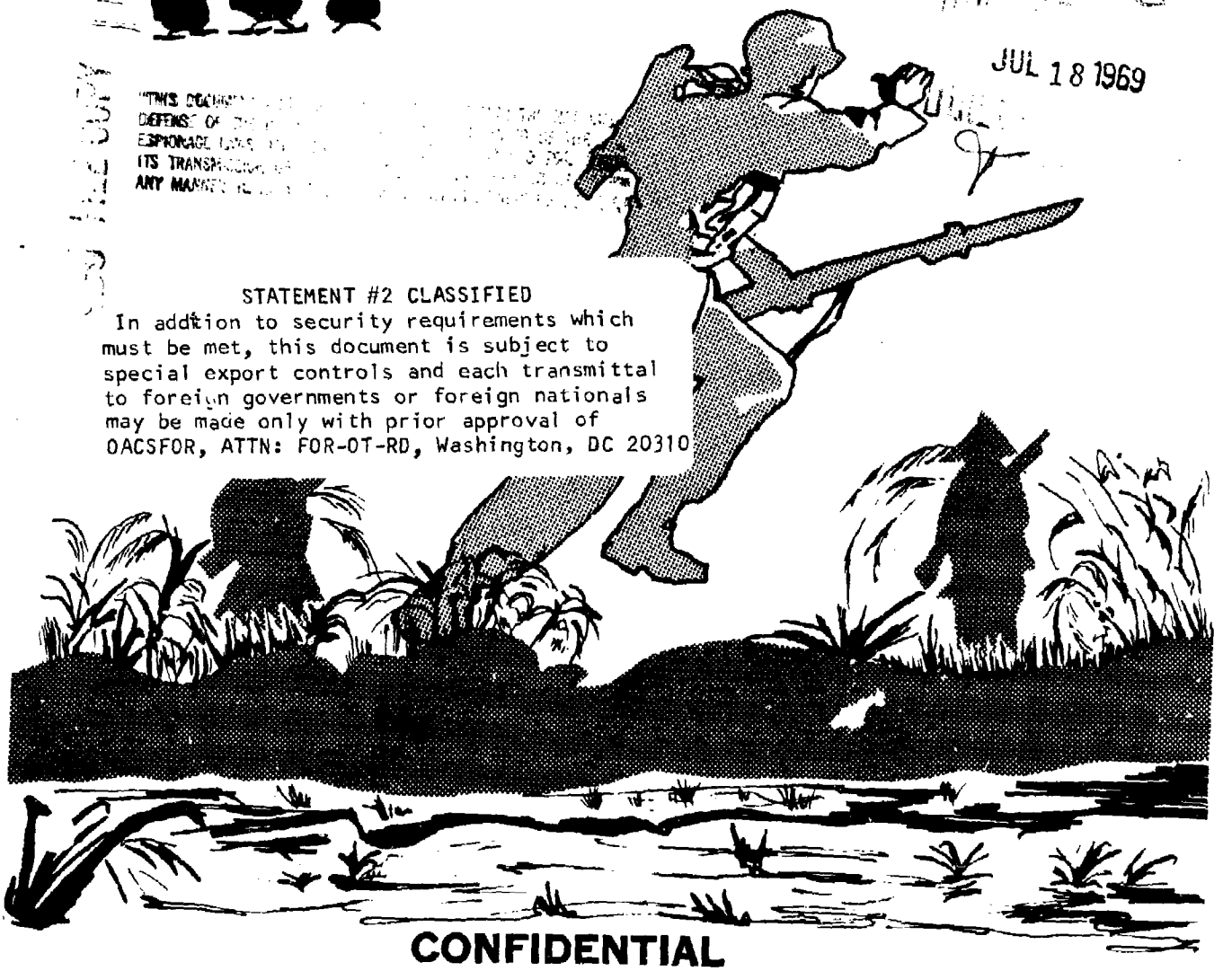
CONFIDENTIAL

OPERATIONS REPORT LESSONS LEARNED

REPORT 9-66



STATEMENT #2 CLASSIFIED
In addition to security requirements which must be met, this document is subject to special export controls and each transmittal to foreign governments or foreign nationals may be made only with prior approval of OACSFOR, ATTN: FOR-OT-RD, Washington, DC 20310



CONFIDENTIAL

CONFIDENTIAL

DEPARTMENT OF THE ARMY
OFFICE OF THE ADJUTANT GENERAL
WASHINGTON, D.C. 20310

(12) 32p.

IN REPLY REFER TO
AGAM-P (M) (30 Nov 66) FOR OT RD

(11) 7 Dec 66

SUBJECT: Operational Report - Lessons Learned 9-66 - Equipment

TO: SEE DISTRIBUTION (9) Operational Rept.

1. This is the tenth of a series of reports from operations being conducted by US Forces in Vietnam.

2. Information contained in this report is provided to insure appropriate benefits in the future from lessons learned during the current combat operations. The lessons cited in this report may be adapted for use in developing training material.

3. This report is a compilation of professional information on the lessons learned from equipment usage. Source material is primarily derived from Operational Reports - Lessons Learned submitted by units operating in Southeast Asia, in accordance with AR 1-19. It is important that this report be placed in the hands of those officers and enlisted men training our individual replacements and units for RVN.

4. Previously published reports of the Operations Report - Lessons Learned series were:

a. Summary of Lessons Learned, Vietnam, 2 November 1965, UNCLASSIFIED.

b. Operations Report - Lessons Learned, Report 1-66, Operation CRIMP, 22 March 1966, marked FOR OFFICIAL USE ONLY.

c. Operations Report - Lessons Learned, Report 2-66, The Battle of Annihilation and the BONG SON Campaign, 1 Apr 66, CLASSIFIED.

d. Operations Report - Lessons Learned, Report 3-66, The PLEIKU Campaign, 10 May 1966, UNCLASSIFIED (Limited Distribution).

e. Operations Report - Lessons Learned, Report 4-66, Evasion and Escape RVN, 24 May 1966, CLASSIFIED.

OCS 6-70

REGRADED UNCLASSIFIED WHEN SEPARATED FROM CLASSIFIED INCLOSURES

CONFIDENTIAL

f. Operations Report - Lessons Learned, Report 5-66, Combat Service Support - RVN, 10 June 1966, UNCLASSIFIED.

g. Operations Report - Lessons Learned, Report 6-66, Lessons Learned in Vietnam -- 1966, 1 July 1966, UNCLASSIFIED.

h. Operations Report - Lessons Learned, Report 7-66, Operations COCOA BEACH and HAPPY VALLEY, 11 Aug 1966, CLASSIFIED.

i. Operations Report - Lessons Learned, Report 8-66, Engineer Notes #1, 13 October 1966, UNCLASSIFIED.

5. Addressees other than US Army are provided copies of Operations Report - Lessons Learned in accordance with the provisions of DJSM 545-66, dated 2 May 1966.

