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ARMY CONCEPT TEAM IN VIETNAM

APO SAN FRANCISCO 96384

DEPARTMENT OF THE ARMY
ARMY CONCEPT TEAM IN VIETNAM
APO San Francisco 96384

FINAL REPORT
EMPLOYMENT OF THE AVIATION HEAVY HELICOPTER COMPANY (CH-54A FLYING CRANE)

ACTTV Project No. ACA-21F
23 JUNE 1969

Approved:

JOHN E. REID
Colonel, Infantry
Commanding

AVHGC-DST (23 Jun 69) 1st Ind
SUBJECT: Final Report Employment of the Aviation Heavy Helicopter Company (CH54A Flying Crane) (U)

HEADQUARTERS, UNITED STATES ARMY, VIETNAM, APO San Francisco 96375 12 SEP 1969

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

1. The final report on the Employment of the Aviation Heavy Helicopter Company (CH54A Flying Crane) is forwarded for your comment and dispatch to DA. Request a copy of your forwarding indorsement be furnished to this Headquarters, ATTN: AVHGC-DST and to Commanding Officer, Army Concept Team in Vietnam.

2. USARV concurs in the conclusions and recommendations. The following comments are offered for your review and consideration.

a. It is requested that recommendations 35a thru 35d be submitted to Project Manager for appropriate action.

b. Subsequent to the evaluation period and prior to the writing of this report, the Heavy Helicopter Companies submitted a change to MTOE 1-259G which incorporates most of the changes recommended in this report. USARV plans to re-evaluate recommendations against the new MTOE 1-259G when it is approved by DA.

FOR THE COMMANDER:

B. A. GOODWIN
CPT, AGC
Assistant Adjutant General

AUTHORITY

Letter, FOR ACTIV, Office of the Assistant Chief of Staff for Force Development, DA, 1 August 1967, subject: ACTIV Program FY 1968-69

ACKNOWLEDGMENTS

Deep appreciation is given to the officers and men of the units participating in this evaluation:

273d Assault Support Helicopter Company (Heavy)
652d Transportation Detachment
478th Assault Support Helicopter Company (Heavy)
222d Combat Aviation Battalion
756th Transportation Battalion (AM&S)

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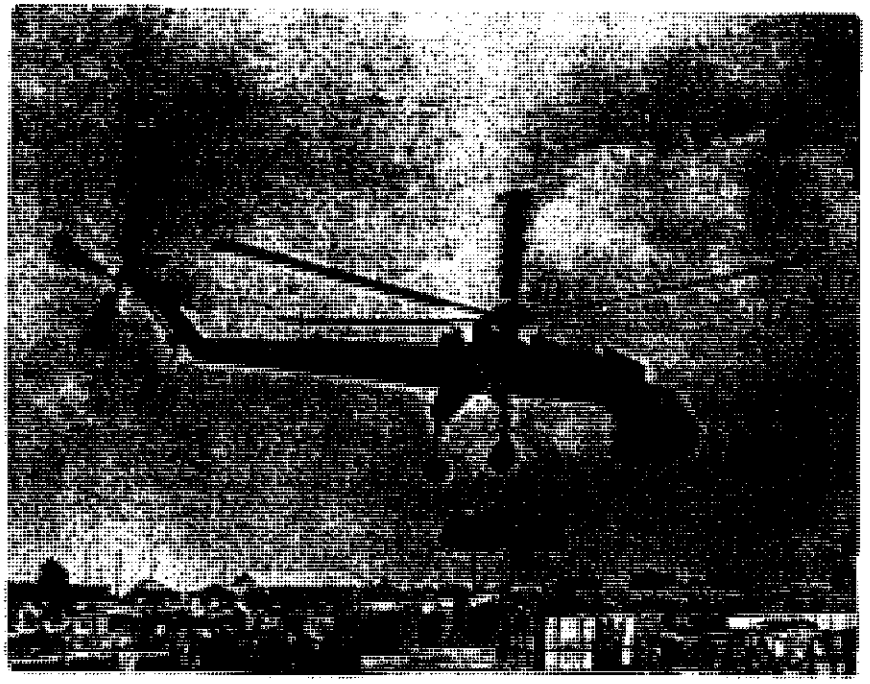

The Army Concept Team in Vietnam evaluated the operations of the 273d Assault Support Helicopter Company (Heavy) from 28 October 1968 to 1 February 1969. The 273d Company was composed of three platoons of three CH-54A helicopters each and one float CH-54A. The primary mission of the company was to provide combat support and combat service support airlift. The purpose of the evaluation was to document the capabilities and limitations of the company in performing support airlift missions, and to determine the adequacy of a heavy lift helicopter company TOE. The 273d Company successfully carried out its assigned mission, providing satisfactory airlift movement of heavy supplies, equipment, vehicles, and aircraft to units throughout the III and IV CTZs. Analysis of all evaluation data resulted in 14 recommendations which, if satisfied, will improve the effectiveness of the heavy lift helicopter company.

The most significant conclusions and recommendations indicate that a more effective use of the unique capabilities of the heavy lift helicopter company may be obtained. This evaluation determined that 82 percent of the logistic support rendered by the 273d Company was expended for routine supply movement from base camps to forward elements. Most of these standard resupply missions could have been accomplished by other cargo type helicopters, thereby making the CH-54A available for ship-to-shore cargo movement applications, or other missions to exploit this helicopter's heavy lift capabilities. With minor modification, MTOE 1-259G has been found satisfactory and is recommended for approval.

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1. REFERENCES

a. Letter, ACTIV CH, Headquarters, Army Concept Team in Vietnam, 15 October 1966, subject: Proposed ACTIV Program FY 1968 - 1969.

b. Letter, CDCRE-T, Headquarters, US Army Combat Developments Command, 28 March 1967, subject: Proposed ACTIV Program FY 1968 - 1969.

c. Letter, FOR ACTIV, Office of the Assistant Chief of Staff for Force Development, 1 August 1967, subject: ACTIV Program FY 1968 - 1969; with 1st Indorsement, GPOP-DT, Headquarters, US Army, Pacific, undated.

d. Disposition Form, AVHGC-DST, Assistant Chief of Staff G3, US Army, Vietnam, 4 September 1967, subject: ACTIV Program FY 1968 - 1969.

e. Subparagraph 533a (14), Office of the Assistant Chief of Staff for Force Development, 15 August 1964, Combat Development Objectives Guide (CDOG) (U), Secret.

f. Department of the Army Technical Manual 55-1520-217-10, 12 January 1967, Operator's Manual: Army Model CH-54A Helicopters.

g. TOE 1-259G, Headquarters, Department of the Army, 30 November 1966, Aviation Heavy Helicopter Company.

h. Message, AVHAT-AAD, 68906, US Army, Vietnam, 10 September 1968, subject: Evaluation Plan - Project ACA-21F, Employment of the Aviation Heavy Helicopter Company (CH-54A) (U), Confidential.

i. Report, RAC-R-48, Research Analysis Corporation, August 1968, subject: An Evaluation of the Heavy Lift Helicopter in the Logistics Role.

2. PURPOSE

The purpose of this evaluation was to review operations of a heavy helicopter company in the Republic of Vietnam (RVN), to document its capabilities and limitations in performing combat support and combat service support airlift missions, and to determine its organizational adequacy.

3. OBJECTIVES

a. Objective 1 - Capabilities and Limitations

To document the capabilities and limitations of a heavy helicopter company in support of counterinsurgency operations in RVN.

b. Objective 2 - Tactics and Techniques of Employment

To evaluate tactics and techniques employed by the company, including command and control procedures, in combat support and combat service support airlift missions.

c. Objective 3 - Adequacy of the Table of Organization and Equipment (TOE)

To determine the adequacy of the company TOE for operations in the counterinsurgency environment of RVN.

d. Objective 4 - Logistical Support Requirements

To assess and document logistical support requirements for the company and to determine the adequacy of organization and procedures of supply and maintenance.

4. BACKGROUND

a. The Army Concept Team in Vietnam (ACTIV) initiated a project to document the capabilities and limitations of a heavy helicopter company to perform tactical logistical airlift missions. The US Army Combat Developments Command (USACDC) recommended that the scope of the project be expanded to document the capabilities and limitations in performing combat support and combat service support airlift missions, including airlift missions such as over-the-beach operations, transport of construction materials to remote engineering construction sites, and airlift of heavy engineering construction equipment. The adequacy of slings and pods as aids in expediting cargo handling would also be included.

b. The Office of the Assistant Chief of Staff for Force Development, Department of the Army (DA), concurred with the USACDC recommendations and approved the evaluation of the 478th Assault Support Helicopter (ASH) Company (Heavy). The evaluation was scheduled to begin in January 1968.

c. Three heavy helicopter companies equipped with CH-54A helicopters and manned under TOE 1-259G are operating in RVN. They are the 273d ASH Company (Heavy), 355th ASH Company (Heavy), and the 478th ASH Company (Heavy). A comparative review of helicopter lift data for the period February to August 1968 revealed that operations of the 273d Company substantially exceeded those of the other two companies. It was determined that the significantly larger data base and centralized operations of the 273d Company would facilitate the acquisition of comprehensive data for a more meaningful evaluation. Therefore, the Evaluation Plan was amended to designate the 273d Company as the evaluation unit. The evaluation began on 28 October 1968 and ended on 1 February 1969.

5. SCOPE

The evaluation was conducted concurrently with combat support airlift missions, and no missions were scheduled solely for the purpose of generating data. The majority of the missions (52 percent of the tasks) involved delivery of Class V (ammunition) supplies with no variation in the techniques of employment or the mission profile. Pickup and landing zones (PZ and LZ) were preselected for these missions and the only variation in operating conditions was the amount of dust made by rotor down-wash.

6. DESCRIPTION

a. 273d Assault Support Helicopter Company (Heavy)

(1) The 273d Assault Support Helicopter Company (Heavy) (hereafter called the 273d Company) was organized at Fort Sill, Oklahoma, under TOE 1-259G, and deployed to RVN in December 1967. The assigned mission of the 273d Company in RVN was to provide combat service support airlift for movement of heavy supplies, vehicles, aircraft, and, as directed, provide combat support airlift of combat units and air resupply of units engaged in combat operations.

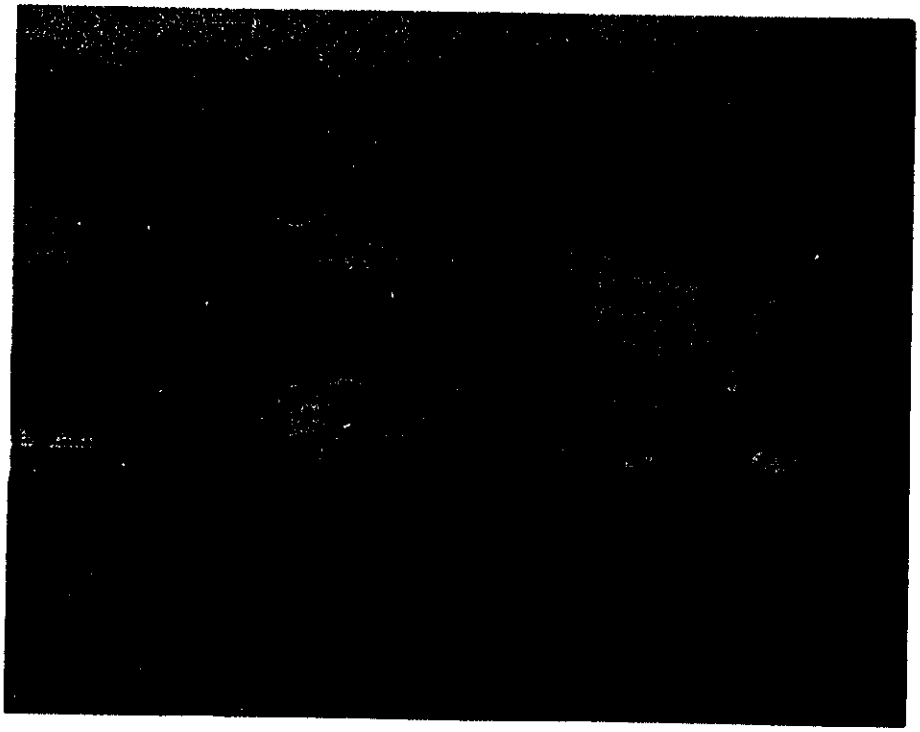
(2) The 273d Company was composed of three platoons of three CH-54A helicopters each, and one float CH-54A helicopter. It was authorized 8 commissioned officers, 9 warrant officers, and 85 enlisted men. A description of the organization, the organizational chart, the command and control network, and a discussion of the TOE are contained in Sections III and IV.

b. CH-54A Flying Crane Helicopter

(1) The CH-54A Flying Crane Helicopter is a heavy-lift transport vehicle designed to externally transport single- and four-point suspended loads and detachable pods (see Figure I-1). The pods are used for transporting personnel and cargo. The fuselage is constructed in a crane configuration. The helicopter is powered by two JFTD12-14A axial flow, gas turbine engines. The interior arrangement of the cockpit area provides for side-by-side seating of the pilot and co-pilot, with the pilot on the right-hand side. A third pilot is seated back-to-back with the co-pilot. The aft-facing pilot is provided with an electric hover control stick (cyclic and yaw), a collective pitch control, and flight and cargo handling instruments. These controls enable the aft pilot to control the helicopter precisely while maintaining visual contact with loads which are being picked up or released from a hover.

(2) The helicopter has a fixed tricycle landing gear, a full swiveling nose wheel, and main wheels supported by struts that have a "kneeling" capability to assist in loading.

(3) The CH-54A is constructed to carry single-point loads from a cargo hook location at its center point of gravity. The single-point



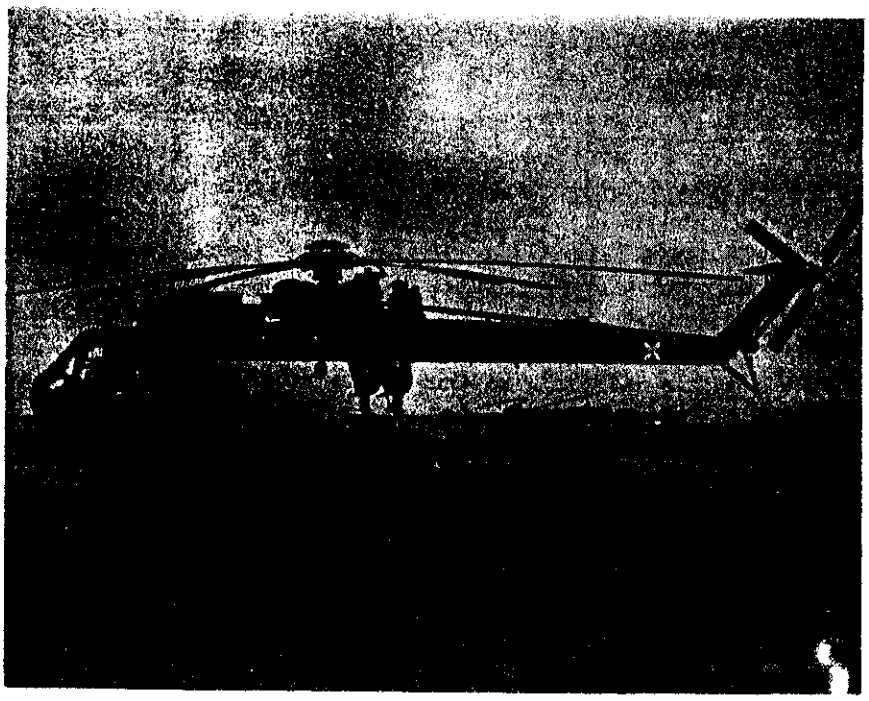


FIGURE I-1. CH-54A Helicopter, Major Item of Equipment of the 273d Company.

suspension system consists of a hydraulically powered winch, cable, and cargo hook. The cargo hook may be actuated to jettison loads in flight if necessary. The single-point system is designed to carry a 20,000-pound load in a fixed cable position. The hydraulic hoist (winch) is used to raise and lower loads up to 15,000 pounds through a cable length of 100 feet.

(4) A four-point suspension system is mounted in the basic framework of the helicopter in a manner which symmetrically brackets the center of gravity. This system incorporates four load-leveling devices that provide vibration-absorbing capabilities for load isolation. Each of the four load-leveling devices has a 5,000-pound capability for a total of 20,000 pounds. Together they are used for external four-point loads or pod attachment.

(5) The CH-54A helicopter has a 42,000-pound maximum gross weight capability. The fuel quantity (which determines range and endurance) onboard the aircraft must be varied in accordance with the weight of the cargo load, so as not to exceed the 42,000-pound gross weight limitation.

7. APPROACH

a. Three categories of operational variables were investigated:

(1) Company capabilities.

(2) Company environment.

(3) Company mission.

These variables were reduced to measurable performance factors which defined and characterized the operational variables:

(1) Capabilities

(a) Personnel capabilities (job specialties, training, experience).

(b) Materiel (subsystems, components, equipment hardware).

(c) Organization (doctrine, Standing Operating Procedures (SOP), support services).

(d) Human Factors (morale, leadership, temperament).

(2) Environment

(a) Terrain.

(b) Radio conditions.

(c) Weather.

(d) Non-organizational support facilities.

(e) Enemy threat.

(f) Friendly distribution.

(3) Mission

(a) Limitations.

(b) Aircraft performance.

(c) Cargo type.

(d) Reliability and maintainability.

(e) Aircraft availability.

(f) Cargo demand.

b. Project evaluators, who accompanied the 273d Company on many of its missions, used questionnaires, check lists, unit records, structured interviews, and observations to obtain data.

8. ENVIRONMENT

a. The 273d Company conducted operations from Vung Tau airfield (28 October to 19 November 1968) and Sanford Army Airfield, Long Binh (20 November 1968 to 1 February 1969). Both were established airfields equivalent to airfield facilities in CONUS. There was no fragmentation of flight platoons away from the company and all company functions were conducted at these base locations.

b. The area of operations extended over the III and IV Corps Tactical Zones (CTZ). These CTZs encompass the Mekong Delta and Mekong Terrace in RVN.

c. The weather conditions were practically invariant. Only one mission was aborted because of severe weather conditions. Good flying weather, characterized by generally unlimited cloud ceilings and moderate to good visibilities, prevailed throughout the data collection period.