BY ORDER OF THE SECRETARY OF THE ARMY:

Kenneth G. Wickham

KENNETH G. WICKHAM
Major General, USA
The Adjutant General

1 Incl
Lessons Learned 9-66 - Equipment

DISTRIBUTION:
Office, Secretary of the Army
Office, Chief of Staff, US Army
Deputy Chiefs of Staff
Comptroller of the Army
Chief of Research and Development
Chief, Office of Reserve Components
Assistant Chiefs of Staff
The Adjutant General
Chief of Engineers
Chief of Finance
The Surgeon General
The Inspector General
Chief of Communications-Electronics
Chief, National Guard Bureau
Chief of Information
Chief of Military History
Chief, Army Reserve
The Provost Marshal General
Chief of Support Services
Commanders in Chief
US Army, Europe
US Army, Pacific

(Continued on page 3)

AGAM-P (M) (30 Nov 66) FOR OT RD 7 December 1966
SUBJECT: Operational Report - Lessons Learned 9-66 - Equipment

DISTRIBUTION (Cont'd)
Commanding Generals
US Continental Army Command
US Army Materiel Command
US Army Combat Developments Command
CONUS Armies
US Army Strategic Communications Command
US Army Security Agency
US Army Intelligence Command
Commanding Generals
US Army, Alaska
US Army, Hawaii
US Army, Japan
US Army, Ryukyu Islands
Seventh US Army
Eighth US Army
US Army Training Centers
Army Corps
Army Divisions CONUS

US Army Deseret Test Center
US Army Electronic Command
Commander
US Army Forces Southern Command
Superintendent
US Military Academy
Commandants
US Army Command and General Staff College
US Army War College
US Army Air Defense School
US Army Armor School
US Army Artillery and Missile School
US Army Chemical Corps School
US Army Engineer School
US Army Military Police School
US Army Infantry School
US Army Intelligence School
US Army Medical Field Service School
US Army Ordnance School
US Army Quartermaster School
US Army Security Agency School
US Army Signal School
US Army Transportation School
US Army Special Warfare School
US Army CBR Weapons Orientation Course
US Army Aviation School
US Army Civil Affairs School

COPIES FURNISHED:
- Chief of Naval Operations
- Chief of Staff, US Air Force
- Commandant of the Marine Corps
- Director, Joint Staff, JCS
- Commanders in Chief
  - Alaska
  - Atlantic
  - Pacific
  - STRIKE Command
  - US European Command
  - Southern Command
  - Pacific Fleet
  - US Air Force, Pacific
  - Fleet Marine Force, Pacific
- Commanders
  - US Military Assistance Command
    - Thailand
    - Vietnam
  - Commandants
    - Armed Forces Staff College
    - Industrial College of the Armed Forces
    - National War College
  - Director, Military Assistance Institute
    - Senior Army Advisors
      - Naval War College
      - Marine Corps School
      - Air University
    - US Exchange Instructor
      - Tactics School, Royal School of Military Engineering Chatham, Kent, England
      - Security Officer, ICR, University of Pennsylvania
      - USA Standardization Group, Ottawa, Canada
      - Corps of Engineer Class II Installations and Activities
      - Director, Air University Library
      - US Army Map Service

TABLE OF CONTENTS

Annex A topics considered 21 Sep

EXTRACTED FROM COUNTERINSURGENCY LESSONS LEARNED NO. 59
HEADQUARTERS, MACV, 13 JULY 1966

SUBJECT: Employment of Image Intensification Devices

1. (CMHA) INTRODUCTION:

a. A new chapter in night combat operations has now been introduced in Vietnam with arrival of the first generation of passive night vision devices in December 1965. Unit commanders, soldiers and operators of these night vision instruments have been impressed by the outstanding results obtained in night combat operations. This group of electro-optical instruments which are passive visual aids for night viewing, utilizes both natural illumination from the moon and stars, and artificially induced light such as flares and searchlights.

b. Presently over 900 of the devices have been issued to various US units in Vietnam. Units of the 1st Cavalry Division (Airmobile), 1st Infantry Division, 25th Infantry Division, 1st Brigade of the 101st Airborne Division, 173d Airborne Brigade, 5th Special Forces Group and 7th Air Force have been using the night vision instruments in night combat operations to develop techniques of employment, capabilities, limitations and requirements. Combat operational successes, particularly with the small Starlight Scope both on the surface and from the air have resulted in an urgent demand for thousands more of these devices.

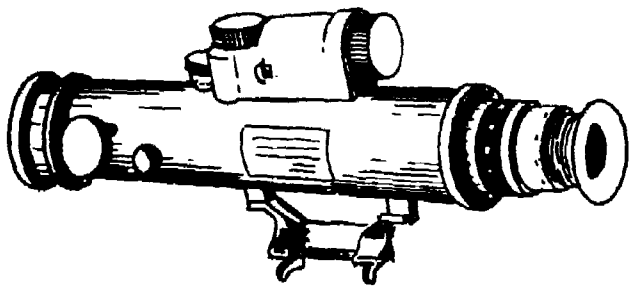
c. The Army Concept Team in Vietnam is currently evaluating the first generation of image intensification night vision equipment used by US Army units in the Republic of Vietnam in order to obtain data on the employment, maintenance, system performance and to recommend the basis of issue. The report of this evaluation is expected in July of this year. Some of the preliminary results of the evaluation and suggested techniques for employment of the night vision devices are included in this paper.

d. The Air Force Test Unit has completed evaluation of this equipment on aerial observation, surveillance, and attack missions. Their evaluations are also reflected in this publication.

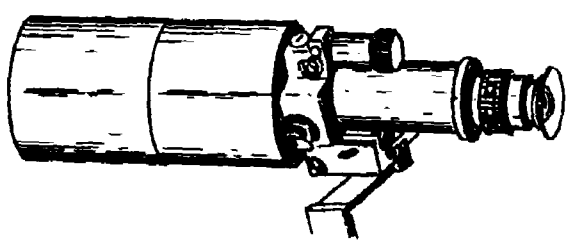
SUBJECT: Employment of Image Intensification Devices

e. The family of Night Vision Devices (NVD) now available includes the following types.

(1) The Starlight Scope (SSS) which provides battlefield surveillance, target acquisition and delivery of aimed fire from rifles and machine guns within a range of 400 meters.

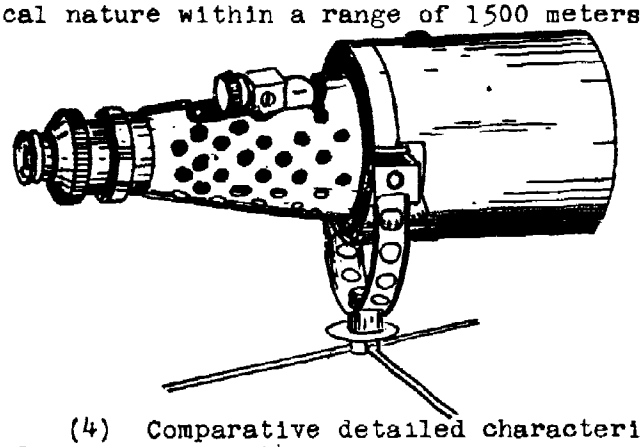


(2) The night Vision Sight for Crew-served Weapons (CSWS) which provides battlefield surveillance, target acquisition and delivery of aimed fire from crew-served weapons within a range of 1000 meters.



SUBJECT: Employment of Image Intensification Devices

(3) The night Observation Device, Medium Range, (NOD) which provides terrain observation and detection of objects of a tactical nature within a range of 1500 meters.



(4) Comparative detailed characteristics of the scopes are listed on page 14.

2. (CMHA) TECHNIQUES OF EMPLOYMENT:

a. General.

(1) Many variables, such as the terrain, vegetation, amount of ambient light and capability of the operator, influence the results obtained in utilizing night vision devices. To cite the extremes, on the darkest night in the jungle a man using the Starlight Scope can see from 10 to 30 meters; on the other hand, under a full moon and a starfilled sky, an observer, using the same scope over open terrain can plainly observe activity and objects out to 500 meters.

(2) For general aerial use the night vision devices perform satisfactorily with available ambient light from starlight and at least one fourth of the moon. The effectiveness of the night vision devices varies directly with the amount of ambient illumination. During bright moonlight nights when the cloud cover is light and thin, the operational capability of night vision devices is excellent.

(3) Satisfactory Starlight Scope mounts for aircraft do not yet exist since the scope was designed primarily for surface use. However, good results with the Starlight Scope can be

achieved by hand holding the instrument or by mounting it on an handheld M-16 rifle.

(4) On nights when insufficient natural ambient light is available, excellent results with night vision devices may be obtained by employing artificial light. Searchlights, artillery and mortar flares properly placed enable the Starlight Scope to operate at peak efficiency. However, if the light source shines directly or is reflected into the lens of the scope, it causes the image to "white-out" or in the case of newer scopes to automatically cutoff. Further,permanent damage may result to the scope which is similar to burned spots on a TV picture tube. The burn spots will mar the presentation of the image and thereby decrease the reliability of the instrument. For this reason flares should be fired to the sides of area under surveillance or high and close with reference to the scope.

b. Ambushes - The Starlight Scope is especially suited for use in an ambush. It assists the operator in surveying the area surrounding the ambush site prior to establishing the ambush and then provides good observation of the approaches to the killing zone. Once the enemy has entered the killing zone the operator is able to place accurately aimed and effective fire on the enemy. The Starlight Scope can be mounted on M-14, M-16, and M-60 weapons.

c. Reconnaissance Patrols - The Starlight Scope is very useful in night reconnaissance patrol activities. It enables the patrol to identify landmarks and reference points at greater distances -- thereby decreasing the number of orientation halts and facilitating rapid patrol movements. Security of the patrol is increased by using Starlight Scope to check danger areas such as open clearings, stream beds, and possible ambush sites prior to the patrol's advance. Better observation of the patrol's objective is obtained and reentry into friendly lines is facilitated.

d. Night Defensive Operations - The night vision devices can be used effectively in night defensive operations by employing the devices at strategic observation and listening posts within and without the perimeter. Improved night visibility permits early detection, identification and engagement of the enemy forces. The Starlight Scope is particularly effective when used in conjunction with the AN-PPS-4 ground radar surveillance equipment.

SUBJECT: Employment of Image Intensification Devices

Enemy forces and objectives are detected by radar and identified through improved vision provided by the Starlight Scope.

e. Aerial Techniques of Employment:

(1) An observer using the Starlight Scope on a search and destroy mission in the AC-47 can observe enemy movement and activities on a clear night with a quarter moon or better and effectively engage the enemy targets. The navigator observing through the Starlight Scope at the cargo door can easily detect people, vehicles and objects on the highways or in the area of rice paddies and boat movement on the waterways. The optimum altitude for this surveillance is about fifteen hundred feet above the ground. Depending on the amount of moonlight, the scope operator can see the objectives satisfactorily while flying one to two thousand feet above the surface. Once the target is identified, the observer directs the pilot to the target who then fires on the objective.

(2) Slick and gunship helicopters working together can conduct night time operations utilizing the Starlight Scope. Visibility of surface objects with the Starlight Scope is good under a one-eighth and is excellent under one-fourth moon or full moon with clear skies. Optimum speed ranges are from 40-70 knots depending on the altitude and ambient light. Good target identification is obtained from altitudes of one thousand to fifteen hundred feet above the ground The gunship flies at a higher altitude than the slick and at a distance of one half to one and one half miles to the rear. This distance is necessary as a safety factor since the gun ships fly blackout and the slick flies with the rotating beacon only. When the target is identified, it is marked by the scope operator with tracer fire or trip flares (with the bottom flanges broken off). WP or smoke may be used during periods of one-half moon to full moon. At this point the pilot notifies the gun ship of the nature of target, its location with respect to the marker and his new heading and altitude, i.e., "climbing turn" to 280 degrees at 1000 feet.

(3) If artillery is available, the Fire Support Center is notified of the mission while the objective is being engaged by the gun ships. Upon completion of the gun ships mission, artillery is adjusted on the area using normal observer fire procedures. The following system for artillery fire adjustment can be employed. The M-34 WP grenade is dropped to

SUBJECT: Employment of Image Intensification Devices

harass the enemy as well as to mark targets for artillery fire which can be adjusted by the scope operator with excellent results. The easiest method of observing the target while adjusting fire without induced illumination is to fly a figure eight pattern at fifteen hundred feet, centered on and perpendicular to the gun target line, approximately one thousand meters beyond the target.

(4) During periods of less than one-fourth moon on Starlight Scope surveillance missions, navigation may be facilitated by using the Decca navigational system (preferably using the model with the six digit coordinate console). The exact route must be determined and plotted in advance and much of the success of the mission depends upon the pilot's ability to tell the scope operator exactly where he is at all times.

(5) The UH-1D model helicopter is preferred for Starlight Scope night operations as the two observers can obtain good results by sitting on the rear seat on either side of the transmission. An alternate seating arrangement is to place two seats immediately forward of the door gunners facing outward. The latter system permits better coordination between the scope operator and the door gunner. In addition, the operator can follow the pilots instrument panel for more accurate orientation. By installing a tee plug the observers can be tied into the aircraft interphone net.

3. (CMHA) TACTICAL EXPERIENCES:

a. Combat use of the small Starlight Scope on the surface and from the air has produced impressive results. This scope provides a means for friendly troops to counter and disrupt night operations of Viet Cong and North Vietnamese troops.

SUBJECT: Employment .. Image Intensification Devices

Selected examples which follow indicate the capabilities and diversified uses of the Starlight Scope during night operations.

b. Beginning with the night of 7 January 1966, under a full moon, the Starlight Scope was used by Detachment A-412, 5th Special Forces Group. to detect VC actions close-in to their camp at Don Chu. Using the scope they observed the VC preparing mortar positions and a command post approximately 1500 meters north from the Special Forces compound. These positions were cleverly concealed and were so constructed as to be impervious to countermortar fires. Special Forces personnel maintained the VC construction team under surveillance each night until completion of their emplacements. A demolitions patrol was sent to destroy the prepared mortar position and CP the following day.

c. While on a night aerial observation flight in an OH-13 helicopter, an observer of the 3d Brigade, 1st Infantry Division using the Starlight Scope sighted 100 cooking fires in the western portion of the TAOR (Tactical Area of Responsibility). Within the perimeter of the fires, the observer could detect the presence of personnel. The observer marked the target with an M-34 WP grenade. Several VC scrambled to their feet when the grenade exploded. Artillery was then placed on the target and the VC fires disappeared. This action commenced at 0407 hours, 14 February 1966, with the aircraft flying at 45 knots at an altitude of 700 feet above the ground.

d. On the night of 2 March 1966, with nearly a full moon, a helicopter borne US Army artillery observer of Battery B, 2/32 FA Battalion used the Starlight Scope while conducting fire on targets of opportunity in the general vicinity of 3d Brigade, 1st Infantry Division at Lai Khe. As a result of electronic radiation reports of activity on the Saigon River and agent reports of movement in the same area, the flight route was diverted to include a surveillance mission along the Saigon River. At 2045 hours, the observer sighted a large 60-man VC motorized junk approximately 30 miles north of Saigon. Prompt artillery fire from a 175mm gun scored a first round hit from a range of approximately 15 km. Another junk was also engaged and sunk a few minutes later from the bracketing volley from two 175s. The remaining VC vessels rapidly dispersed.

SUBJECT: Employment of Image Intensification Devices

e. On 4 March 1966, a sidefiring AC-47 equipped with a Starlight Scope detected, identified and attacked a force of VC who were preparing to attack a nearby town. It was a clear moonlight night and the aircraft was flying at 1500 feet above ground level when approximately 200 VC were sighted in a rice paddy. Fifteen hundred rounds of 7.62mm were fired at them before machine gun malfunctions forced the aircraft to temporarily withdraw. Later, three thousand rounds were fired into the woods where the survivors of the gorup had fled while the guns were being repaired. After daylight on the following morning, forward air controllers in an O-1E airplane counted and took pictures of 52 bodies left by the VC in the open rice paddy. The crew of the AC-47 stated that it was only through the use of the Starlight Scope that they were able to see and direct fire against the attackers.

f. Shortly before dawn on 5 March 1966, a reconnaissance patrol of the 2/28 Infantry, using the Starlight Scope detected a company size force of VC moving up the road towards their position. The patrol prepared an ambush site but discovered a second company-sized force of VC a short distance behind the first group. The patrol leader allowed the first group to pass and then ambushed the second group inflicting heavy casualties. The first group of VC then returned to the ambush site and entered the fire fight. In the confusion the two groups of VC fired on each other while the patrol withdrew towards the battalion perimeter and called for artillery fire on the VC. Although the patrol leader was killed during the battle, the platoon sergeant credited the Starlight Scope with saving the patrol and stated that it was one of the most useful pieces of equipment he had ever used in combat.

g. On 15 March 1966, an element of the 173d Airborne Brigade in War Zone "D" had an observation post set up as part of its perimeter defense. At 0100 hours, with approximately one-half moon, the Starlight Scope observer spotted and identified six enemy troops moving along a ridge line. The operator adjusted artillery fire on the target area and at the completion of the fire mission was able to observe several bodies lying on the ground. The following morning, a reconnaissance patrol found traces of blood but was unable to confirm a body count.

h. The Starlight Scope was used in conjunction with AN-PPS-4 ground radar surveillance set at the 3d Brigade, 1st Infantry Division's Base Camp at Lai Khe. The Starlight Scope

SUBJECT: Employment of Image Intensification Devices

and the radar set were collocated in a tower 75 feet high. The Starlight Scope was used by the radar operators to identify stationary targets which had been located by radar. For several nights the radar operator detected activity along the Lai Khe - Ben Cat road and artillery fire was placed on these targets. A body count could not be confirmed, but bloodstains and equipment were found on two occasions.