9. DATA COLLECTION AND ANALYSIS

a. Information was collected by interviews of unit personnel, questionnaires completed by unit personnel and ground commanders, unit record review (including supply and maintenance records), and completion of

after-action reports by air crew members. Day-to-day observations of unit operations were made and recorded by the project evaluators.

b. The analysis techniques used in this evaluation included:

(1) Inferential statistical techniques -- logical analysis of expert judgment based on statistical data (i.e., frequency counts and means).

(2) Graphic and statistical comparisons of performance versus time (or appropriate variable) in the form of frequency distributions of of quantified data -- application of trend analysis and logical deductions from the frequency distributions.

(3) Descriptive analytical methods -- discussion and presentation of organizational block diagrams, percentages, averages, operational diagrams, frequency counts, and communication charts and networks.

The analysis techniques used depended upon the objective being addressed and the type of data that was being analyzed.

c. To obtain more meaningful results in those areas where limited data resulted in incomplete analysis due to the time constraint of the data collection period, unit records extending back to July 1968 were reviewed and useful data summarized.

d. The accuracy of significant or questionable data collected during the evaluation of the 273d Company was compared to similar data obtained from the 478th ASH Company (Heavy) operating in the I CTZ. Data thus compared and substantially validated was incorporated in this report, increasing confidence in the results obtained.

SECTION II

OBJECTIVE 1 - CAPABILITIES AND LIMITATIONS

10. ASSIGNED MISSION OF 273d COMPANY

The assigned mission of the 273d Company as defined in TOE 1-259G was: "To provide Combat Service support airlift for movement of heavy supplies, vehicles, aircraft, and as directed, provide combat support airlift of combat units and air resupply of units engaged in combat operations."

11. CAPABILITIES AND LIMITATIONS OF THE CH-54A

a. Configuration of CH-54A

(1) The single-point lift configuration, without the aft-facing pilot, was used almost exclusively during the evaluation because the using units had little demand for specialized type service such as ship-to-shore operations, precise emplacement of large bulky items of equipment, or the transporting of personnel, Therefore, mission programming for various aircraft configurations had little effect on the accomplishment of the 273d Company's mission. More than 95 percent of the assigned missions were accomplished expeditiously with the use of the single-point suspension system. Even though certain vehicles had lifting shackles for attachment of the four-point suspension system, they were usually rigged for the single-point system (see Figure II-1). This was done to expedite loading and unloading and to eliminate the requirement for landing. The aviators preferred this system because jettison of the load was positive in the event of an emergency. Normally the four-point suspension was used when the configuration of the load restricted the airspeed capability. A 2 ½-ton truck would sometimes be hauled with the four-point system if the distance to dropoff was greater than 20 miles. Use of the four-point suspension system allowed the aircraft to maintain greater airspeeds due to better load stability. The kneeling and jacking capability was used to expedite the hooking up of equipment to the four-point suspension system and to assist in the attachment of the pod. The kneeling of the left gear was used in the refueling area to lower the aircraft for attachment of the pressure refueling nozzle (see Figure II-2). The aircraft was also lowered in the maintenance area to make it more accessible to maintenance crews.

(2) The 273d Company had on inventory two of the new Cargo Pod Assemblies for the CH-54A (see Figure II-3). One arrived on 14 August 1968 and the other was picked up at Vung Tau on 3 January 1969. The one old type pod available to the company was used for a storage shed in the CH-54A parking area (see Figure II-4). As of 1 February 1969, only one of the ten assigned aircraft had the required modification to attach the pod to the aircraft hard points in order to haul passengers. Modification kits for other assigned aircraft were on requisition. The four-point

FIGURE II-1. Single-Point Lift of 2 ½-Ton Truck. Airspeeds of 70+ knots can be obtained with the load (14,000 lb) in this configuration. It is the preferred method of rigging for short hauls.

FIGURE II-2. CH-54A in Pressure Refueling Area Taking on Fuel.

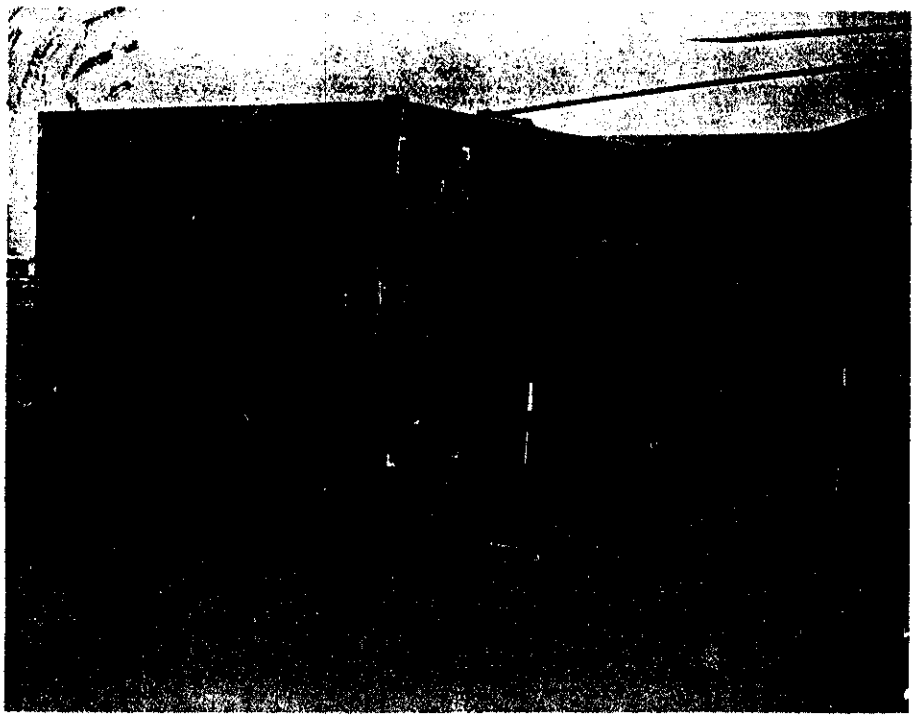


FIGURE II-3. New Cargo Pod Assembly.

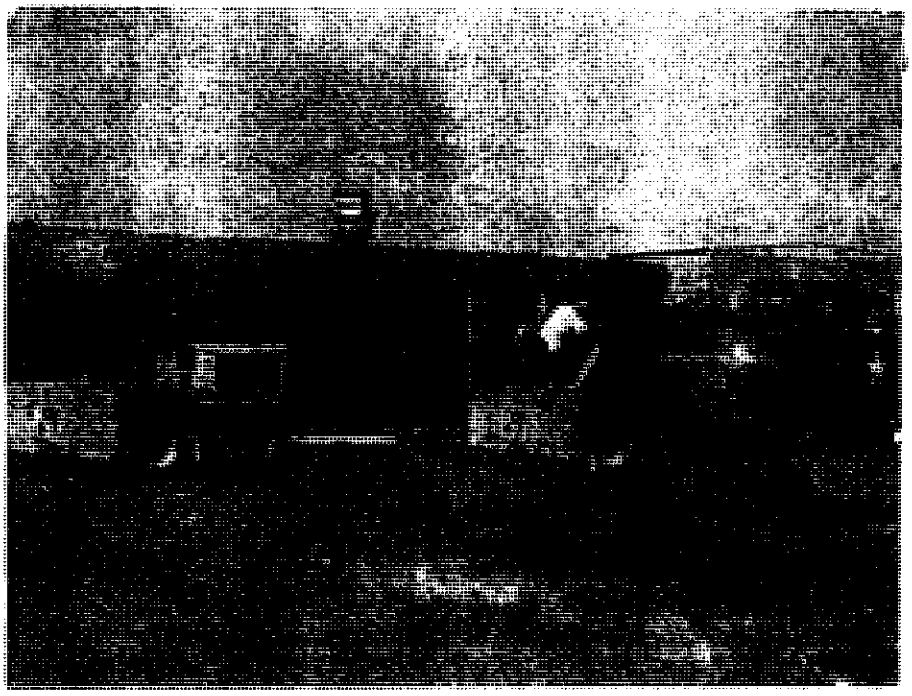


FIGURE II-4. Old Type Cargo Pod.

unmodified suspension system did allow the pod to be used for cargo hauling on all assigned aircraft. During the evaluation, the cargo pod was used by the 273d Company to move its TOE equipment from Vung Tau to Long Binh Post. One pod mission was received from civil action personnel to haul refugees.

(3) The versatility of the CH-54A could be improved if a capability existed for internal loading. The size of a supported unit such as a company or battery requires periodic resupply services of limited quantities of supplies which are difficult or impossible to rig for external hauling. The capability to haul a combination of passengers and light equipment, in addition to an external load, without a scheduled configuration change would be a desirable asset for future heavy-lift helicopters that are used to support units in the forward battle area. The CH-54A helicopter does not normally backhaul equipment or cargo to the resupply area unless sufficient tonnage can be rigged to provide stability of the load in flight. Backhaul requirements are presently satisfied by other aircraft working in the area of operations.

(4) During the evaluation there were no load bearing pallets available to the using units, therefore an evaluation could not be conducted. However, the possibility of using pallets was discussed with various ground and aviation unit commanders as well as experienced heavy lift helicopter pilots. The palletized load concept with the CH-54A four-point suspension would show a marked advantage over other methods when moving supplies by air from one large supply area to another. At these locations, personnel and equipment would be available to load, handle, and rig the pallets. At present this mission is being accomplished by ground vehicles and some fixed-wing aircraft. The US Air Force (USAF) uses pallets for cargo hauling from airfield to airfield quite successfully. These airfields are fairly secure and are not subject to move on short notice, as are small artillery and infantry units located in the forward areas. These company and battery sized units are numerous and are scattered throughout the area of operation. Other than Class V (ammunition), the supplies needed for everyday operations is a matter of several tons and can be hauled by smaller, more economical aircraft than the CH-54A. The palletized load with a portion dropped off at each LZ is a possible solution. The significant advantages and disadvantages of using pallets while supporting units in hostile areas are listed below.

(a) Advantages

1 There would be less damage to lightweight fragile equipment. This type equipment is now hauled internally by smaller aircraft.

2 It would provide better inflight stability and increased airspeeds with possibilities of improved instrument flight capabilities.

(b) Disadvantages

1 Necessary ground handling equipment and personnel are not available in forward LZs.

2 The need to backhaul pallets to the rear is a definite disadvantage because the CH-54A is the only helicopter at this time that has the four-point suspension capability. The single-point system presently available on other helicopters is not satisfactory for transporting these pallets due to their aerodynamic characteristics at airspeeds above 50 knots.

3 The requirement to land to pick up or drop off a pallet while under constant enemy surveillance is not acceptable.

4 Additional time is required while hooking to and dropping off palletized loads compared to other methods with the single-point suspension system.

5 Many items of equipment, such as a 2 ½-ton truck and engineer construction equipment, can be hauled on the single-point or four-point load suspension system without the use of the pallet. This method allows the operator to put the equipment into operation immediately upon release from the helicopter.

b. Reliability

(1) During the evaluation, a total of 521 missions in excess of 2 hours duration were successfully completed. Due to maintenance problems, 25 missions were aborted. These figures indicated that 95.2 percent of the CH-54A helicopter missions requiring 2 hours or more were successfully accomplished. No operational missions less than two hours duration were scheduled.

(2) It is necessary that an aircraft crew be able to communicate with ground personnel in the PZs and LZs, to obtain artillery advisories, and to coordinate with unit operations to perform their mission efficiently and safely. One major component shortcoming was associated with the operation of the FM radio (AN/ARC-54). Problems were encountered with this radio on a daily basis. Seven missions were aborted because of recorded radio failures; this was 30 percent of the total aborts. The majority of failures in the radio system were due to the unreliability of the antenna coupler (CU-492/AR). The necessity to change frequency on the FM radio approximately 100 times in an 8-hour flight period has decreased the life expectancy of the antenna coupler. It was the opinion of the evaluators that the vibrations in the tail area, where the antenna coupler is located, was a contributing factor. A junction box was positioned in such a manner that it could be easily damaged by maintenance personnel, or by the placement of equipment and necessary gear carried along on each flight. This junction box is located at station 210 in the attic of the

aircraft. This problem could be eliminated by moving the junction box to the side of the compartment. This has been accomplished on four of the unit's aircraft.

(3) Approximately 45 percent of the cable tension indicators used by the pilot to determine his load weight were inoperative or yielded results 1000 to 1500 pounds heavier than the load weight determined by the ground commander. The discrepancy noted in the indicator was evident when personnel rigging ammunition loads tallied up the weights stamped on the shipping crates.

12. INSTRUMENT FLIGHT CAPABILITIES

The total instrument flight time logged by the 273d Company during the evaluation was 3.7 hours. The 3.7 hours represented accumulation of instrument flying time logged by pilots who encountered intermittent instrument weather conditions while en route from mission location to home base. Fair weather persisted throughout the evaluation period with the exception of one day when ceilings of 500 feet and visibility of 3/4 mile prevailed. On this day all missions for the 273d Company were cancelled. The majority of the flights conducted by the company were in support of units found in an infantry division. These units operating in the forward areas did not have the capability to control Instrument Flight Rules (IFR) traffic, nor did their area of operation have instrument flight facilities. Under these conditions, even if a requirement had been placed on the company to fly under instrument conditions, it is doubtful that the mission could have been accomplished successfully. During this evaluation, operational requirements of the company were such that instrument flight capabilities of the aircraft could not be evaluated.

13. PERSONNEL TRAINING AND EXPERIENCE

a. Flight Platoon

(1) All assigned aviators had prior tours in RVN. The flight experience of the 273d Company is shown in Figure II-5. The orientation training which was required for all newly assigned aviators was significantly reduced because of the experience they acquired during their prior tours. Scheduling a CH-54A for the sole purpose of training was difficult and impractical even though a training program was specified. Upon arrival, the new aviator was assigned to a unit instructor pilot. He received an operational briefing on all aspects of the SOP and participated in a one-hour orientation flight. The training phase continued under the supervision of the unit instructor pilot, however, it was accomplished while performing operational missions. It continued for a minimum of ten flying hours, which was considered adequate, prior to releasing the average aviator to fly with experienced aircraft commanders. When additional flying time was required, the new aviator continued to fly with instructor pilots until he gained the necessary proficiency to be assigned to an aircraft

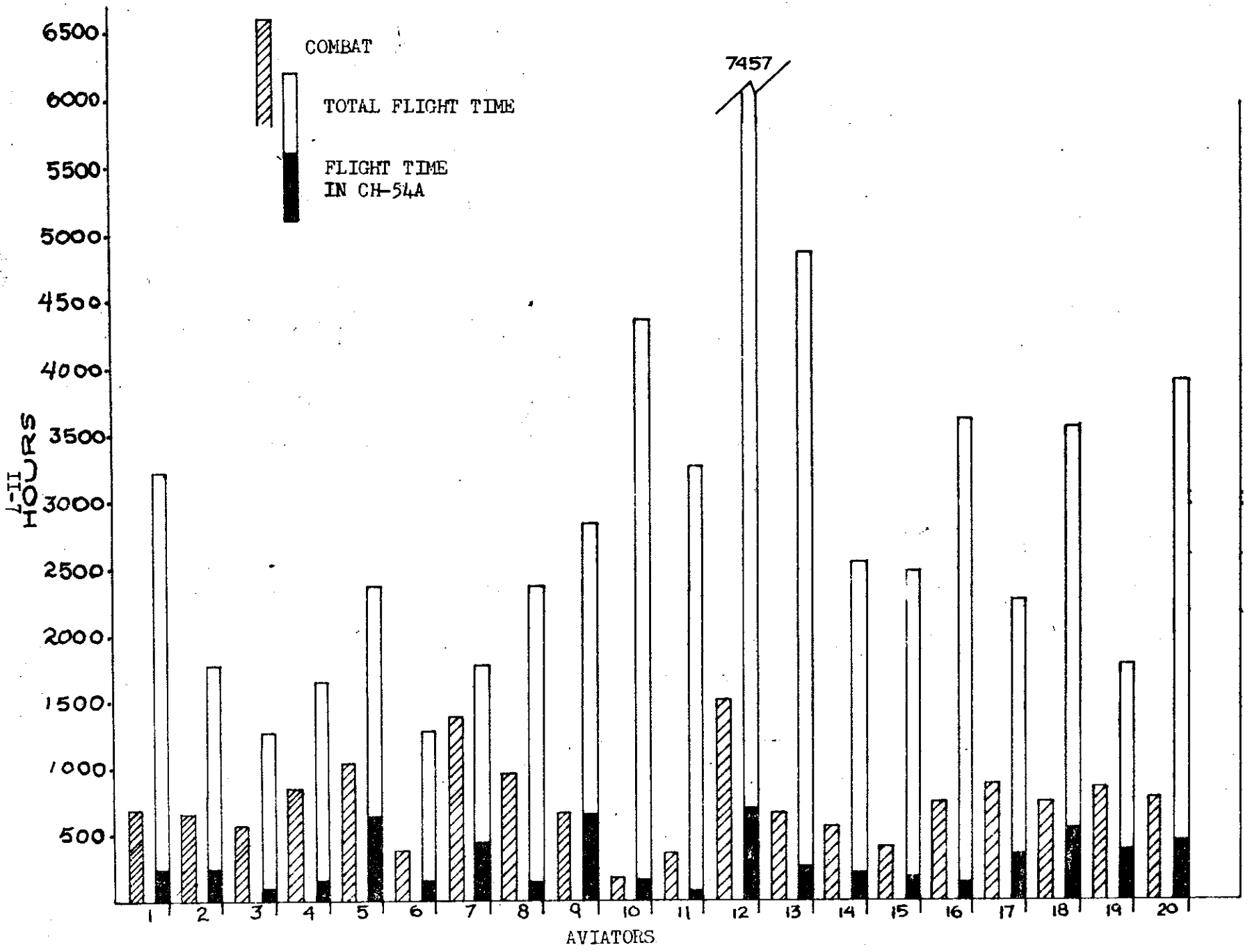


FIGURE II-5. Aviator Flight Experience

commander as part of his crew. All pilots within the unit were required to demonstrate their proficiency to a designated unit instructor pilot every 90 days. This check ride was conducted during the performance of an operational mission. Thus a high level of proficiency was established and maintained by the unit.