4. (CMHA) LESSONS LEARNED:

a. The use of night vision devices in both offensive and defensive operations is limited only by the imagination of the unit commander in his employment of the equipment.

b. The Starlight Scope has aided greatly in developing the individual soldier's confidence in his ability to conduct night operations effectively and aggressively.

c. When used in conjunction with the AN-PPS-4 ground radar surveillance set, the night vision devices provide a more accurate identification of targets sighted on the radar scope.

d. Some weather conditions tend to reduce the effectiveness of these scopes. Fog has a tendency to reduce the ambient light level and also decrease the range. Light haze and smoke has very little effect on the sharpness of images. If the objective lens face becomes streaked with water during rain, it will distort the appearance of the area under observation.

e. On dark nights without moon and stars, the night vision devices can be operated at peak efficiency with the assistance of properly employed artificial illumination.

f. Prolonged use of light intensification devices tends to impair the night vision of the user. Therefore, the devices should not be used by the pilot who will land the aircraft as in all probability his depth perception and night vision will be impaired.

g. A suitable mount is required to operate the Starlight Scope from O-1E aircraft satisfactorily. The scope cannot be used effectively through the aircraft window or canopy because

of the adverse effect of reflections. Using the scope with the window open curtails the observers vision because the airstream presses against the observers face.

h. The night vision scopes are most suitable for linear air surveillance along highways, canals, rivers, coastlines and small areas familiar to the aerial observer.

i. Permanent damage to the night vision devices can result from the exposure of excessive natural or artificial light into the lens of the instrument.

COMPARATIVE CHARACTERISTICS

	SSS	CSWS	NOD
Range up to:	400 meters	1000 meters	1500 meters
Magnification:	4 power	7 power	7 power
Field of view:	Approx 10 171 mils	Approx 5.5 108 mils	Approx 3 55 mils
Lens Focus:	4 meters to inf	50 meters to inf	50 meters to inf
Eye piece focus:	Adjustable from minus 4 to plus 4 diopters		
Weight:	5.91 lbs	15 pounds	34 pounds
Tripod weight:	-	-	9 pounds
Length:	13.86"	24.75"	33"
Width:	3.35"	6.31"	12.7/8"
Height:	5.52"	7"	14.7" (without tripod)*
Elevation:	-	-	+ 600 mils to - 400 mils
Azimuth:	-	-	0 to 6400 mils
Battery:	6.75 volts, mercury BA 1100U (disposable)		
FSN:	1090-688-9954	1090-911-1370	5850-688-9956

* Adjustable (approx 4 to 6 feet for large tripod and approx 1 foot for small tripod).

EXTRACTED FROM LESSONS LEARNED
#52, HEADQUARTERS, USMACV, DATED 22 NOV 1965

SUBJECT: Employment of the Mity Mite Portable Blower

1. INTRODUCTION:

The Mity Mite portable blower is now in the hands of US Forces operating in South Vietnam.

The following account of an operation in which the Mity Mite was successfully employed to trace and flush a Viet Cong tunnel system and the Lessons Learned from this experience, reveals one technique of employment.

2. GENERAL:

a. The Mity Mite portable blower when properly used in conjunction with smoke pots or smoke grenades will force the smoke throughout a tunnel system and generally reveal the entrances and vents, if any are present. As the Mity Mite portable blower is soon to be issued in quantity to ARVN units, US advisors should become familiar with the methods of employing this piece of equipment.

b. The Mity Mite is an agricultural backpack sprayduster (See page 21). It is powered by a two-cycle gasoline engine, weighs 25 pounds (without fuel or agent) and displaces 450 cubic feet of air per minute. The fuel tank holds approximately one quart of gasoline-oil mixture which will permit operation in excess of 30 minutes. It is equipped with a two foot long flexible tube that has a metal nozzle on the end. The Mity Mite has a polyethylene agent tank which can be filled with either ten pounds of powder agent or three gallons of liquid agent.

c. The Mity Mite portable blower can be used to:

(1) Force the evacuation of unmasked personnel from a tunnel system using smoke or riot control munitions.

(2) Locate vents and entrances of a tunnel system using smoke munitions.

(3) Generate an agent cloud for use against unmasked personnel in the open using a powder agent.

3. OPERATIONAL EXPERIENCE:

The Mity Mite was employed during a search and destroy operation conducted by the 8th Inf Regt, 5th Div, in III CTZ from 8 to 11 October 1965. This is believed to have been the first tactical employment of Mity Mite by ARVN.

The objective area selected was the Iron Triangle which was known to contain many VC tunnel systems. The US Chemical Advisor to III Corps participated in planning the operation, and proposed the use of the Mity Mite.

The III Corps Chemical Advisor contacted the ARVN 5th Inf Div Chemical Team Leader and coordinated the time and location for organizing and training a tunnel tracing and flushing team. On 7 October a team was organized from the Division Chemical Team as follows:

Team Leader	- Second Lieutenant (Div Chem Team Ldr)
Mity Mite Operator	- Sergeant (carries blower)
Assistant Operator	- Private (carries two gallons of gas, one quart of oil, tool kit, and two ponchos).
Munitions Bearers	- 3 Privates (each carries three smokepots, HC, 10 pound, M-1 and five smoke grenades, M-8, HC or M-18 colored smoke).

Training for the newly organized tunnel tracing and flushing team included operation and maintenance of the portable blower, and practical exercises in operation of the blower with smoke. The total time devoted to training was two hours. The team also prepared for the operation by cutting a five gallon can in half. A hole the size of the blower nozzle was cut in the upper half to facilitate blowing smoke into vertical entrances of tunnels. It was planned to use the lower half to block tunnel entrances (See page 22).

Initial plans for employment of the tunnel tracing and flushing team called for it to initially remain with the 8th Regt CP and respond to requests from the attacking battalions. However,

this plan was later amended to place the team and an engineer platoon in direct support of one of the attacking battalions for each day of the operation. This method of employment would insure that the tunnel tracing and flushing team could respond rapidly to requests, and the engineer platoon could promptly destroy the tunnel system after it was traced and flushed.

A tunnel was discovered on the first day of the search and destroy operation by the 2nd Bn, 8th Inf Regt. The area surrounding the tunnel was secured by the 2nd Bn while the tunnel tracing and flushing team went into action. The techniques which they employed were as follows:

(1) The Mity Mite blower was placed near the tunnel entrances and a poncho was spread over the horizontal aperture. The hose nozzle was placed through the head opening of the poncho and the hood strings were fastened tightly around the hose nozzle. Earth was placed around the edges of the poncho to form a good seal (See Page 23).

(2) The lower half of the five gallon can was inserted in another tunnel entrance which was a few feet away from the original entrance to prevent the smoke from dissipating before penetrating all portions of the tunnel system.

(3) One corner of the poncho was raised and a smoke grenade was placed in the tunnel (approximately three feet away from the poncho to prevent burning it). At this time the Mity Mite blower was started. A smoke grenade was used initially so that if the tunnel was small an entire smokepot would not have been expended. Further, the 10 pound smokepot burns approximately eight minutes while the smoke grenade burns for two minutes.

(4) 2nd Battalion troops moved out in all directions (360 degrees) from the blower while smoke munitions were continuously placed into the tunnel entrance. The troops detected smoke escaping from tunnel vents and entrances, and were on the look out for escaping VC. However, no VC were discovered in this particular tunnel system. As vents and entrances were detected, the apertures were marked and sealed.

(5) When it was determined that all entrances and vents of the tunnel system had been detected and the tunnel trace was

apparent, further smoke munitions were unnecessary. However, the blower was left running until all smoke had been cleared from the tunnel system.

(6) The engineers then searched through the tunnel system for possible asphyxiated VC, booby traps, weapons, equipment and supplies. Once this had been accomplished, the engineer unit set the charges and destroyed the tunnel system.

This experience with the Mity Mite blower was successful and established that the blower could be used to trace tunnel systems. It should be pointed out that, although only HC smoke was used with the blower on this operation, the use of riot control munitions employed either singly or in combination with HC smoke would be very effective in flushing VC from tunnels.

4. LESSONS LEARNED:

a. The principles of operation and employment of the Mity Mite portable blower were learned quickly and easily by members of the 5th Inf Div (ARVN) Chemical Team.

b. Plans for search and destroy operations using the Mity Mite Team must allow sufficient time for proper tunnel tracing and flushing.

c. The tunnel tracing and flushing team is most effectively employed when attached to infantry maneuver units. If the team stays at a rear location with the headquarters or reserve unit, time is lost and security for movement to the tunnel site is limited. In addition, the team enjoys relatively good security with the infantry maneuver element.

d. Both smoke grenades and smokepots should be taken with the team on an operation. Smoke resources will be conserved by using a smoke grenade for initial tunnel tracing.

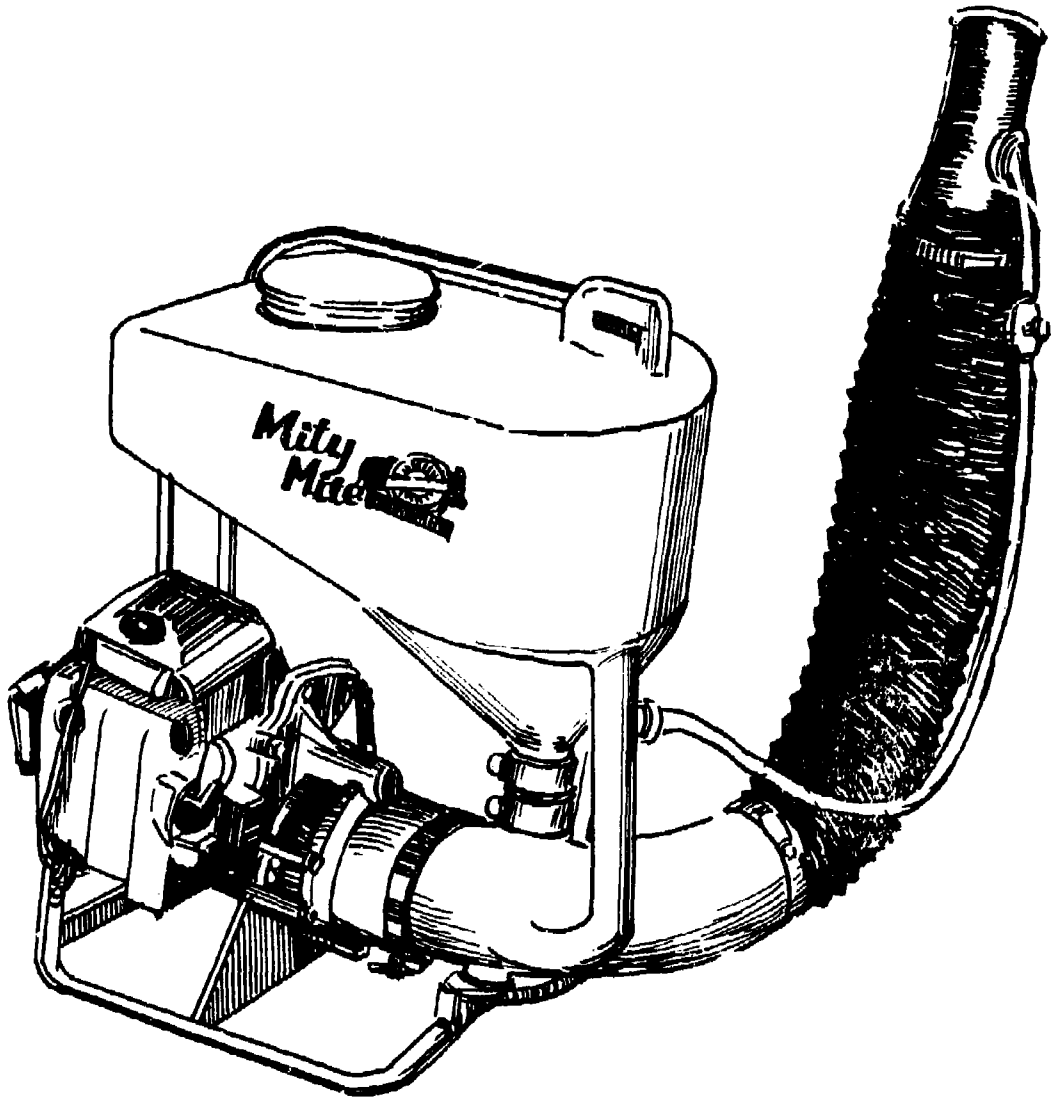
e. Extra fuel for the blower must be taken with the team because the blower's fuel tank capacity is only one quart. Determine fuel requirements by totaling the burning times of all smoke munitions (smokepot - 8 min; smoke grenade - 2 min).

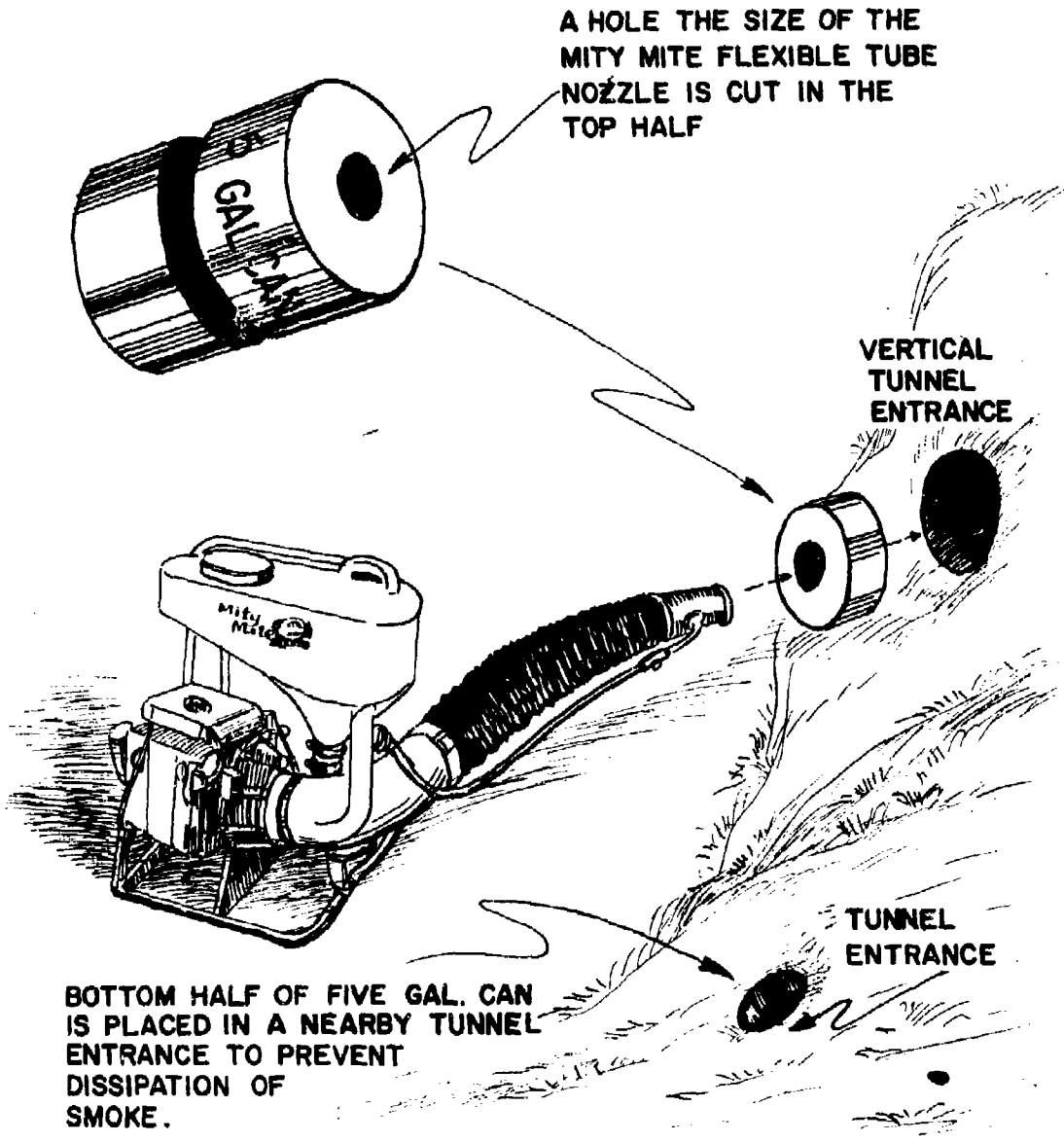
f. The upper and lower halves of five gallon can were effective field expedients. The lower half should be used to seal any nearby tunnel entrances and prevent dissipation of the smoke. A hole the size of the Mity Mite blower nozzle should be cut in the center of the upper half. Employing this half with the blower simplified blowing smoke into vertical tunnel entrances. The poncho when tied securely around the blower nozzle was effective on horizontal entrances to tunnels.