(2) Due to the priority of operational missions it was difficult for the unit to schedule the CH-54A for instrument training. A total of 24.2 hours hood time was logged while flying to and from the working areas. Although over 50 percent of the assigned aviators had current rotary wing instrument cards, it was estimated that aviators would need an average of 10 hours of instrument flight training to regain necessary proficiency.

b. Maintenance Platoon

(1) Nine of the ten enlisted flight engineers (Military Occupational Speciality (MOS) 67X20) assigned to flight engineer duties in the 273d Company had no prior experience on the CH-54A aircraft. The majority of enlisted replacements received in the Maintenance Platoon were fresh out of schools in CONUS with no practical experience on the CH-54A aircraft. These men required at least 90 days of on-the-job training (OJT) prior to taking over full responsibilities. OJT was used effectively in the training of CH-54A mechanics. If an individual had prior experience on another aircraft such as the CH-47 or UH-1, the period of OJT was reduced approximately 50 percent.

(2) Optimum utilization of an individual is not possible when approximately 25 percent of his tour will be devoted to learning his job. Additional time is lost when experienced personnel have to be used to train their replacements. Consideration should be given to programming enlisted personnel for the CH-54A units while in CONUS, and additional training should be given on the aircraft systems prior to deploying to RVN. Unit assignments to heavy lift helicopter companies in RVN should be based on previous experience and/or individual qualifications. The critical MOSs that require additional training are:

68B, Senior Engine Repairman.
68E, Senior Rotor and Propeller Repairman.
35N, Aviation Electronic Equipment Repairman.
(Automatic Flight Control System Repairman).
68H, Senior Hydraulic System Repairman.

14. AIRLIFT MISSIONS

a. Supplies Delivered

(1) The 273d Company delivered the following classes of supply:

Class I	Subsistence.
Class II	TOE Equipment.
Class III	Petroleum, Oils, and Lubricants.
Class IV	Construction Material.
Class V	Ammunition.

The new classification of supplies had not been fully implemented at the beginning of the evaluation, and supplies were categorized according to the old classification. The definitions of supplies used during this evaluation are included in Annex A.

(2) The Class I type supplies that were hauled consisted mostly of C rations and 500-gallon blivets of water. Class II supply requirements made use of the CH-54A to haul TOE items that could not be hauled by other type aircraft. Vehicles and engineer equipment made up most of this tonnage. Class III items consisted mainly of 500-gallon blivets of JP-4 fuel. Most of the Class IV supplies, with the exception of pierced steel planking, were hauled by smaller aircraft. The majority of Class V tonnage was 105mm howitzer ammunition.

b. Types of Missions Performed

The 273d Company performed five types of missions. The missions and percent of each performed during the evaluation were:

Aircraft recovery	1 %
Towing of ground vehicles	1
Movement of engineer equipment	7
Movement of artillery	9
Normal resupply	82
	100 %

(1) Aircraft Recovery

(a) During the evaluation, the 273d Company accomplished 16 aircraft recovery missions as follows:

CH-47 helicopter	12
Al-H fixed-wing aircraft	2
CH-34 helicopter	1
OV-1B fixed-wing aircraft	1
	16

All the aircraft recovered required the lifting capabilities of the CH-54A. All tonnage recovered was credited to Class II supply.

(b) For the CH-54A to lift the CH-47, it was necessary to reduce the load weight below 18,000 pounds. This required defueling, and removal of armor shielding, engines, rotor blades, personal gear, guns,

and loose equipment from the CH-47. The CH-47 in any configuration does not make a stable sling load and airspeed must be maintained between 20 and 40 knots to reduce tendencies of the load to twist and turn in flight. The CH-54A used the single-point suspension system with a drogue chute attached to the rear of the CH-47 (see Figure II-6). Approximately 40 to 50 feet of cable was extended from the CH-54A to allow a safe distance between the carrier and the retrieved aircraft. Prior planning is involved if the CH-47 has to be carried for a long distance. It is necessary to compute load weights to allow maximum fuel on board the CH-54A to decrease refueling stops.

FIGURE II-6. Recovery of CH-47 Helicopter (17,000 lb).

(2) Towing of Ground Vehicles

The CH-54A accomplished three tow missions: pulling ten armored personnel carriers, five 2 ½-ton trucks, and one five-ton wrecker

out of soft mud. All efforts to retrieve these vehicles by other means were unsuccessful. The wheeled and tracked vehicles were rigged with two 20,000-pound web slings attached to the front or rear lifting shackles of the vehicles. The slings were attached to the cargo hook of the aircraft by use of a clevis. Approximately 30 feet of cable was necessary to allow the CH-54A some freedom of maneuver. The helicopter required assistance from the driving power of the vehicles to tow them to solid ground. During these missions, the cable tension indicator on the aircraft registered between 16,000 and 18,000 pounds. An aft pilot was not used. The flight engineer assisted by controlling the length of the cable and verbally directing the pilot. The retrieval procedure took approximately ten minutes for each vehicle. The weight of the towed vehicles exceeded the lifting capabilities of the CH-54A. Other vehicles that were damaged or mired were sling-loaded to secure areas if the vehicles were within the lifting capabilities of the CH-54A. These missions could not have been performed by any other helicopter.

(3) Movement of Engineer Equipment

Engineer equipment hauled during the evaluation consisted of bulldozers, generators, front and rear scoop loaders, fork lifts, graders, rollers, well diggers, and bridge sections. The loads were hauled by the CH-54A with the single-point suspension system, and their weight exceeded the lift capability of other helicopters. There was no requirement to use the aft pilot or the four-point suspension system. No special techniques had to be employed while accomplishing these missions. The engineer equipment tonnage moved was credited to Class II supply.

(4) Movement of Artillery

In RVN, the CH-54A is the primary mover of the 155mm howitzers (see Figure II-7) because no other helicopter could handle the load as well. During the evaluation, 155mm howitzers were moved 104 times by CH-54A aircraft. To ensure mission success, these artillery moves required close coordination among the aviation elements, the artillery battery commander, and fire support base security forces. Gun crews were required in the LZ prior to the arrival of the guns to designate specific drop-off points. Two or more CH-54As were committed whenever the distance to the fire support base was greater than 20 nautical miles (nm). One mission performed in the Delta consisted of the movement of six 105mm howitzers mounted on delta platforms. Figure II-8 shows hauling of a 175mm gun tube.

(5) Normal Resupply

Normal resupply missions constituted 82 percent of the assigned tasks and usually consisted of hauling Class I through Class V supplies from the resupply area at a division base camp to a fire support base or LZ approximately 20 miles away. All normal resupply tasks were within the capability of other rotary-wing aircraft. Various types of rigging

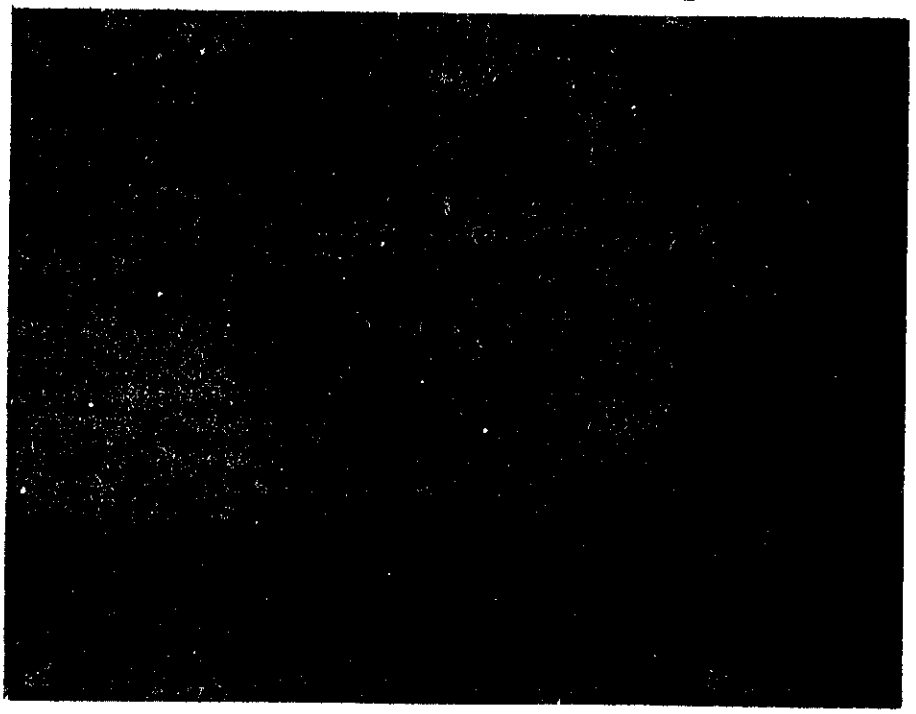


FIGURE II-7. Movement of 155mm Howitzer (12,850 lb).

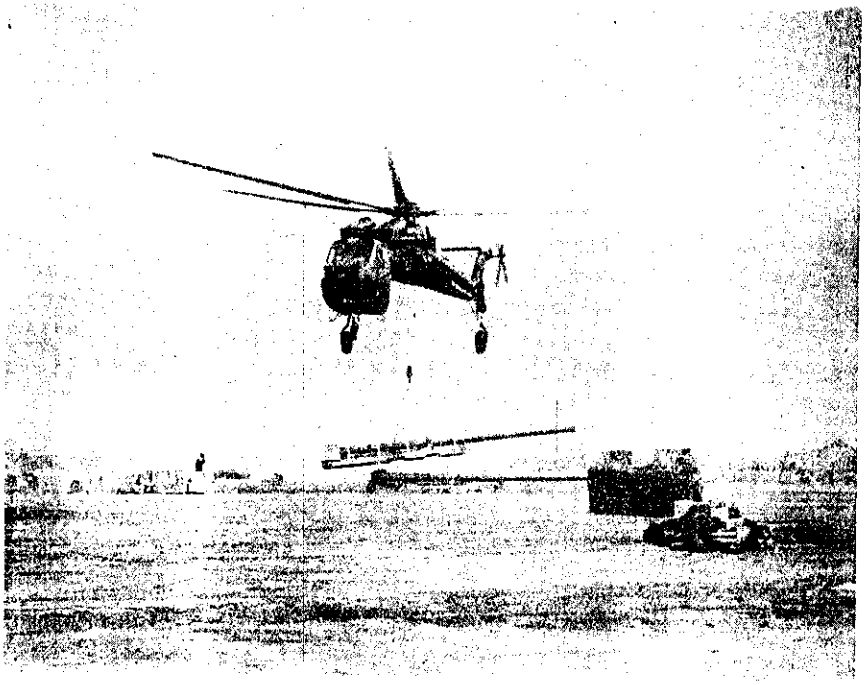


FIGURE II-8. Hauling of 175mm Gun Tube (14,000 lb).

equipment were used to prepare the supplies for airlift. The 500-gallon blivets were normally used to haul liquid supplies (see Figure II-9). Nets made out of rope, steel, or webbing, and A-22 cargo containers were used to haul small items of equipment (see Figures II-10 through II-13). Different length cargo slings were used to rig most of the TOE items. Upon approaching the resupply area, the pilot would contact the ground personnel to confirm information on his mission sheet. Normally the aircraft moved over the load and, with the aid of the flight engineer verbally directing the pilot, the load was attached to the cargo hook and the aircraft was ready to depart in less than one minute.

(6) Other Missions

Many possible areas of heavy lift helicopter employment such as troop transport, bridge emplacement, palletized cargo, and ship-to-shore trans-shipment were not exploited and therefore could not be evaluated. The aircraft were fully used to satisfy tactical needs and missions of the type indicated did not materialize, hence were not accomplished. It should be noted here that no missions were contrived solely for the purpose of evaluating the CH-54A in that mission.

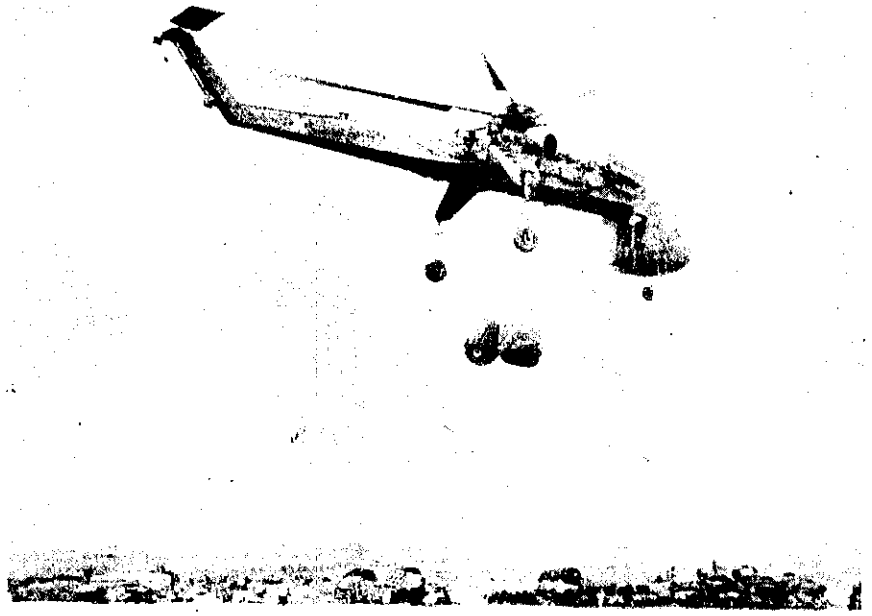


FIGURE II-9. Three 500-Gallon Blivets of JP-4 Fuel (12,000 lb).

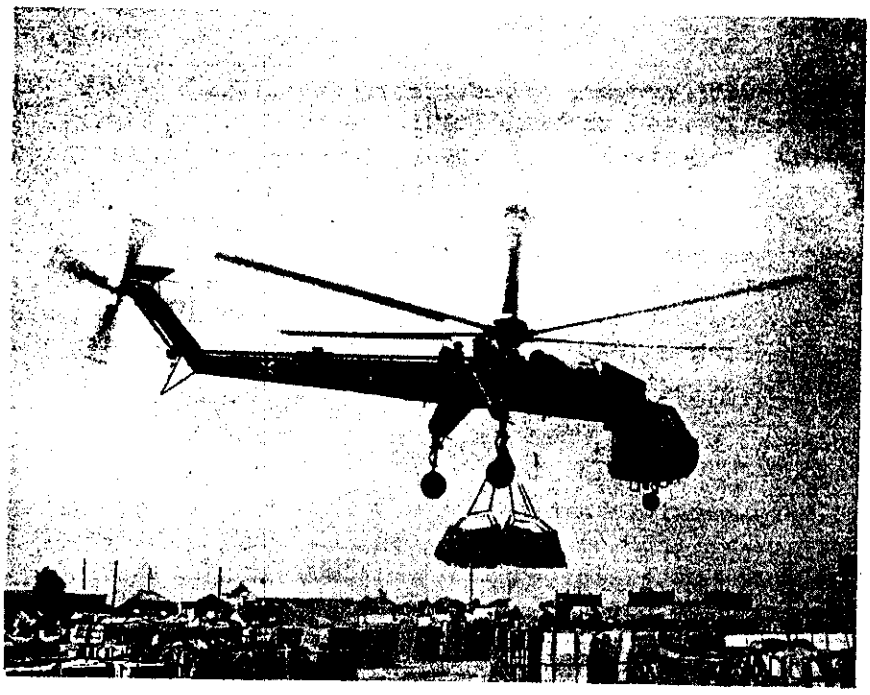


FIGURE II-10. 105mm Ammunition Rigged in Rope Nets (14,000 lb).

FIGURE II-11. 105mm Ammunition Rigged in Web Nets (14,000 lb).

FIGURE II-12. 105mm Ammunition Rigged in A-22 Cargo Containers (14,500 lb).

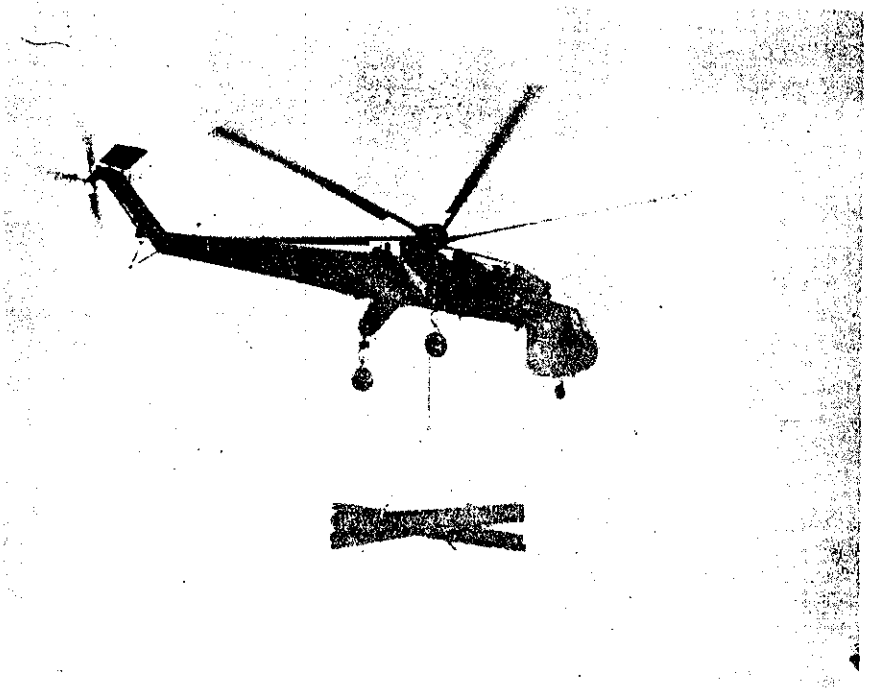


FIGURE II-13. Sling Load of Lumber for Barrier (12,000 lb).

c. Exploitation of CH-54A Capabilities

It was the opinion of the evaluators, and key personnel of the 273d Company, that the diverse capabilities of the CH-54A were not fully exploited because of the significant changes that would be required to present tactics, techniques and logistic procedures. In the case of troop transport, the approved flight safety modification to the pod and aircraft four-point suspension system had not been completed. Palletized cargo concepts were not well defined in terms of present tactical considerations. The ship-to-shore movement of cargo would have required substantial change to existing logistic concepts and procedures.