g. The Vietnamese soldier is quite capable of carrying the 25 pound blower for extended operations. Further, the desirable smoke munitions load for the ARVN munitions bearer is three smokepots and five smoke grenades.

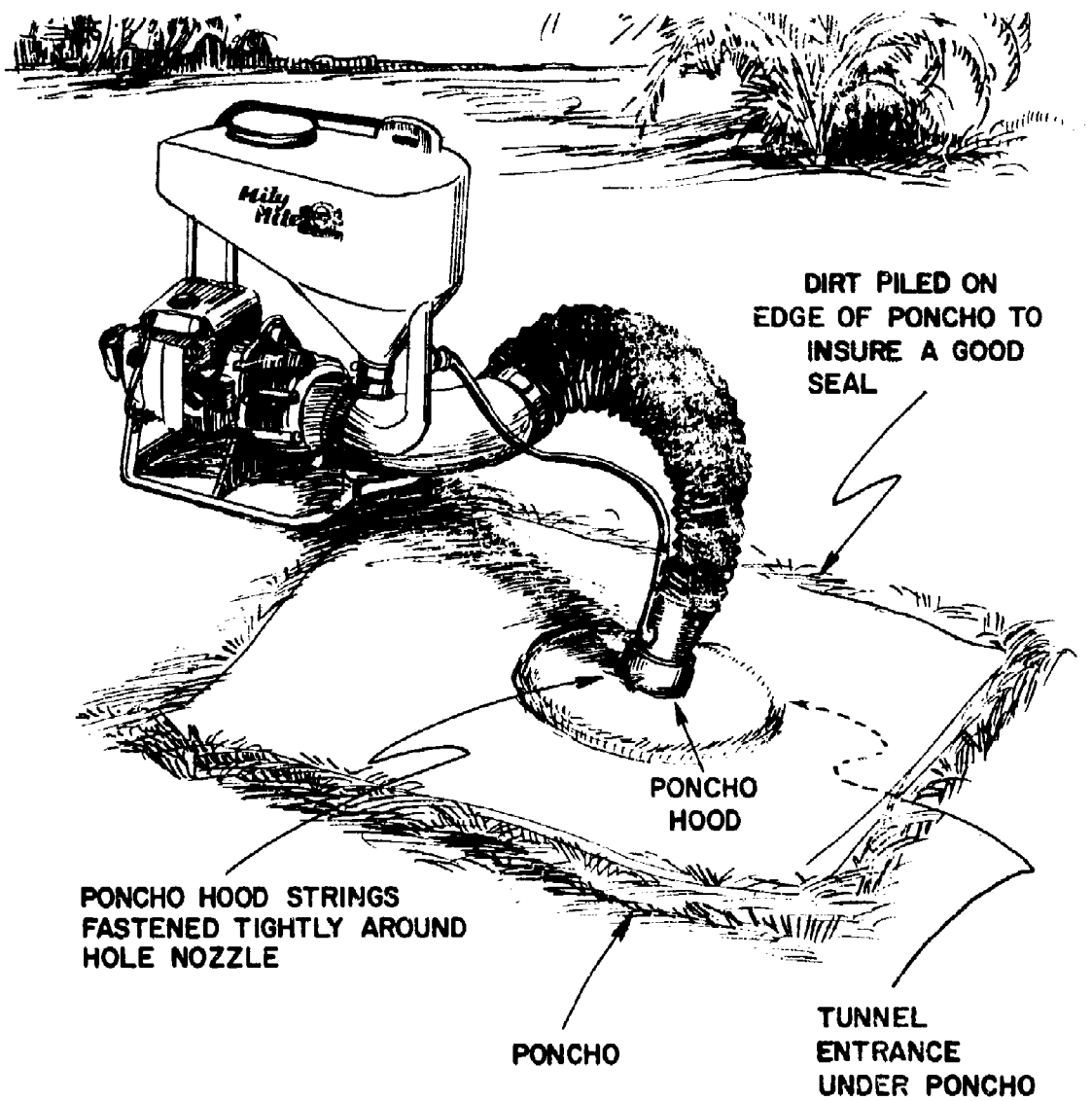
h. The Mity Mite proved to be effective on this particular operation.

MITY MITE PORTABLE BLOWER





FIELD EXPEDIENT METHOD USING
5 GALLON CAN



USE OF PONCHO WITH MITY MITE BLOWER

EXTRACTED FROM HEADQUARTERS, US ARMY VIETNAM
COMBAT LESSONS BULLETIN NUMBER 7, DATED 28 OCT 66

BRIDGE FAILURES

The subject of this bulletin is bridge capacities. Three recent bridge failures, cited below, point up a need for reiteration of the rules pertaining to bridge and vehicle load classifications.

ITEM 1: Failure of a Bailey Bridge on Route 16. (Source: 18th Engineer Brigade).

Discussion: On 24 July 1966, an M88 tank retriever towing an M48A3 tank attempted to cross a triple single Bailey Bridge. The bridge failed at the center under this combined load of approximately Class 100. A 100 foot TS Bailey is rated at Class 55, normal crossing, and Class 65, risk crossing.

Observation: Engineer advice in planning the move or application of the basic rules for determining load classification and bridge capacities could have prevented this incident.

ITEM 2: Collapse of an Eiffel Bridge on Route 15. (Source: 18th Engineer Brigade).

Discussion: On 3 September 1966, an M62 wrecker towing a 2½ ton truck attempted to cross a Class 9 Eiffel bridge. The bridge collapsed under the combined load estimated to be Class 32. The bridge was posted with the correct military load classification sign.

Observation: Had the driver or person in charge of the move been properly trained in the rudiments of load classification, this incident could have been prevented.

ITEM 3: Failure of a Bailey Bridge on Route 1: (Source: 18th Engineer Brigade).

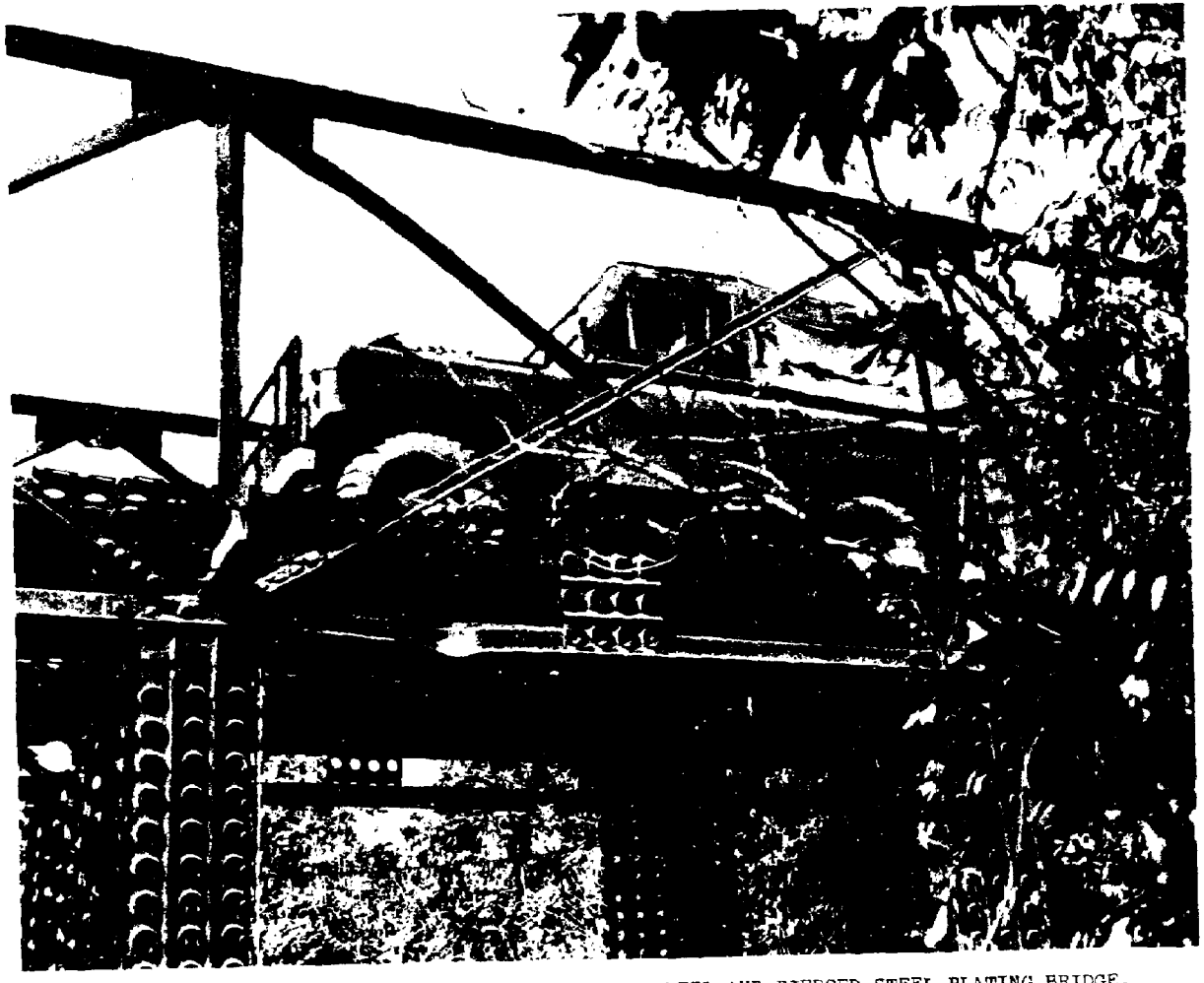
Discussion: On 6 October 1966, an M88 tank retriever towing an M48A3 tank dozer attempted to cross a triple double Bailey bridge. The bridge failed under this combined load estimated at Class 105. A 105 foot TD Bailey is rated at Class 60,

normal crossing, and Class 90, risk crossing.

Observation: The capability of practically any bridge in RVN to withstand the combined, concentrated weight of a tank retriever and a tank should be questioned and engineer advice sought prior to an attempted crossing.

Programs to determine and post bridge calssifications on all bridges within II and III CTZ's have been initiated. Commanders should ensure that all personnel associated with vehicular movement become familiar with and follow the guidance contained in FM 5-36, Route Reconnaissance and Classification. In addition, all drivers should know the purpose of the load classification number which is painted on each vehicle (required by AR 746-5 and TB 746-93-1).

Bridges in RVN are generally of low capacity; thus, the planned movement of vehicles with a load classification greater than Class 12 and wider than eight feet should always be coordinated with the engineer or personnel trained in route reconnaissance.



A VEHICLE OF THE US ARMY, VIETNAM, PASSES OVER STEEL AND PIERCED STEEL PLATING BRIDGE.

EXTRACTED FROM OPERATIONAL REPORT - LESSONS LEARNED

97TH ARTILLERY GROUP (AD) FOR PERIOD ENDING 31 JULY 1966

ITEM: AIRCRAFT DETECTION AND IDENTIFICATION UTILIZING HAWK SYSTEM RADARS (C)

DISCUSSION: Location and capabilities of HAWK System Radars will in some cases allow surveillance in areas where US Air Force surveillance radars are limited by masking, ground clutter or electronic "dead zones". Due to this situation, there have been numerous instances, especially in the Cam Ranh Bay - Nha Trang area, where HAWK aided the US Air Force in detection and identification of aircraft. Due primarily to the increased coordination which has resulted from the AF/ADA collocation in the CRC, the Air Force movement and identification section has a better understanding of the HAWK radar capabilities; as a result, HAWK is frequently called upon to aid in surveillance and interrogation of unidentified aircraft. In a majority of the cases, the response from the HAWK units has allowed accurate and timely identification, thereby precluding the necessity for scramble of intercenters to make visual identification. This situation has provided dollar savings in the case of the Air Force, and has added to the prestige of the HAWK System.

OBSERVATION: Emphasis must be given to the use of the HAWK radars in air defense surveillance and identification in AF/ADA joint air defense operations. Furthermore, emphasis must be placed on maintenance of HAWK acquisition/IFF capabilities, and on training of operators in IFF techniques, to insure that the HAWK System will respond to requests in this area of air defense operations.

BATTLEFIELD ILLUMINATION SYSTEM

As a result of recommendations and observations made in Operational Reports - Lessons Learned received from units operating in South Vietnam, the new Battlefield Illumination System has been developed. The observation cited below is extracted from the Operational Report submitted by the 3d Brigade 25th Infantry Division, and is typical of the observations on this subject matter that resulted in the development of the new Battlefield Illumination System.

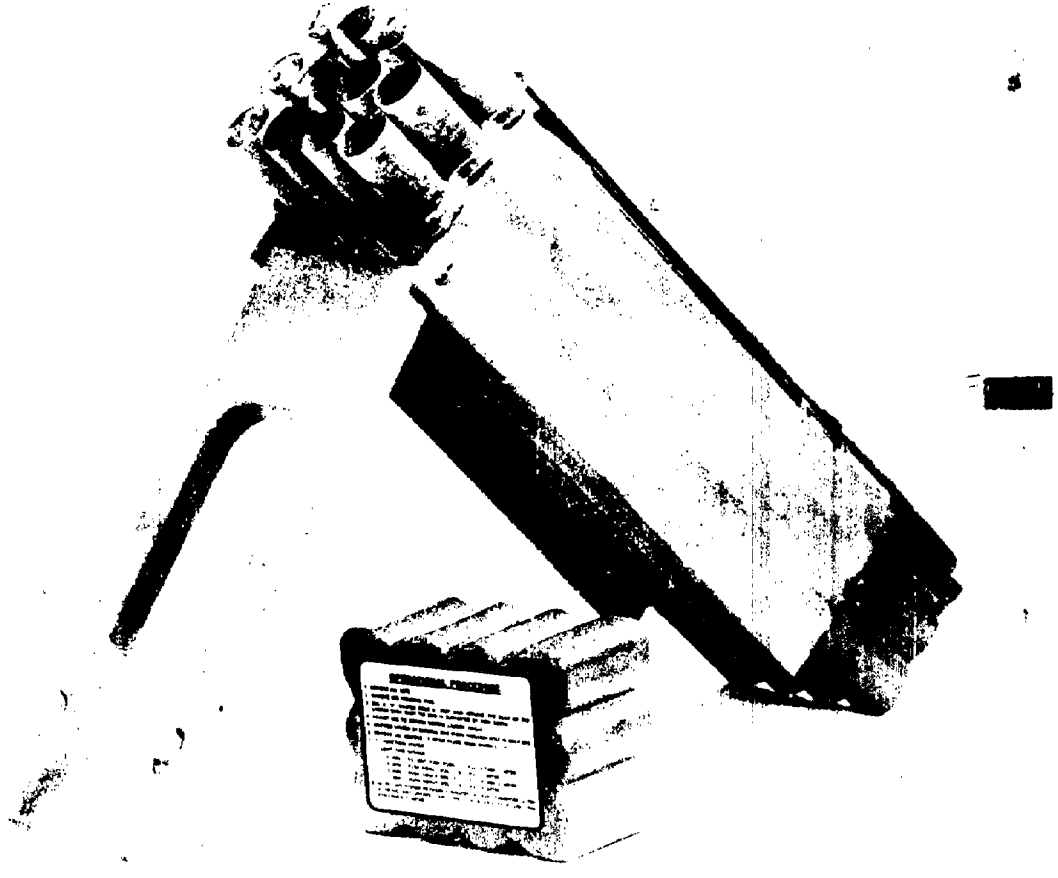
Item: Command Detonated Illumination. (C)