15. PERFORMANCE

a. During the three-month evaluation, the CH-54As assigned to the 273d Company flew 3,462 sorties, performed 1,568 tasks (sorties in which useful loads were delivered), and delivered 9,897 tons of cargo. The data is summarized by cargo type in Figure II-14. Tasks and sorties listed under "other" include maintenance test flights, training flights, and dead head time going to and from the working areas.

CLASS	TASKS	SORTIES	TONS
I	11	18	61
II	465	1011	3003
III	47	94	300
IV	117	232	795
V	823	1794	5738
OTHER	105	313	0
TOTAL	1568	3462	9897

FIGURE II-14. Performance Summary by Cargo Type.

b. Figure II-15 presents a summary of mission data for each aircraft. This summary represents accumulated totals for the three-month period during which data was acquired. Over 1400 flying hours resulted in a total productivity of 185,335 ton-nm. The tasks and sorties included test, training, dead head, and refueling flights.

c. Weekly mission productivity in ton-nm, flying hours, and average ton-nm per flying hour is presented in Figure II-16. The average ton-nm per flying hour was 132.4. The total maintenance manhours (MMHR) was 23,083. This resulted in 0.15 MMHR per ton-nm.

A/C NO.	TASKS	SORTIES	TONS	TON-NM	FLYING HOURS
66-18408	124	270	759	16,762	123:30
66-18409	108	233	738	12,982	109:25
66-18411	149	346	782	15,369	126:40
67-18419	160	348	1100	16,331	148:15
67-18420	172	391	1019	21,250	138:40
67-18421	120	270	896	13,124	104:15
68-18436	169	371	1214	23,975	166:05
68-18437	104	241	589	13,166	91:10
68-18443	245	515	1408	29,215	205:55
68-18445	217	477	1392	23,161	186:55
TOTALS	1568	3462	9897	185,335	1400:50

FIGURE II-15. Performance Summary by Aircraft.

WEEK	TON-NM	FLYING HOURS	TON-NM PER FLYING HOUR
1	14,195	117:05	121
2	13,609	119:35	115
3	25,016	173:05	145
4	20,178	131:20	154
5	10,580	92:05	115
6	15,391	114:35	134
7	11,217	100:35	112
8	13,635	102:45	133
9	16,938	115:15	147
10	12,318	90:25	136
11	11,640	88:25	132
12	9,454	72:55	130
13	11,164	82:45	135
TOTAL	185,335	1400:50	
AVERAGE			132.4

FIGURE II-16. Weekly Mission Productivity.

d. No aircraft were lost during the evaluation. The techniques employed in the use of the aircraft to ensure a high degree of survivability are discussed in Section III. Damage due to enemy action is discussed in Section V. Survivability as a performance capability was not considered an objective of this evaluation. During the course of the evaluation, the 273d Company successfully carried out its assigned mission, providing satisfactory logistic support to combat units throughout the III and IV CTZs.

16. ATTACHMENT OF 3d PLATOON, 478th ASH COMPANY (HEAVY)

a. During the month of November 1968 the 1st Cavalry Division (Airmobile) moved from the I CTZ to various locations in the III and IV CTZs. The 3d Platoon, 478th ASH Company accompanied the 1st Cavalry Division and was attached to the 273d Company on 3 November 1968. The 3d Platoon consisted of three CH-54A aircraft, six aviators, three flight engineers, and six enlisted maintenance personnel.

b. During the data collection period, the three aircraft of the 3d Platoon accomplished 969 sorties, performed 421 tasks, hauled 2,683 tons, and flew a total of 330 hours. The work accomplished by these aircraft is separate from the data presented on operations of the 273d Company.

c. The 273d Company maintenance platoon supported the 478th aircraft with maintenance facilities, ground support equipment, and 7669 MMHR. The support rendered to the 3d Platoon did not create any significant problems within the company maintenance organization.

17. FINDINGS

a. Over 95 percent of assigned missions were accomplished using the single-point suspension system.

b. One mission for the CH-54A pod was received during the evaluation.

c. Light equipment supply movement requirements were difficult and sometimes impossible to rig for external hauling.

d. Load bearing pallets were not available to the using units and could not be evaluated.

e. Ninety-five percent of the CH-54A missions requiring two hours or more were successfully accomplished.

f. Thirty percent of mission aborts were caused by malfunction of the FM radio system (AN/ARC-54).

g. Approximately 45 percent of the CH-54A cable tension indicators were inoperative or gave erroneous readings.

h. The 273d Company logged 3.7 hours of instrument flight time during the evaluation.

i. The ground units forward of the division base camps lacked the capability to aid or control aircraft flying in instrument conditions.

j. Aviator training was accomplished during the conduct of operational missions.

k. Previous tours in RVN decreased aviator orientation training requirements.

l. Over 50 percent of assigned aviators had current rotary-wing instrument cards.

m. Nine of the ten assigned enlisted flight engineers had no prior experience on the CH-54A aircraft.

n. A majority of mechanic replacements were assigned directly out of CONUS schools and required 90 days OJT.

o. The majority of Class V tonnage was 105mm ammunition.

p. Eighteen percent of the total tasks accomplished by the 273d Company involved movement of heavy equipment considered to be beyond the capability of other army cargo helicopters.

q. Eighty-two percent of the total tasks involved movement of various classes of supply and material within the capability of other rotary-wing aircraft.

r. The CH-54A was used to tow ground vehicles that exceeded the lifting capability of the aircraft.

s. The absence of ship-to-shore resupply operations by heavy lift helicopters during the evaluation precluded accomplishment of an assigned sub-objective of the evaluation.

t. Ammunition resupply represented 58 percent of total tonnage hauled.

u. No aircraft were lost due to hostile fire.

SECTION III

OBJECTIVE 2 - TACTICS AND TECHNIQUES OF EMPLOYMENT

18. COMMAND AND CONTROL

a. Prior to 9 November 1968, the command and operational control channels to the 273d Company coincided. During this period, the mission request channel followed by the II Field Force Vietnam (FFV) units requesting heavy helicopter airlift support is shown in Figure III-1.

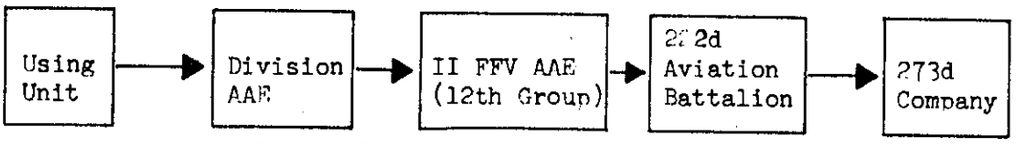


FIGURE III-1. Mission Request Channel

The 12th Aviation Group, of which the 222d Aviation Battalion is a part, had aviation personnel at II FFV, Army Aviation Element (AAE) for the purpose of screening CH-54A missions and coordinating with the supported units. The units that were supported during this period included elements from the 1st, 9th, and 25th Infantry Divisions, 11th Armored Cavalry Regiment, 1st Australian Task Force, and the Royal Thai Forces.

b. On 9 November 1968, the 273d Company was placed under the operational control of the 1st Cavalry Division (Airmobile). The request channels for heavy helicopter airlift support from units operating under II FFV and units of the 1st Cavalry Division are shown in Figure III-2. When the 1st Cavalry Division (Airmobile) assumed operational control of the 273d Company, Headquarters, II FFV delegated the consolidation of daily heavy lift mission requirements to the division.

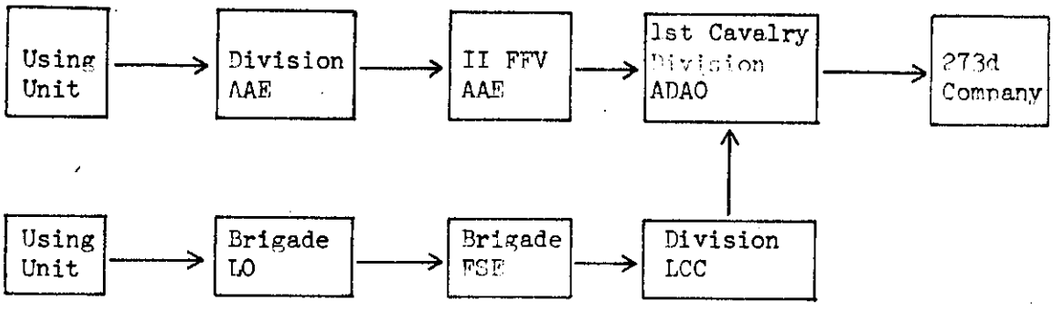


FIGURE III-2. Modified Mission Request Channels.

c. A typical mission request from using units in the III and IV CTZs was transmitted to the appropriate division AAE. Aviation personnel assigned to the division AAE screened all mission requests and established priorities. Requests were forwarded to the II FFV AAE with information on PZ, contact frequencies and call signs, type load, weight, number of sorties, LZ, and other necessary information. Aviation personnel working at II FFV Headquarters consolidated and further scrutinized each request to eliminate duplication and unnecessary flights. Normally, aircraft assets assigned to or under direct operational control of II FFV accomplished all the missions requested by subordinate units. Since the 273d Company was operational control to the 1st Cavalry Division, all CH-54A missions requested by II FFV had to be approved by the 1st Cavalry Division. The 1st Cavalry Division Assistant Division Aviation Officer (ADAO) consolidated these requests with those from the 1st Cavalry Division and forwarded them to the 273d Company. These mission requirements were transmitted to the 273d Company operations via land line or radio and were processed by the operations officer.

d. All aviation units in RVN have a certain number of flying hours programmed for each type aircraft. To stay within established guidelines, major headquarters such as II FFV further allocate flying hours to their subordinate ground units. The flying hours used by each ground unit are monitored by higher headquarters and additional flying hours are not allocated unless a tactical emergency exists. The final decision as to the type of aircraft to be used to accomplish a specific mission is made by the headquarters exercising operational control over the aviation units.

19. MISSION PLANNING

a. The operations officer planned the missions for the following day, plotted the routes on the operation map, and determined the number of aircraft to be committed. He also assigned the crews, and scheduled take-off times to permit the aircraft to arrive at the PZ at the time prescribed by the ground commander. Pilots were briefed at operations prior to the flight, and the flight crews were given the aircraft mission sheets detailing the mission to be performed for all aircraft committed that day. Necessary Signal Operation Instructions, survival kits, maps, and other flight gear were issued at that time. The maintenance officer informed operations of the aircraft to be flown and the sequence of release. The company commander's policy was to use the least number of aircraft per day to accomplish daily missions. For instance, two aircraft were commited for nine hours each in lieu of three aircraft for six hours. This procedure reduced dead head time, assisted in maintenance scheduling during periods of low availability, and decreased the number of consecutive days that aviator flew. The number of aircraft committed daily by the 273d Company during the period of the evaluation is presented in Figure III-3. The average monthly flying hours per aviator during the evaluation period was 59 hours. This time was normally acquired in flight periods of five to ten hours.

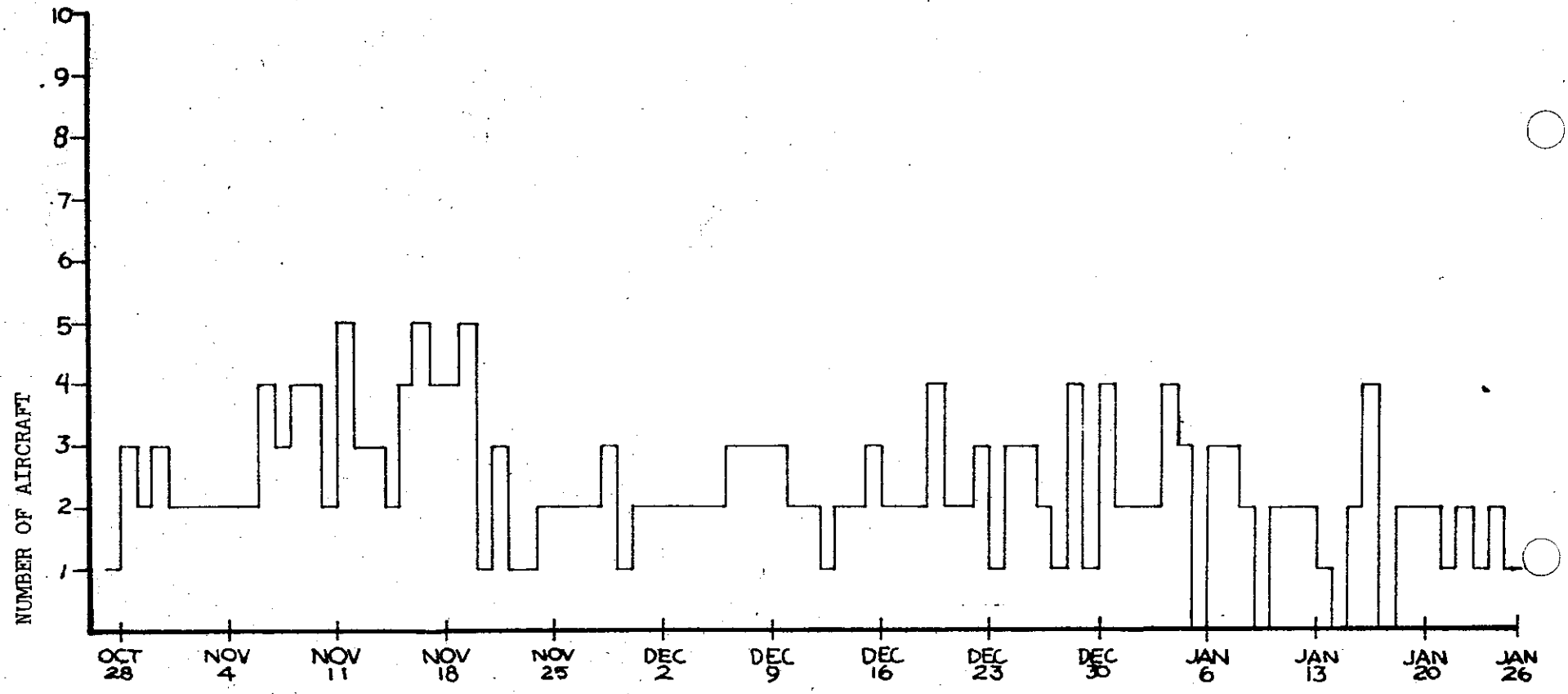


FIGURE III-3. Number of Aircraft Committed by Day.

b. More than 95 percent of the company's missions were single-ship missions. These aircraft normally had two or more units to support during the day. During the course of the mission, if the aircraft commander determined that he could not accomplish his mission before nightfall, he would contact flight operations to request additional aircraft. One aircraft was normally used on resupply missions because it was difficult for the using units to keep sufficient cargo rigged for more than one aircraft. On two occasions the 273d Company dispatched three aircraft to work together to accomplish a tactical move with a critical time frame. An example of this type mission would be an extraction from an LZ in the forward area.

c. Considerations which influenced the decisions of the 273d Company Commander and had direct bearing on the techniques employed by the company in accomplishing missions were:

(1) Helicopter performance limitations.

(2) Cargo type.

(3) Tonnage to be delivered.

(4) Availability of aircraft and crew.

(5) Enemy situation.

(6) Survivability and vulnerability.

(7) Location of home base.

(8) Location of refueling stations.

(9) Type of refueling facility available (pressure or gravity feed).

20. MISSION FLIGHT PROFILE

Units supported by the 273d Company were deployed throughout the area of operations in division sized base camps. These divisions deployed their subordinate units into LZs and fire support bases within their area of responsibility. All terrain within the confines of the defense perimeters surrounding the units was considered secure. All terrain outside the perimeter not physically occupied by friendly troops was considered insecure. Normally secure ground lines of communications between units forward of the division base camps did not exist. The enemy infiltrated into the area of operations with capabilities to mass his forces for limited operations. These troops were equipped with automatic small arms, RPGs, recoilless rifles, mortars, and light antiaircraft weapons. They normally engaged aircraft flying at absolute altitudes below 3,000 feet. Damage from enemy ground fire was not sustained by 273d Company aircraft at or above 3,000 feet absolute altitude. For this reason, maximum effort was

was made to obtain 3,000-foot terrain clearance as soon as possible after take-off from the PZ. The selected flight altitude and the direction of departure depended on known or suspected enemy positions around the PZ. In some cases it was necessary to circle while climbing inside the security of the PZ prior to departure. Normally 3,000 feet was sufficient altitude for the aircraft to remain out of small arms range. Most missions accomplished in the forward area were 15 to 20 nm in radius-of-action, and additional altitude was not practical. As the aircraft approached the drop zone for the first sortie of the day, the unit on the ground relayed information on the enemy situation. The crew maintained altitude as long as possible prior to initiating an approach. This approach was normally steep with a rate of descent approximately 1500 to 2000 feet per minute. A circling approach was sometimes used, depending on the weight of the load, enemy situation, and en route altitude. Figure III-4 represents the flight profile of a normal mission. After dropping off the load, the empty aircraft climbed at maximum rate-of-climb to a safe altitude and returned to the PZ. These techniques were normally employed, but were sometimes influenced by factors such as weather, artillery, pilot experience, enemy situation, and the aircraft capabilities.