Observation: "A requirement exists for a simple electrical or manually detonated, easily erected and disassembled command illumination system"

Results: The Army developed a new Battlefield Illumination System for use in Vietnam. United States Army, Pacific, forwarded a request for fifty Battlefield Illumination Systems on 17 January 1966. This item was designed to relieve tactical weapons from performing illuminating missions in built-up areas and to allow their concentration on casualty producing employment. The new system affords a longer burning capability to replace the repetitive firings of pyrotechnics by conventional weaponry. These devices will be prepositioned around compounds, base camps, and stabilized perimeters.

The twelve tube self-contained unit was developed by the Limited War Laboratory. Individual flares can be fired to a maximum range of 600 meters and provide a clear circle of illumination 400 meters in diameter for a period of over six minutes duration.

Delivery to troop units in the field can be expected in December 1966.



NEW BATTLEFIELD ILLUMINATION SYSTEM

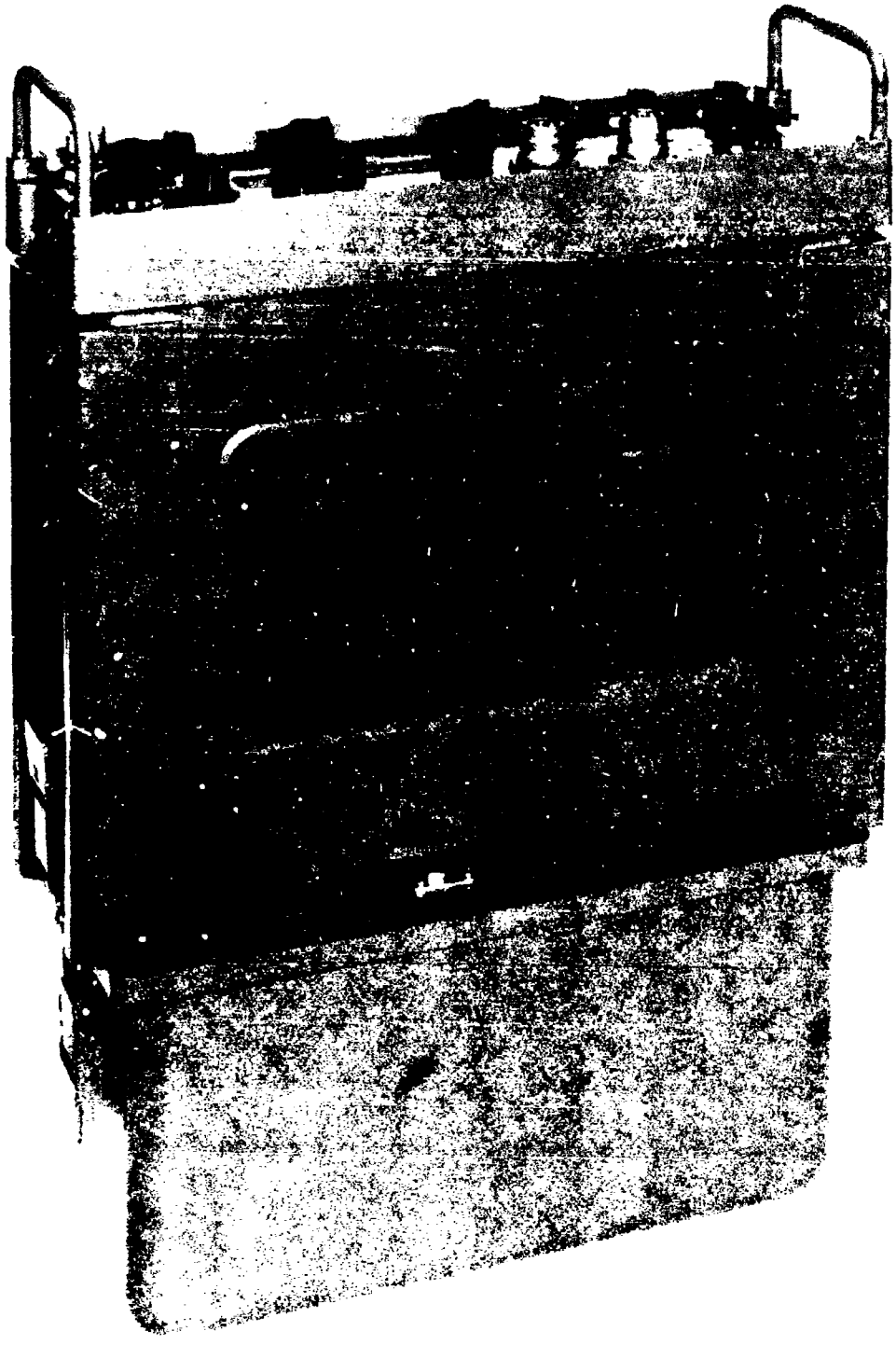
NEW LIGHT WEIGHT BATTERY FOR USE WITH THE AN/PRC-74 SINGLE SIDEBAND RADIOS

The following Lessons Learned was extracted from several Operational Reports - Lessons Learned submitted in accordance with AR 1-19 from units operating in South Vietnam. As a result of DA Staff evaluation, the following action has been taken.

LESSONS LEARNED: Combat elements in Vietnam have a requirement for a lighter weight, throw away type dry battery for use with the AN/PRC-74 (Hughes HC-162) single sideband radios.

COMMENT: In the fall of 1965, USARV stated a requirement for 1089 AN/PRC-74 (Hughes HC-162) single sideband radios. The AN/PRC-74 is a commercially developed set for single sideband voice and CW communications in the 2-12 MC range. It weighs 14.5 pounds without battery. The radio is currently being powered by either a wet cell battery which weighs 15 pounds or a dry cell battery pack, which contains seventy (70) each BA-30 batteries and weighs 27 pounds. USARV plans to use this radio to meet requirements for Special Forces, Advisor and Long Range Patrol. DA is procuring approximately 1700 sets. Initial deliveries of approximately 270 radios have been delivered to Vietnam. The radios have operated over ranges beyond their stated capabilities. The radios have satisfied the requirements, however, the weights of radio is still an undesirable feature.

RESULT: A light weight battery carrier has been designed to be used with the AN/PRC-74. The carrier is designed to contain two (2) BB-386/PRC-25 dry batteries and with two such batteries has a total weight of approximately 9 pounds. This battery reduces the overall weight of the AN/PRC-74 by 6 pounds in comparison with the radio using the wet cell battery and by 18 pounds in comparison with the radio using the dry cell BA-30 pack battery.



AN/PRC-74 RADIO WITH NEW LIGHT WEIGHT BATTERY CARRIER ATTACHED.