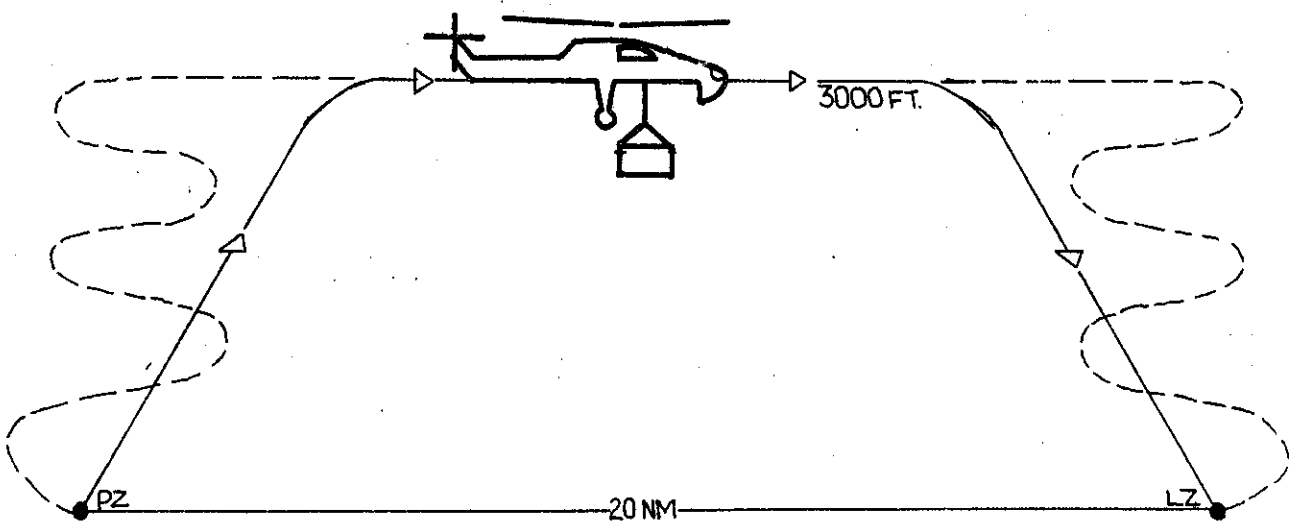


FIGURE III-4. Typical Flight Profile.

21. MISSION CYCLE

a. A typical mission-to-mission cycle is presented in Figure III-5. This illustrates the activities required by the mission and identifies the time spent in the performance of these activities. The cycle of activities has been divided into the time the helicopter spent in the air, on the ground, and in maintenance, but not necessarily in the order of occurrence. The definitions of the symbols used to identify the activities are:

Airborne Activities

a_1 Flight time from home base to the PZ of the forward support element.

a_2 Flight time delivering cargo (task time).

a_3 Time consumed in picking up and dropping off cargo.

a_4 Sortie time flown on-station during which no load was carried, including sorties to and from refueling stations.

a_5 Flight time from last station point, either drop-off site or refueling station, to home base.

Ground Activities

g_1 Refueling time.

g_2 Hours waiting, aircraft is down for parts.

g_3 Time the aircraft is operationally ready (OR) but not commited.

Maintenance Activities

m_1 Time in scheduled maintenance plus field maintenance.

m_2 Time in non-scheduled maintenance.

b. The typical mission cycle was based on a six-hour flight commitment, i.e., the aircraft returned to base six hours after initial take-off. The ground time was determined from maintenance and supply records. The flight time was determined from aircraft flight and operational records. However, for the purpose of developing the mission cycle, an average flight time for the cycle was determined from 114 samples of aircraft commitments of 5 hours or greater. This represented 66 percent of the total aircraft commitments during the data collection period. Samples of aircraft commitments of 5 hours or greater were selected because SOP normally required the performance of field maintenance at least once during the mission. The remaining cycle segments are based on data obtained during the entire evaluation period. The average ground times were determined from average MMHR per

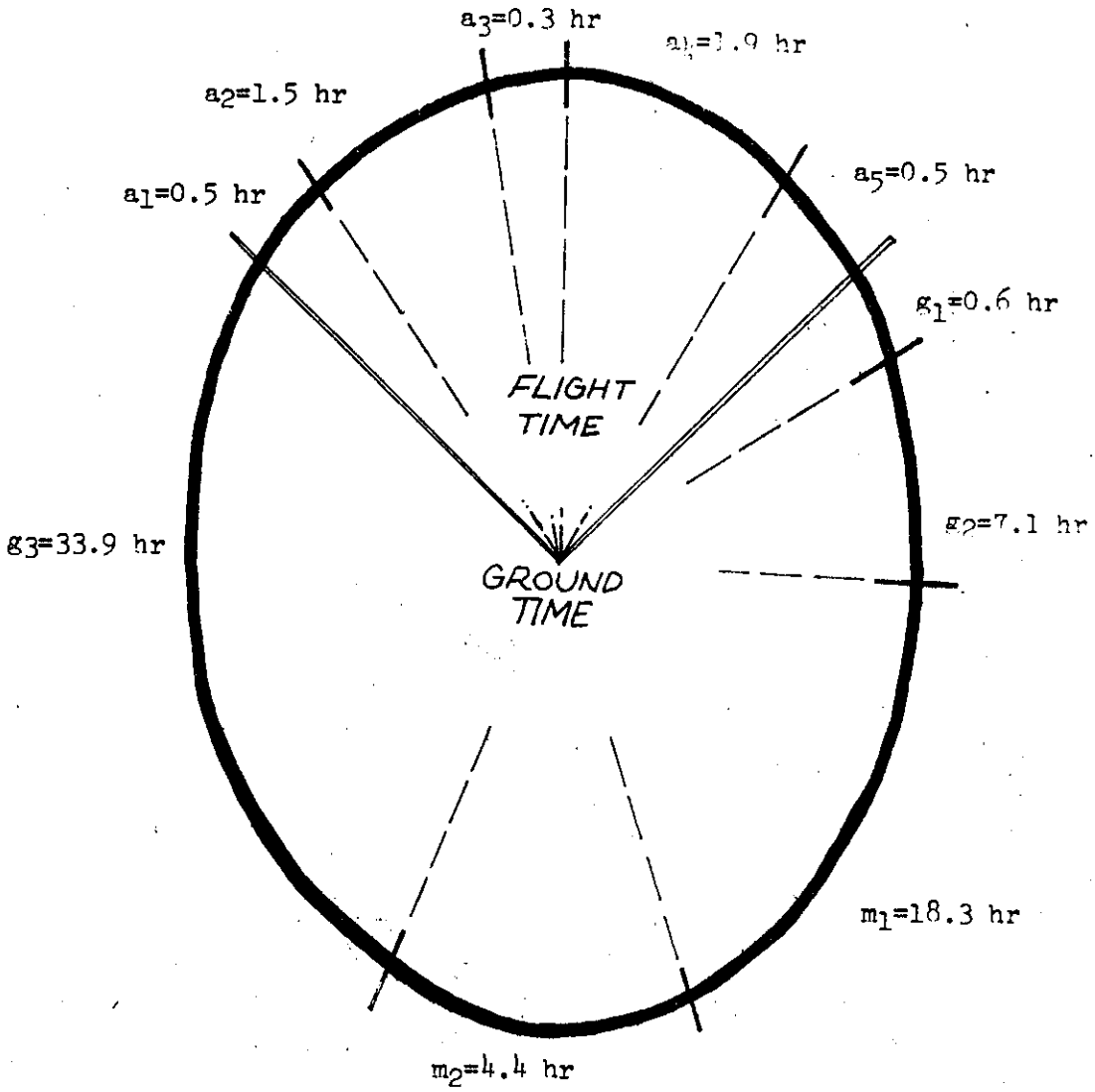


FIGURE III-5. Typical Mission to Mission Cycle Time

flying hour for the 273d Company (20.8), the percent of total aircraft Not Operationally Ready, Supply (NORS) and Not Operationally Ready, Maintenance (NORM), and the total direct MMHR performed.

c. Based on the NORM rate of 33 percent, the average MMHR per day was computed as 8 MMHR. The total cycle time was 69 hours or 2.9 days; the aircraft is idle for 33.9 hours, with no work performed. Based on the 24-hour day assumed to compute OR, NORS, and NORM, approximately 24 hours of the 69 hour cycle are hours of darkness. Substantiating data is summarized below:

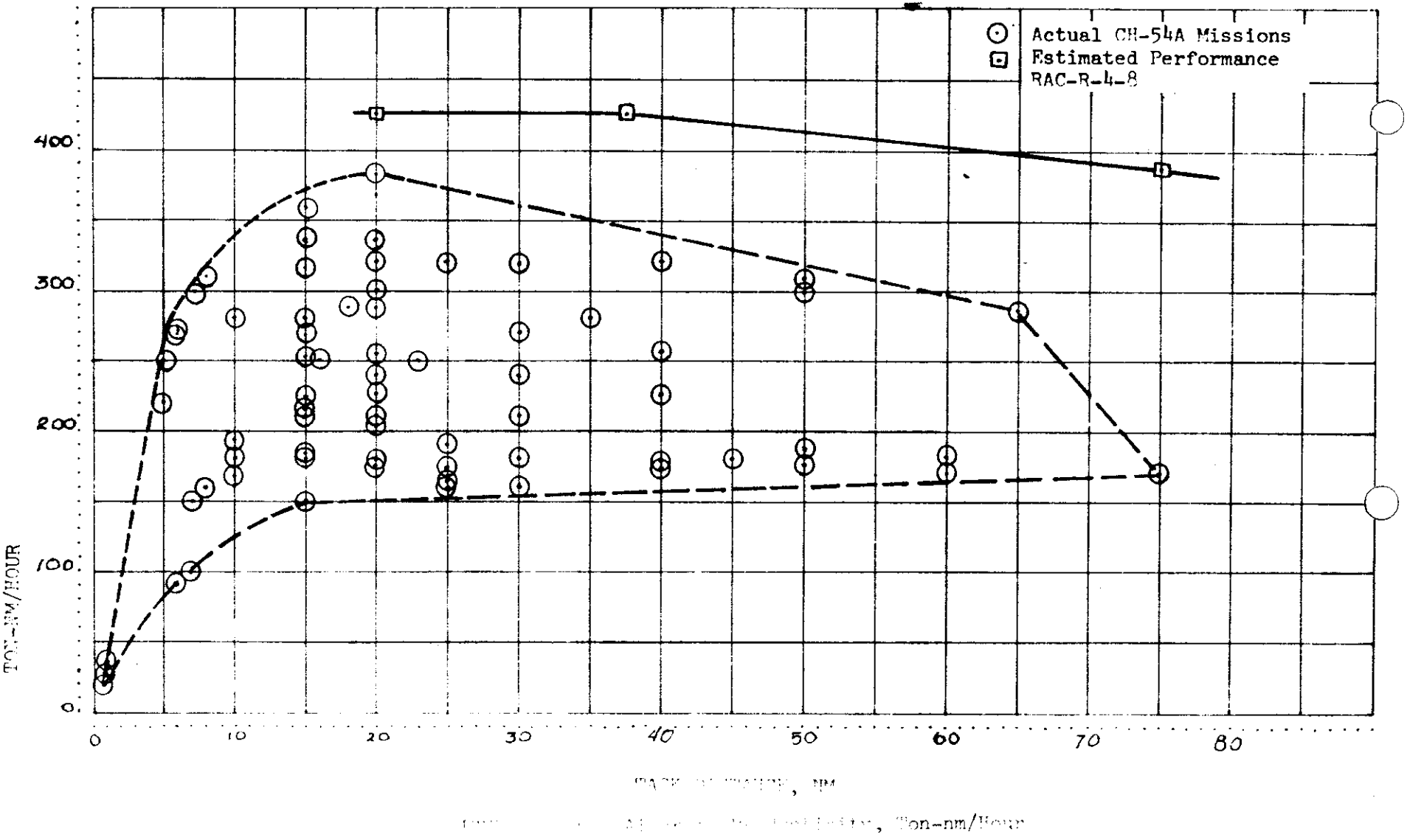
Field maintenance time	45 minutes
Load and unload time	2.6 minutes average
NORM	33 percent
NORS	10.7 percent
OR (includes flight time)	56.3 percent
Flight time, in percent of total mission to mission cycle time	6.5 percent
Total MMHR per mission cycle hour	3.9 MMHR
Hours waiting per flying hour, less NORS	7.7
Maintenance hours per flying hour	5.1
Hours waiting for parts per flying hour	1.6

22. AIRCRAFT PRODUCTIVITY

a. Aircraft productivity is presented in Figure III-6. This data was extracted from the After-Action Report questionnaires completed by the pilot after each mission. The data points were computed by multiplying the aircraft useful load in tons by the sortie radius-of-action and dividing this product by the total flight time to and from the drop-off zone. Many data points coincided, and the figure represents approximately 50 percent of the reported data. The data was checked to ensure validity of the boundary. The results were compared to the design values of the CH-54A aircraft productivity presented in report RAC-R-48 (see reference I). The figure indicates that utilization of the full capabilities of the aircraft did not meet theoretical expectation. The addition of aircraft armor, standard load prerigging practices which were not optimized to the CH-54A, and other factors peculiar to the combat environment in RVN influenced the aircraft's productivity.

b. Figure III-7 presents the limitations on payload weight as a function of radius-of-action. These limitations were established by experience of the 273d Company, and have become SOP for the company. Special planning is needed to determine the radius-of-action of odd-shaped loads which may limit the airspeed to values below 60 knots, or loads rigged with a drogue chute that could result in excessive drag. Factors which contributed to payload limitations included:

PRODUCTIVITY, TON-NAUTICAL MILES PER HOUR, NAUTICAL MILES MEASURED FROM PICK-UP ZONE TO DROP ZONE, TIME IS TOTAL SORTIE TIME. DEAD HEAD TIME AND REFUEL TIME NOT INCLUDED.



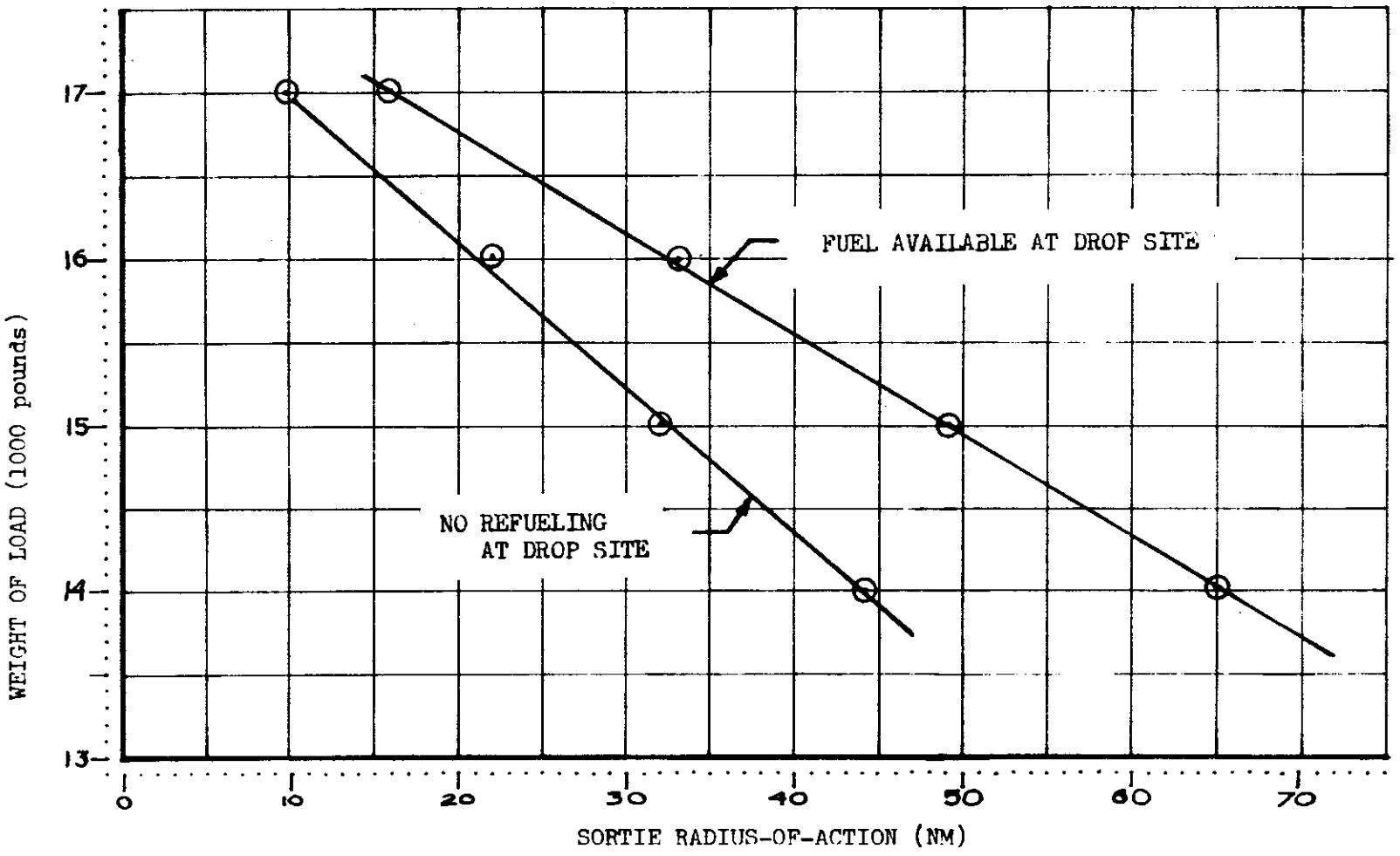


FIGURE III-7. Payload Weight Versus Distance Traveled

(1) High operating temperatures.

(2) Increase in aircraft weight due to armor shielding.

(3) Proximity of refueling facilities to drop-off site.

(4) Degree of accuracy in determining weight of payload.

c. The frequency distribution of sortie radius-of-action in percent of total sorties is presented in Figure III-8. The percentages were calculated by totaling the number of sorties in five-nm increments and dividing by the total number of sorties. As an example, 25 percent of the sorties flown fell within a flight distance of 15 to 20 nm.

d. The typical aircraft performed productive payload delivery approximately 25 percent of the time it was committed to a mission, with the remaining time consumed in-transit between base areas, refueling points, and pickup locations. Ninety percent of the missions involved the forward movements of supplies from the division base to the forward support bases or LZs.

23. MISSION SCENARIOS

a. Scenario One

The scenario presented in Figure III-9 illustrates the movement of one CH-54A helicopter working out of Vung Tau. At an engineer company 45 nm northwest of Vung Tau, the aircraft picked up an external sling load (one 11,000-pound air compressor) and delivered it to a fire support base of the 25th Infantry Division. It then proceeded to a forward support element of the 25th Infantry Division located near Tay Ninh, where an external sling load (an 11,000-pound compressor) was picked up. This load was delivered to Nui Ba Den. The aircraft then refueled at Tay Ninh and proceeded southeast to a fire support base of the 199th Light Infantry Brigade. This third mission of the day involved moving six 2½-ton trucks weighing 14,000 pounds each, approximately ½ mile from the fire support base to a main supply route. The aircraft then departed for Dong Tam, delivered three loads of ammunition to a fire support base of the 9th Infantry Division, and returned to Dong Tam for refueling prior to departing for Vung Tau. During the day the crew reported their mission progress every hour to Operations of the 273d Company. The dead head distance going to and from the working area was 90 nm, consuming one hour of flight time of the 5-hour mission.

b. Scenario Two

The scenario illustrated in Figure III-10 depicts the movement of an aircraft working out of Long Binh Post after the 273d Company moved from Vung Tau. The aircraft proceeded to Phouc Vinh for the first pick-up

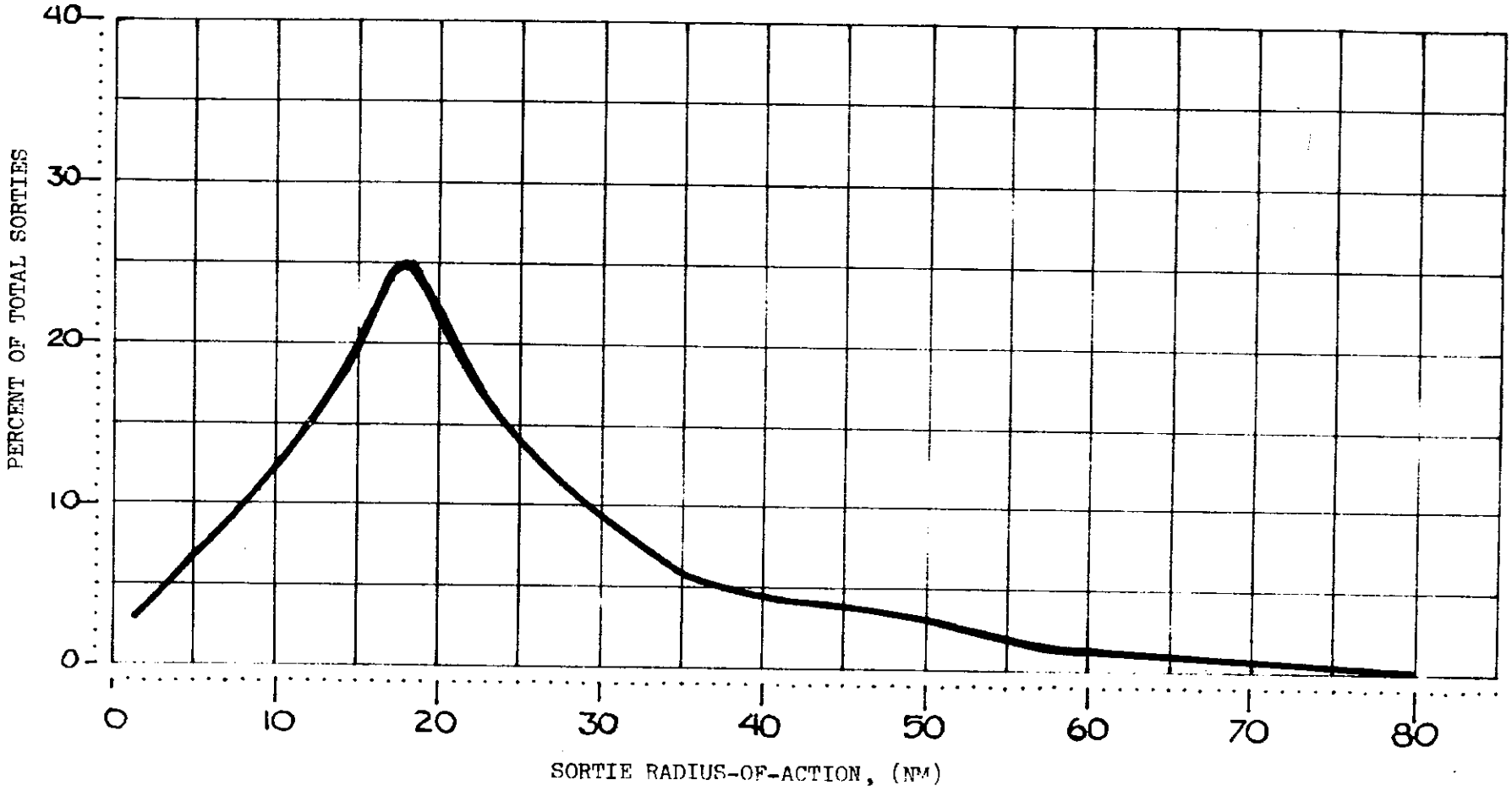


FIGURE III-8. Frequencie Distribution of Sortie Radius-of-Action

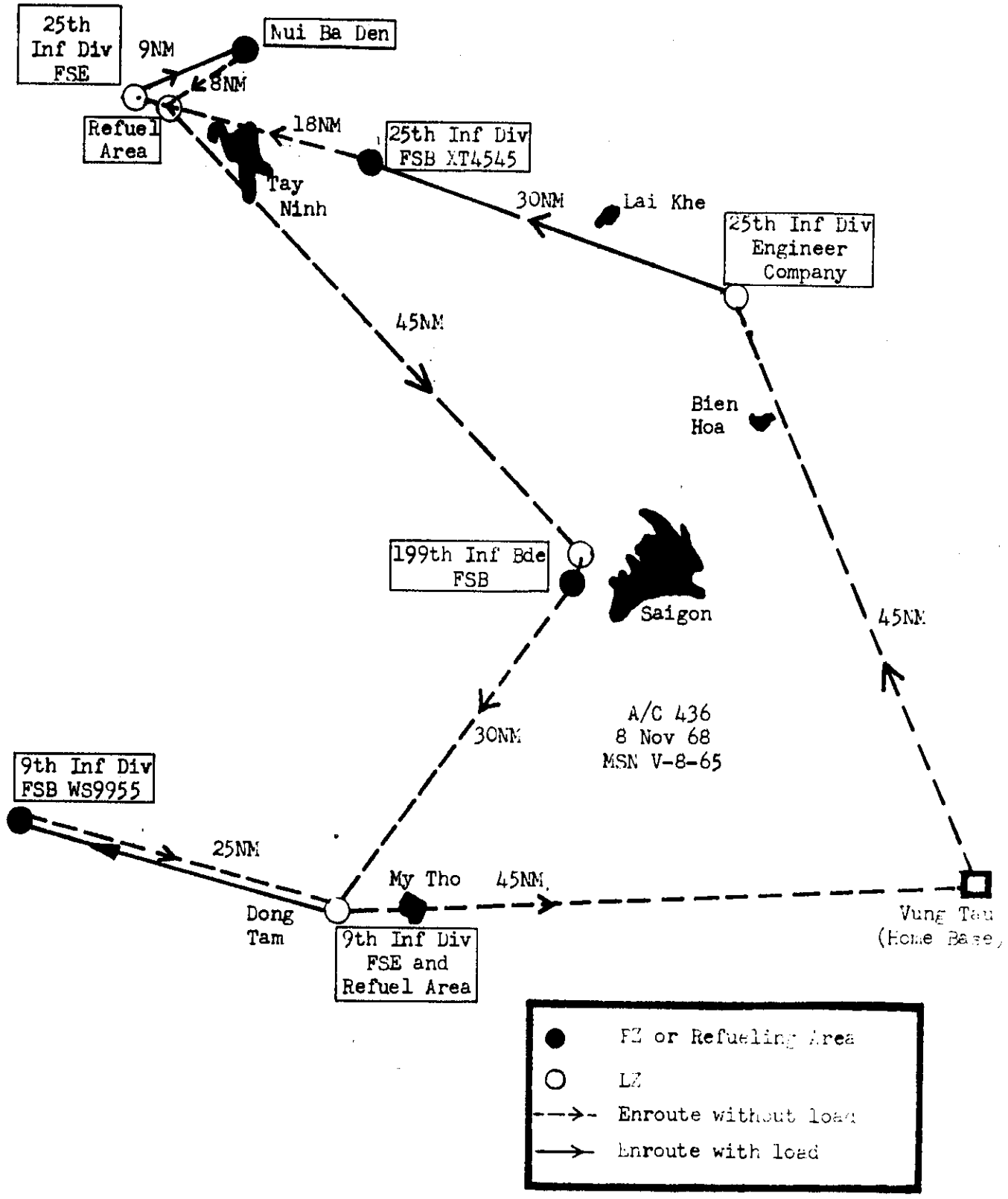


FIGURE III-9. Scenario One.

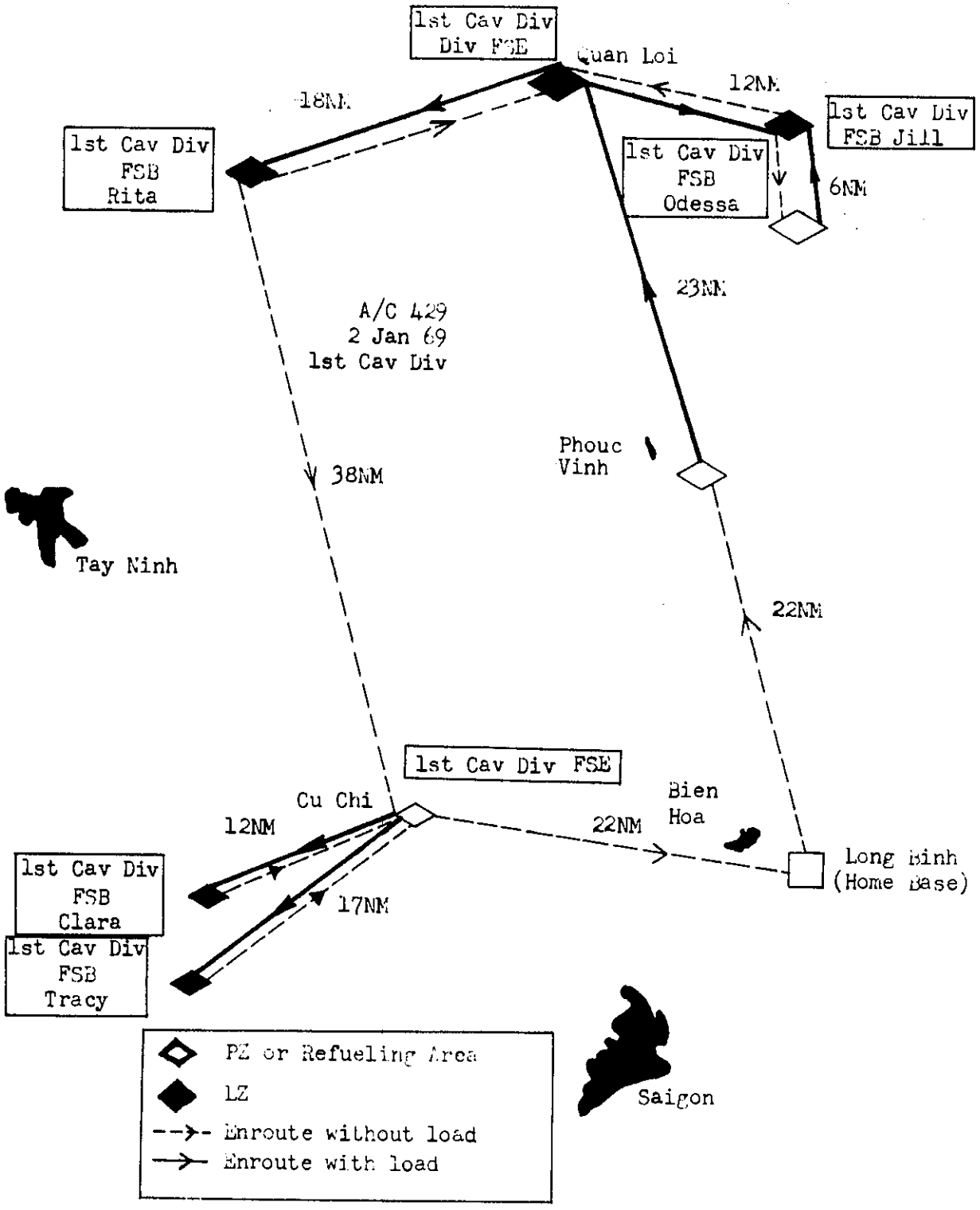


FIGURE III-10. Scenario Two

(a 9,000-pound roller) and delivered the load to Quan Loi. The aircraft then hauled two 11,000-pound Case 450 dozers to Fire Support Base JILL. The aircraft was flown to Fire Support Base ODESSA to recover a 14,000-pound piece of engineer equipment for delivery to Fire Support Base JILL. The aircraft was then flown to Quan Loi for refueling, and from there carried three loads of ammunition to Fire Support Base RITA. The aircraft flew to Cu Chi, refueled, and delivered three loads of ammunition to Fire Support Base CLARA. They returned to Cu Chi, refueled, and delivered four loads of ammunition to Fire Support Base TRACY. The aircraft refueled at Cu Chi and returned to home base. The dead head distance going to and from the working area was 44nm, consuming 40 minutes of flight time. A visual maintenance inspection was performed at Cu Chi prior to deliveries to Fire Support Base TRACY. This was normal procedure, and was performed if the total flight time exceeded five hours.

24. FINDINGS

a. The 273d Company satisfactorily provided heavy airlift support to elements of four US combat divisions.

b. When the 1st Cavalry Division (Airmobile) assumed operational control of the 273d Company, Headquarters II FFV delegated the consolidation of daily heavy lift mission requirements to the Division.

c. The decision as to the type of aircraft to be used to accomplish a specific mission was made by the unit (1st Cavalry Division or II FFV) exercising operational control over aviation assets.

d. More than 95 percent of the Company's missions were single-ship missions.

e. The majority of the division forward support elements did not have sufficient prerigged cargo to efficiently use more than one CH-54A at a time.

f. Damage from enemy ground fire was not sustained by 273d Company aircraft at or above 3,000 feet absolute altitude.

g. Twenty-five percent of the total tasks performed were between 15 and 20 nm of the pickup site.

h. The typical aircraft performed productive payload delivery approximately 25 percent of the time it was committed to a mission, with the remaining time consumed in transit between base areas, refueling points, and pickup locations.

i. The average flight time of an aircraft was 6.5 percent of the typical mission to mission cycle time.

j. Operation within the RVN environment reduced the expected mission payload productivity of the CH-54A.

k. Ninety percent of the missions were from the division base to the forward support bases or LZs.

SECTION IV

OBJECTIVE 3 - ADEQUACY OF TOE

25. GENERAL

a. The 273d Company was organized under TOE 1-259G when deployed to RVN in December 1967. During the first three months of operations, it became apparent to the commanding officer that the company could not operate efficiently with the organizational allowances authorized in TOE 1-259G. It was determined that the TOE was inadequate in that it failed to:

(1) Provide sustained quality scheduled maintenance 24 hours a day.

(2) Provide immediate response to demand maintenance in the field.

(3) Provide adequate technical supply support, responsive to the requirements of the maintenance personnel.

(4) Permit fragmentation of flight platoon(s) to distant areas because of insufficient maintenance personnel and equipment to sustain on-site maintenance.

b. To minimize the foregoing inadequacies, action was taken by the 273d Company commander to consolidate the company with the attached 652d Transportation Detachment (HHC) which was organized under TOE 55-500F. This action resulted in a TOE modification plan which combined TOE 1-259G and TOE 55-500E into MTOE 1-259G. MTOE 1-259G was endorsed by the two other CH-54A helicopter companies operating in RVN, and this MTOE, dated 12 August 1968, was submitted to Headquarters, US Army, Vietnam (USARV).

c. When the company evaluation began on 28 October 1968, the personnel and equipment of the company were integrated with that of the 652d Transportation Detachment (HHC) as prescribed by MTOE 1-259G. The personnel and equipment authorized in TOE 1-259G and TOE 55-500F were integrated and consolidated in such a manner that within the company organization TOE 1-259G lost its identity. Therefore, it was determined that it was not feasible to evaluate the adequacy of the organization and equipment as prescribed by TOE 1-259G. No attempt was made to adjust the information and data collected to assess either TOE 1-259G or TOE 55-500E except to account for their major deficiencies as related to the MTOE. To satisfy this objective, the adequacy of MTOE 1-259G, under which the unit was essentially organized and operated during the data collection period, was thoroughly evaluated, and the objective was divided into the following two sub-objectives:

(1) Personnel and organizational adequacy.

(2) Equipment adequacy.

These sub-objectives are discussed on the following pages. MTOE 1-259G is presented in Annex B.

26. PERSONNEL AND ORGANIZATIONAL ADEQUACY

a. Company Headquarters

The headquarters platoon of the 273d Company had the normal responsibilities of an aviation company headquarters element, including command and control, general administration, supply, mess, and automotive maintenance. Figure IV-1 shows the company headquarters organization as prescribed by the MTOE.

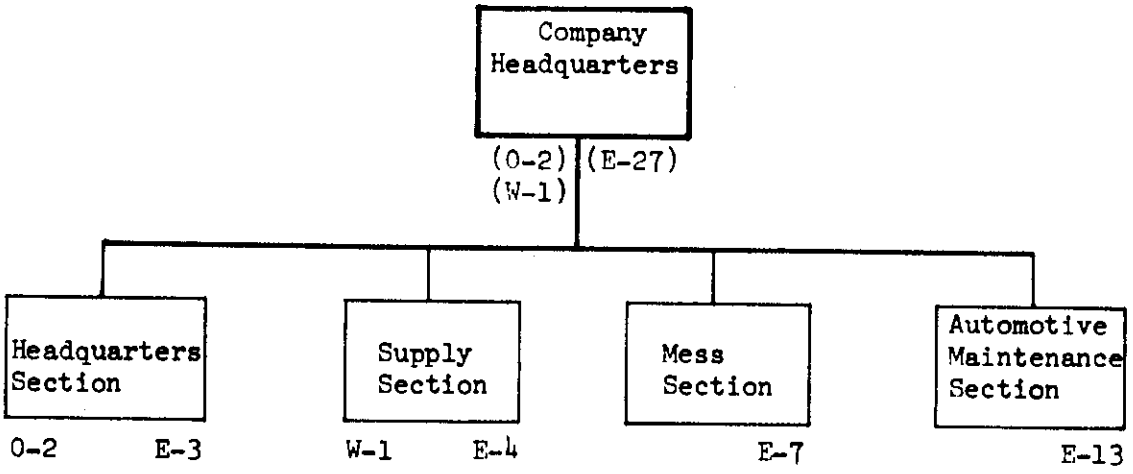


FIGURE IV-1. Organization of Company Headquarters.

(1) Headquarters Section

Personnel authorization requested in MTOE 1-259G, which included an executive officer, was determined to be adequate for command and control and for administration. The inclusion of an executive officer in the MTOE allowed the company commander the freedom of movement that his duties required. The executive officer assisted the commander and, in his absence, commanded the company.

(2) Supply Section

Two aviators from the flight platoons were assigned additional duties as supply officer and assistant supply officer. The company supply officer was responsible for the following:

(a) Property books with approximate property value of 24 million dollars.

(b) Post, camp, and station property accountability.

(c) Supply of TOE and expendable general supply items of the company.

(d) Arms room containing a total of 205 weapons of 5 different types.

(e) Basic load of ammunition and rations.

(f) Unit movement plan.

The supply officer averaged 50 hours of work per week in the company supply, supervising operations and maintaining property accountability. His primary duty as flight platoon aviator was considered a secondary job due to the amount of time required to perform his additional duty as supply officer. The assistant supply officer, who was required to work in the company supply only during the absence of the supply officer, averaged 16 hours of work per week on supply matters. His additional duty as assistant supply officer did not restrict him from performing his primary duty in the flight platoon as an operational pilot. The supply personnel authorization requested in MTOE 1-259G, which includes a non-rated supply officer, is considered adequate for supply operations.

(3) Mess Section

The company mess personnel worked in a consolidated mess conveniently located in the billeting area and used by the enlisted members of the company. All KP duties were performed by Vietnamese Nationals. The officers of the company used one of several officers' field ration mess facilities located in the immediate area. Basic guideline figures, for mess personnel per authorized strength, indicate that the total of seven, currently requested in MTOE 1-259G, is adequate to support the company.

(4) Automotive Maintenance Section

(a) The automotive maintenance personnel were responsible for second echelon maintenance, establishing and maintaining the prescribed load list (PLL) and administrative records, and dispatching of

the vehicles and trailers. First echelon maintenance was performed by the user section of the company under the supervision of automotive maintenance personnel.

(b) An aviator was assigned the additional duty of motor officer. He averaged 20 hours of work per week in the company motor pool supervising its functions. This additional duty did not restrict him from performing his primary duty as aviator.

(c) There were sufficient personnel assigned to the motor pool to meet most aspects of organizational maintenance. Difficulties were noted in the requisitioning of repair parts, maintaining proper PLL, and maintaining the related records that establish a realistic PLL. This difficulty was due to the lack of knowledge and/or experience on the part of the assigned personnel. Considering the number and the various types of vehicles, trailers, and ground support equipment authorized in the company, it was the opinion of the evaluators that a repair parts clerk (MOS 76D20) is required. Personnel authorization requested under MTOE 1-259G, which includes a repair parts clerk, is considered adequate for the company automotive maintenance section.

b. Flight Operations Platoon

The flight operations platoon of the 273d Company was responsible for processing mission requests, assignment of missions, operations of a flight dispatch facility, airfield service, and crash rescue, maintenance of company installed wire and radio communications, maintenance of aviator's individual flight records (DA Form 759, 759-1), and processing of awards and decorations. The flight operations platoon was organized under the MTOE as shown in Figure IV-2.

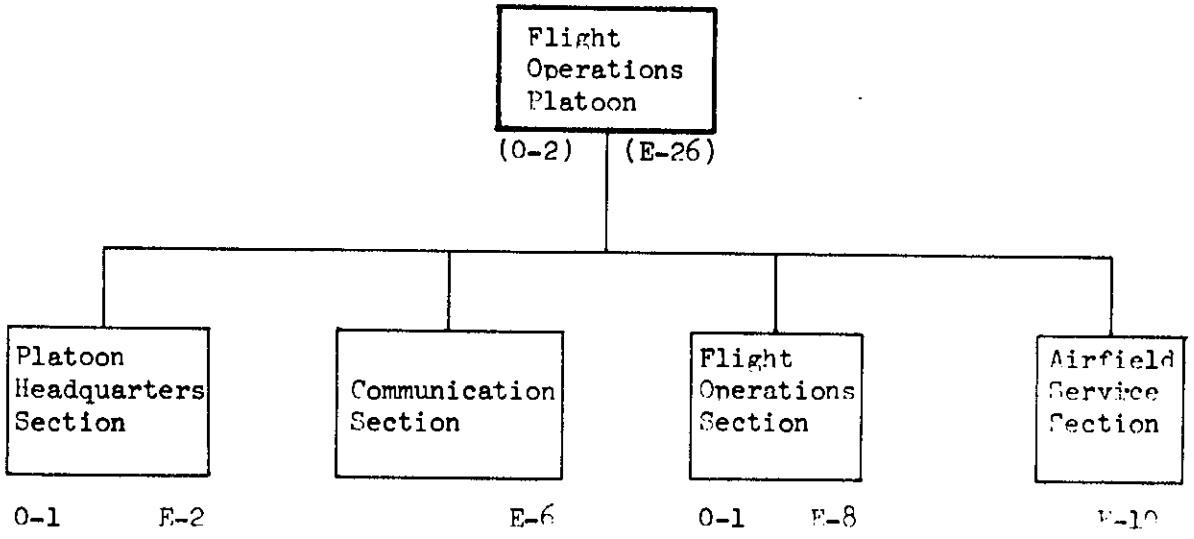


FIGURE IV-2. Organization of Flight Operations Platoon.

(1) Platoon Headquarters Section

Platoon headquarters consisted of a platoon commander, platoon sergeant, and clerk typist. In addition to the normal duties associated with commanding a flight operations platoon, the platoon commander occasionally piloted helicopters on regular lift missions and, in conjunction with these flights, made liaison visits to supported units. The platoon sergeant assisted the platoon commander and, in the absence of the platoon commander, assisted the airfield operations officer who assumed command of the platoon. No difficulties were encountered in the platoon headquarters and there were sufficient personnel to meet all requirements.

(2) Communication Section

(a) The communication section consisted of a communication chief, radio teletypewriter (RTT) team chief, two RTT operators, one senior switchboard operator, and one switchboard operator. One aviator was assigned the additional duty of company communications officer and averaged 15 hours per week in the communication section. The communications officer was responsible for the supervision and operations of the section. The additional duty of communications officer did not restrict him from performing his primary duty as an aviator.

(b) The communications personnel were responsible for operation of one AN/VSC-2 radio, the company's wire communications, and maintenance of 2 VHF and 15 vehicle-mounted FM radios. Since the home station of the company was Vung Tau, and then Long Binh, no requirement developed to operate the section's AN/VSC-2 or make full use of wire communication capability. The two installations, Vung Tau and Long Binh, provided the company with adequate land line communications (dial telephone system) to accomodate the company's communication requirements. The section did operate a company switchboard with approximately two to three miles of wire, providing each element of the company with additional communication. The section's maintenance was confined within organizational level and any additional maintenance requirements were placed on work requests (DA Form 2407) and processed through the signal direct support unit.

(c) Although the adequacy of personnel was never put to a real test, because of the limited use of the section's equipment, it was the opinion of the evaluation team and key personnel of the company that, if required to do so, there were adequate personnel authorized in TOE 1-259G to operate all authorized equipment and accomplish the section's mission. No changes were noted in personnel authorization requested under MTOE 1-259G, and the MTOE is considered adequate for the company communications section.

(3) Flight Operations Section

(a) The flight operations section personnel consisted of an airfield operations officer, a flight operations chief, a senior

operations specialist, two flight operations specialists, and a GCA equipment repairman. The airfield operations officer frequently piloted helicopters on missions as a regular crew member. He assumed command of the flight operations platoon during the platoon commander's absence, thus ensuring continued officer supervision of the flight operations platoon. The flight operations personnel were responsible for 24-hour operations of the flight dispatch facility. The section received and processed mission requests, assisted aviators on flight planning, provided weather information and intelligence data, and monitored an AN/VRC-46 radio used for flight following service and mission progress reports. The section maintained extensive records which included debriefing reports, flight records, and information necessary for awards and decorations.

(b) The small number of personnel assigned to the flight operations section was required to sustain an around-the-clock operation. The flight operations chief and one operations specialist worked a 12-hour day shift. The senior operations specialist and the one other authorized operation specialist worked a 12-hour night shift. It was the opinion of the evaluators and the operations officer that the organization would be more effective if the flight operation section had one additional senior flight operations specialist, (E-5, MOS 71P20), and two additional flight operations specialists, (E-4, MOS 71P20).

(c) The flight operations section is also authorized a GCA equipment repairman and GCA equipment under TOE 1-259G. The MTOE deletes the requirement for GCA equipment and the repairman. This adjustment is warranted due to the availability of GCA services provided by the Army Airfield Command, functioning as a separate unit.

(d) Personnel authorization requested under MTOE 1-259G includes three additional flight operations specialists, and deletion of the GCA equipment repairman. Therefore, MTOE 1-259G is considered adequate in number of personnel and organization for the flight operations section.

(4) Airfield Service Section

(a) The airfield service section was authorized an airfield service chief, a crash rescue chief, three crash rescue specialists, and five aircraft refueling specialists. The airfield service section was responsible for servicing aircraft with POL and providing crash rescue coverage for the company's assigned aircraft. These services are not provided by the Army Airfield Command facility.

(b) The crash rescue personnel and equipment were used on standby missions, but were never used on an actual crash rescue. However, it was the opinion of the evaluation team that personnel and equipment authorized were adequate to perform satisfactorily in the event of an actual crash rescue. TOE authorization of personnel for the airfield service section was determined to be adequate in all respects. MTOE 1-259G does not reflect any changes for the airfield service section.

c. Three Heavy Helicopter Platoons

(1) Each of the three helicopter platoons were authorized, per TOE 1-259G, an aviator platoon commander, eight rotary-wing aviators (commissioned officers and warrant officers), three enlisted flight engineers, and one general clerk. Each platoon was considered as an integral unit and no further organizational subdivision was required by the company. In addition to the pilots assigned to the helicopter platoons, the company commander, executive officer, flight operations platoon commander, airfield operations officer, maintenance platoon commander, and aircraft maintenance technicians were rated helicopter pilots and frequently participated as crew members, relieving the platoon pilots. The average, for duty, aviator strength during the evaluation was 20, including those personnel mentioned above. Flight time per aviator averaged 59 hours per month. Total flying time for each aviator was within limits as recommended by AR 95-17 with the exception of three aviators who flew over 100 hours in a 30-day period during November.

(2) Each of the three platoons was authorized nine pilots per TOE 1-259G to man three assigned aircraft--two pilots to occupy the pilot and co-pilot seat, and the third pilot to occupy the aft-pilot seat. The aft-pilot seat controls have limited control authority over the aircraft, and are designed to be used during missions requiring precision hook-up of external loads. Data collected during the evaluation disclosed that the aft-pilot was not required as the aircraft is now used. The cargo hook-up and release requirements of the missions performed by the 273d Company did not require precision control by an aft-facing pilot. Instead, the flight engineer occupied the aft-pilot seat and, without the use of the aft-pilot controls, verbally assisted the pilot in maneuvering the aircraft over the load for the hook-up. However, pilot interview data did reveal that the requirement for the aft-pilot is valid for other missions requiring precision hook-up of external loads, such as hook-up of loads located in cargo holds of ships during ship-to-shore missions, and bridge section emplacements.

(3) It was determined by the commanding officer that two aft-pilots per platoon would be adequate. Therefore MTOE 1-259G, submitted by the company, deletes three pilots, one from each of the three platoons. It was the opinion of the evaluation team that the personnel allowance of two aft-pilots per flight platoon in MTOE 1-259G is sufficient to accomplish potential missions requiring the use of the aft-pilot.

(4) The flight platoons were authorized one flight engineer per aircraft under TOE 1-259G. However, the operational experience of the company revealed that one enlisted crew member on the CH-54A helicopter was inadequate to perform flight engineer duties, and an assistant flight engineer was assigned to each aircraft. Helicopter mechanics (MOS 67X20) from the maintenance section were used as assistant flight engineers.

(5) The majority of the aircraft committed daily were assigned from one to five separate missions to accomplish. The aircraft flew from two to ten hours a day and normally required two to six refueling stops. To remain on schedule it was necessary that ground time be reduced to a minimum. During the refueling stops, visual inspection of the aircraft was necessary to detect possible ground fire damage and defects that may have developed during the previous flight. Data revealed that the average pressure refueling time was ten minutes. To complete the maintenance inspection within this refueling time, both a flight engineer and an assistant were required. Gravity refueling required an average of 25 minutes. Since one man was required to dispense the fuel manually, an additional man was required to complete the visual inspection within this refueling time period. POL dispensing facilities were available throughout the III and IV CTZs. However, it was not always possible, because of the remote location of some of the mission sites, to plan for refueling at airfields that had pressure refueling facilities.

(6) The primary justification for an assistant flight engineer is that the CH-54A helicopter is a two-enlisted-crewman aircraft due to the complexity of subsystems, configuration, and the size of the helicopter. Performance of maintenance and repairs at mission site, or at home base, normally required two or more mechanics working as a team to accomplish the job expeditiously.

(7) Although the company aircraft were actually operated with assistant flight engineers, no provision for this requirement was made in the MTOE 1-259G. It was the opinion of the evaluators that, since the company is using assistant flight engineers, a requirement for assistant flight engineers does exist. Therefore, MTOE 1-259G should be further modified to include three assistant flight engineers (E-5, MOS 67X20) for each flight platoon.

d. Maintenance Platoon

Restructuring of the TOE 1-259G organization was most evident in the maintenance platoon. The maintenance platoon of the 273d Company was responsible for organizational and direct support maintenance of aircraft assigned to the company. The maintenance platoon organization per the MTOE is shown in Figure IV-3.

(1) Headquarters Section

The headquarters section consisted of a platoon commander, three aircraft maintenance technicians, one aircraft maintenance chief, one repair foreman, four rotary-wing technical inspectors, and one reports clerk. The platoon commander and aircraft chief were responsible for command and control of the platoon. The aircraft maintenance chief functioned as the overall supervisor for the enlisted maintenance technicians, coordinated all maintenance within the platoon, and with the company first sergeant, coordinated personnel requirements for company

details. He supervised all administrative requirements of the platoon including routine and special maintenance and equipment reports to higher headquarters. The warrant officer aircraft maintenance technicians provided technical supervision of all maintenance performed. One maintenance technician was assigned to each of the three maintenance sections and was assisted primarily by the technical inspectors whose job was to ensure that the correct maintenance was performed in accordance with applicable TMs. The maintenance platoon was required to perform both day and night maintenance. One maintenance technician and one technical inspector were therefore required to work the night shift. The repair foreman exercised overall maintenance supervision and coordinated the efforts of the three maintenance sections, and of the flight engineers and assistants assigned to the flight platoons. The authorized strength requested in MTOE 1-259G is considered adequate.

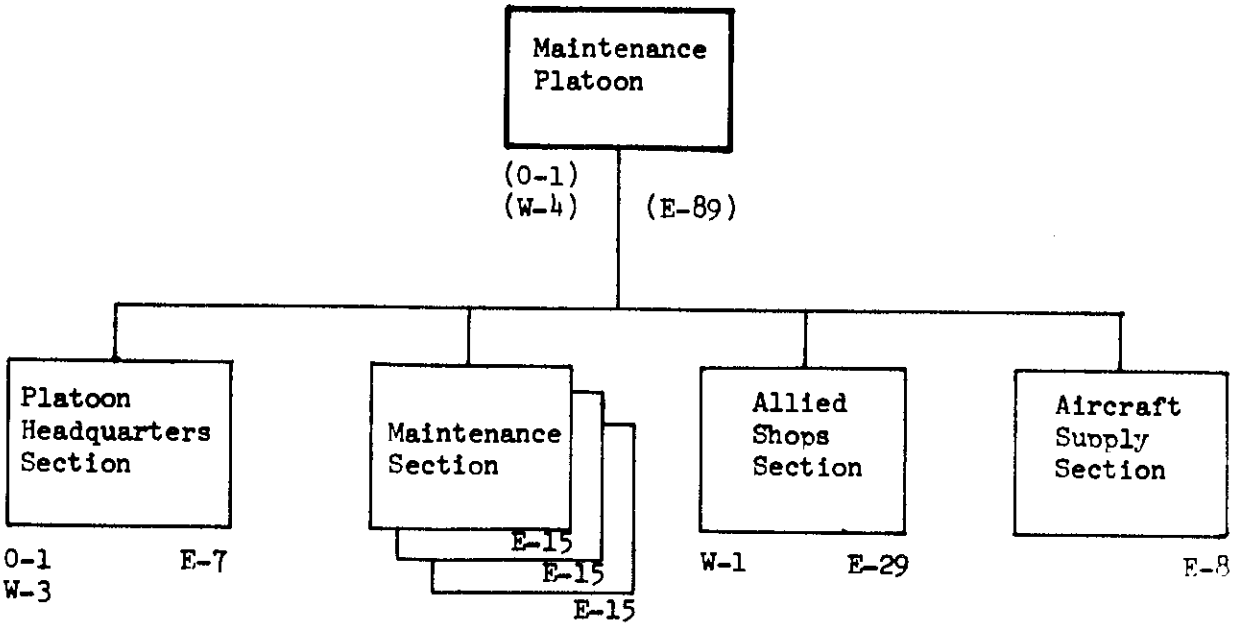


FIGURE IV-3. Organization of Maintenance Platoon.

(2) Maintenance Section

(a) The three maintenance sections shown in Figure IV-3 were responsible for the organizational, direct support, and limited fourth echelon maintenance of the ten CH-54A helicopters assigned to the company (nine authorized in TOE 1-259G and one float helicopter). The maintenance platoon was organized into three maintenance teams, whereby one team could support one flight platoon if the unit was fragmented at different locations. Each maintenance team contained 15 personnel, consisting of a maintenance supervisor (MOS 67X40), 6 senior helicopter mechanics (MOS 67X20), 6 helicopter mechanics (MOS 67X20), and 2 helicopter

mechanic helpers (MOS 67X20). Three senior helicopter mechanics from each of the teams were designated as assistant flight engineers and were away from home station a considerable amount of time performing flight crew duty. They were not available to perform full-time duty in the maintenance section.

(b) The personnel authorization requested in MTOE 1-259G is considered adequate to accomplish the 24-hour operational requirement of the maintenance sections. However, the loss of MMHR attributed to assistant flight engineer duties, coupled with additional MHR lost to guard duty, OJT, and miscellaneous company details, resulted in difficulty in meeting the overall 24-hour maintenance requirement. The addition of assistant flight engineers to the MTOE will alleviate this problem.

(3) Allied Shops Section

(a) Under the supervision of an aircraft repair technician and an aircraft repair foreman, the allied shop personnel were able to adequately complement the three maintenance teams in performing direct support and limited fourth echelon maintenance. The allied shops consisted of five shop vans and two rooms in the maintenance hangar and were organized under the MTOE as shown in Figure IV-4.

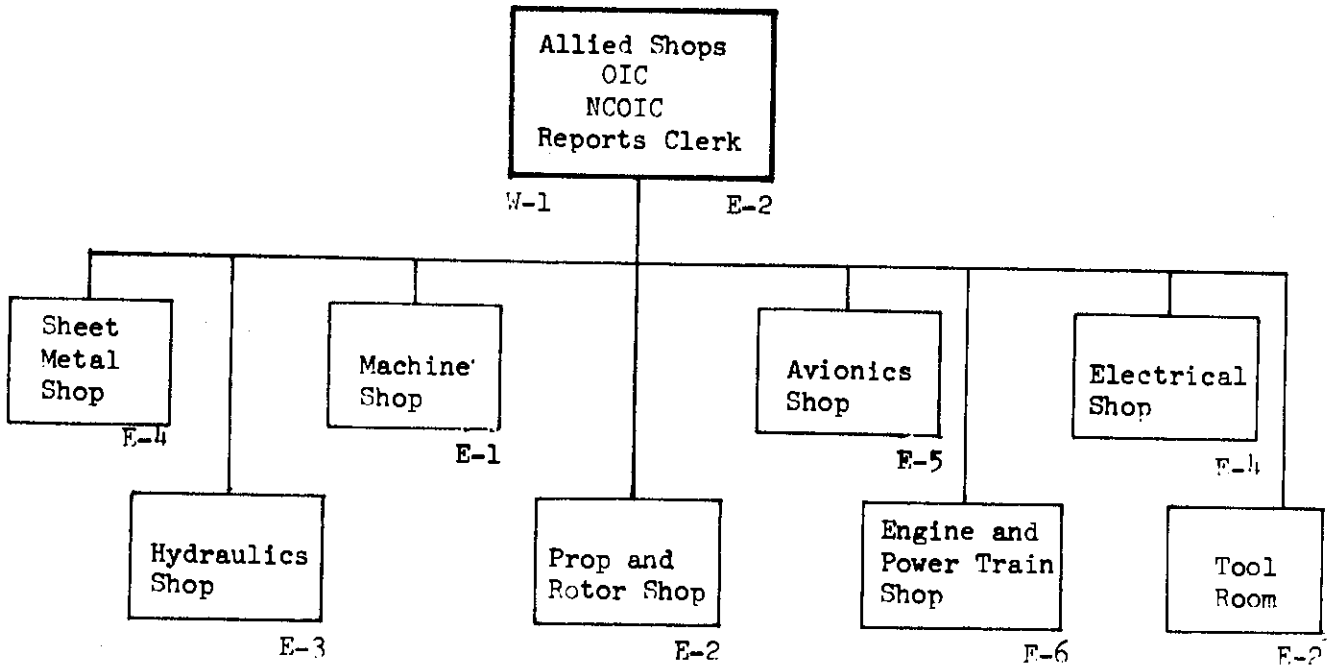


FIGURE IV-4. Organization of Allied Shops.

(b) The allied shops did not have the capability for continuous 24-hour operation. However, a continuous 24-hour operational capability was not required and a night shift was used only infrequently on an "as required" basis. It was the opinion of the evaluators and key maintenance personnel of the 273d Company that the personnel authorization for allied shops requested in MTOE 1-259G is adequate. The shops were able to sustain effective daylight operations as well as accomplish periodic requirements for night maintenance.

(4) Aircraft Supply Section

The aircraft supply section of the 273d Company consisted of a repair parts supply specialist (E-6), two aircraft parts specialist (E-5), three aircraft parts specialist (E-4), one equipment reports clerk, and one signal parts specialist. The aircraft supply section was responsible for organizational aircraft supply as well as direct support aircraft supply requirements. The PLL for organizational maintenance and the PLL for direct support maintenance were combined and duplications eliminated. A more thorough discussion of the aircraft supply procedures used by the 273d Company is contained in Section V. Personnel authorization requested in MTOE 1-259G was determined to be adequate to meet all aspects of aircraft supply requirements including the requirement for a night shift in support of the maintenance sections.

27. EQUIPMENT ADEQUACY

The airfields at Vung Tau and Long Binh Post were well established (see Figure IV-5). The 273d Company was provided with internal and external communications, aircraft hangars, officer space, troop billets, electricity, messing facilities, and post, camp, and station property. The hangars were equipped with adequate lighting for night maintenance. Under these conditions, some of the authorized TOE equipment on hand was not used. The inadequacies resulting from authorized TOE equipment not issued or required equipment not authorized were remedied by borrowing necessary equipment from neighboring Army or Air Force maintenance units. During the evaluation period there was no requirement to separate the Company by individual flight platoons for extended operations away from home base, therefore the fragmentation of maintenance equipment in multiple locations was not evaluated. The Company did satisfactorily operate with the equipment on-hand from a single base of operations. However, should the tactical operations plan require a relocation of the Company, or require the Company to fragment one or more of its flight platoons, the conditions under which the Company has operated successfully could change drastically. In determining the adequacy of equipment, the evaluation team took into consideration the environment in which the Company may be required to operate and the possible requirement that the flight platoons operate from multiple locations.

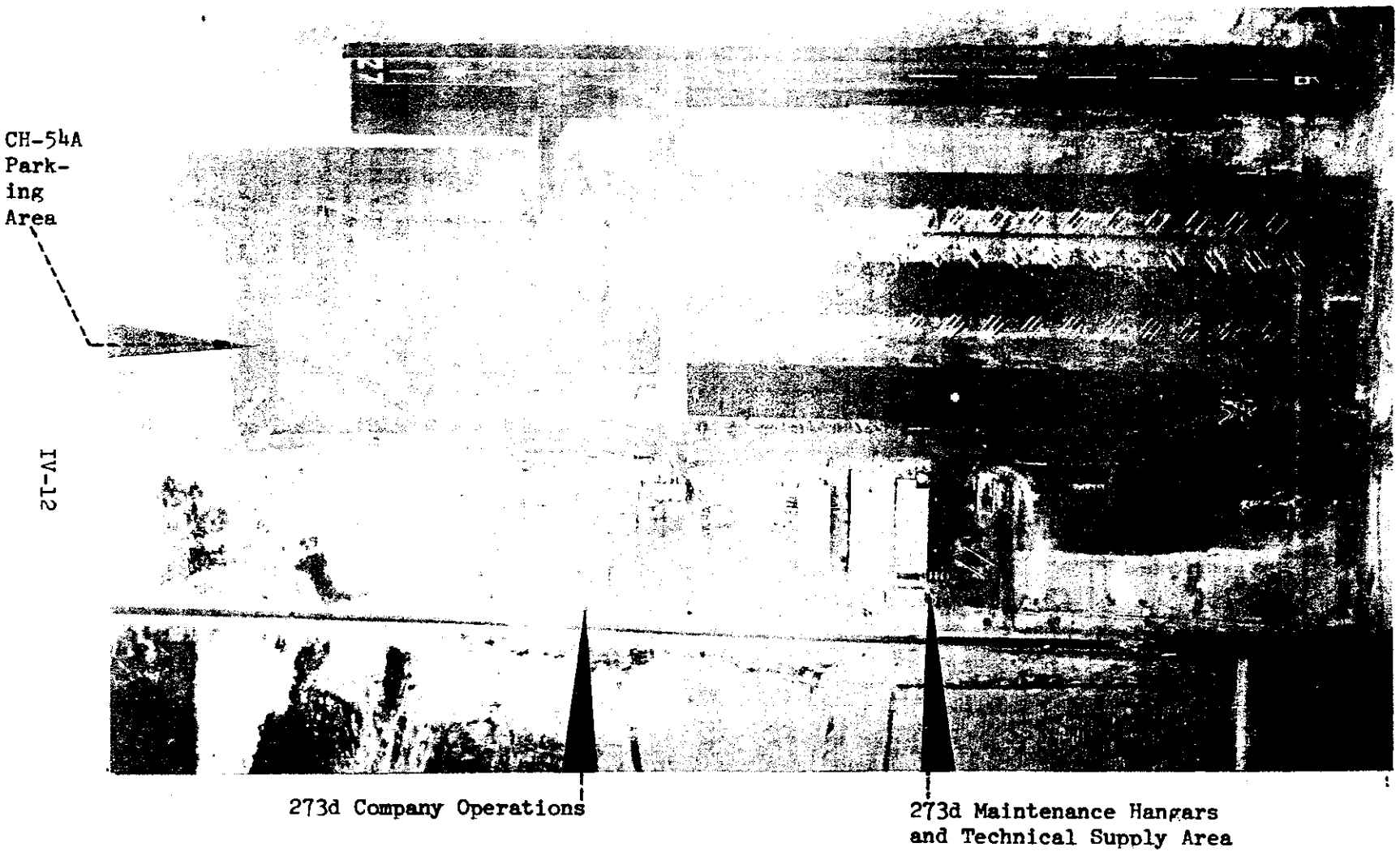


FIGURE IV-5. Facilities at Sanford Army Airfield (Long Binh).

a. Company Headquarters

(1) The commander required an aircraft with which to accomplish vital command and control functions including orientation and liaison visits. In addition, a utility helicopter was constantly required by the maintenance platoon to investigate maintenance problems and when necessary, to transport maintenance crews with repair parts, tools, and equipment to aircraft which malfunctioned at the mission site. Attempts were made by the company to borrow a utility helicopter when necessary, but a suitable aircraft was seldom available when required. The requirements were normally accomplished with a CH-54A, the only means available to the Company. This practice is considered uneconomical. Assignment of a utility helicopter to each heavy cargo helicopter company is considered mission-essential.

(2) The company supply and automotive maintenance sections were adequately equipped to accomplish their missions. The company mess was not operated and the mess equipment was stored and maintained in the company supply storage shed. However, the equipment would have been adequate if the company had been required to operate its own mess facility.

b. Flight Operations Platoon

(1) Minimum use of the communication section's equipment was required at Vung Tau and Long Binh. In lieu of the authorized AN/GRC-46 RTT, the section was issued AN/VSC-2 RTT. During this evaluation, the Company had no requirement to operate the RTT. It was the opinion of the evaluation team and company communications officer that the authorized equipment of the communication section would be adequate if the company were required to operate away from established sites.

(2) The two AN/VRC-24 radios authorized the flight operations platoon were turned in for repair. An AN/VRC-46 radio from the communications section was installed in operations and provided the section with required air/ground communications. Although the two AN/VRC-24 radios authorized the flight operations platoon were never used, they were considered adequate to meet platoon mission requirements for fragmented operations.

(3) Other than standby missions, the crash rescue equipment was not used on an actual crash rescue. It was the opinion of the evaluators that the authorized equipment was adequate.

(4) The aircraft refueling personnel dispensed an average of 70,000 gallons of JP-4 fuel per month. The two authorized 1200-gallon tank trucks and one 5,000-gallon semitrailer tank were considered adequate for servicing the company's assigned aircraft.

c. Three Heavy Helicopter Platoons

The equipment authorized for the three flight platoons, which included a ¾-ton truck and trailer for each platoon, was adequate to accomplish their mission.

d. Maintenance Platoon

(1) One shortcoming observed in the maintenance section (because it resulted in hazardous working conditions) was the lack of maintenance stands of sufficient height to permit inspection and maintenance of the tail rotor gear box mounting area and the stabilizer. With the aircraft on level ground, the tail rotor gear box was 255.7 inches (21 feet) above the ground. There were no maintenance stands authorized or available which would extend to sufficient height. The inspection and maintenance of the tail rotor gear box and associated areas was a daily requirement. The maintenance personnel accomplished daily maintenance on the tail assembly by stacking an assortment of platforms on top of the tallest maintenance stand available until marginal height was obtained (see Figure IV-6). On occasion, a five-ton wrecker was used as a work stand (see Figure IV-7). This procedure created a hazardous condition and still lacked sufficient height to perform a thorough inspection or to give satisfactory accessibility to the tail rotor structure. A maintenance stand with a work platform at a height of 17 feet is required. This would safely elevate average sized maintenance personnel to a height most efficient for inspection and maintenance. MTOE 1-259G includes four maintenance stands (type B-2, USAF, FSN 1730-390-5620) and is considered adequate to meet this requirement.

(2) The company is authorized six maintenance platforms, hydraulic adjustable working level, three to ten feet (FSN 1730-390-5618). They are listed as components to tool set, aircraft maintenance, airmobile CH-54A "A" level (TOE 1-259G), and shop set, aircraft maintenance, ground handling and servicing, set "B" (TOE 55-500). However, the six authorized maintenance stands were not issued. Therefore, the performance of daily, intermediate, and periodic inspections, and repairs performed on the outboard engine areas and fuselage of the CH-54A aircraft, were hampered due to an inadequate and an insufficient number of maintenance stands. To perform the proper maintenance, the maintenance personnel used four borrowed maintenance platforms of various types, and also used the hoods of 3/4 and 2-1/2-ton trucks as maintenance platforms. It was observed by the evaluators that two to six maintenance platforms or substitute platforms were in constant use in the maintenance hangar and a minimum of two platforms were required per aircraft to accomplish work on more than one area. A requirement for six additional platforms was established as necessary on the flight line. A total of 12 maintenance platforms are required to perform aircraft maintenance simultaneously in the hangar and on the flight line. MTOE 1-259G requests 12 maintenance platforms, in addition to the 6 authorized by airmobile set "A" and aircraft maintenance set "B". It was determined that MTOE 1-259G should be further

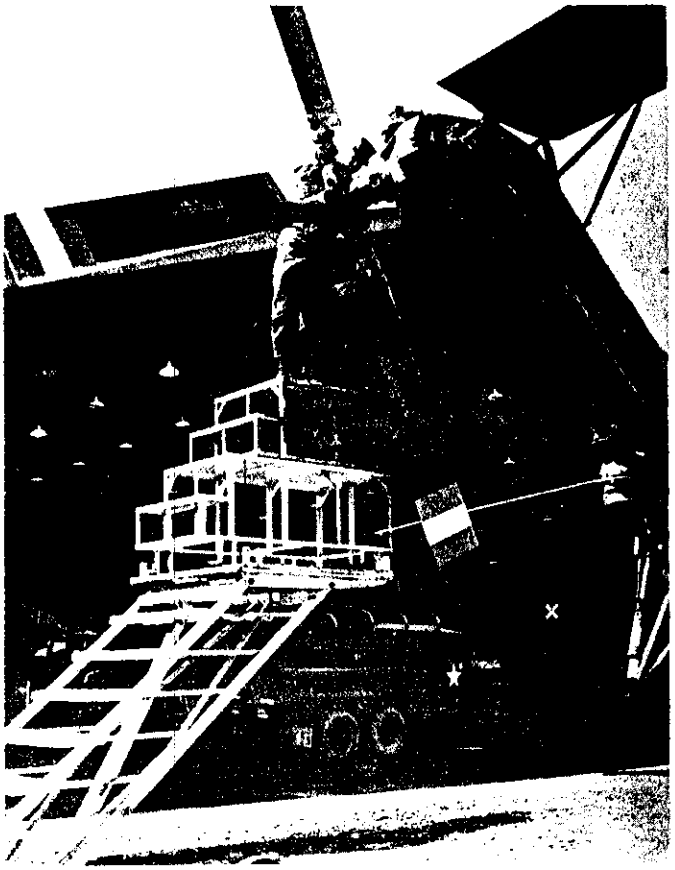


FIGURE IV-6. Three Assorted Maintenance Platforms Stacked to Reach Tail Rotor Area.

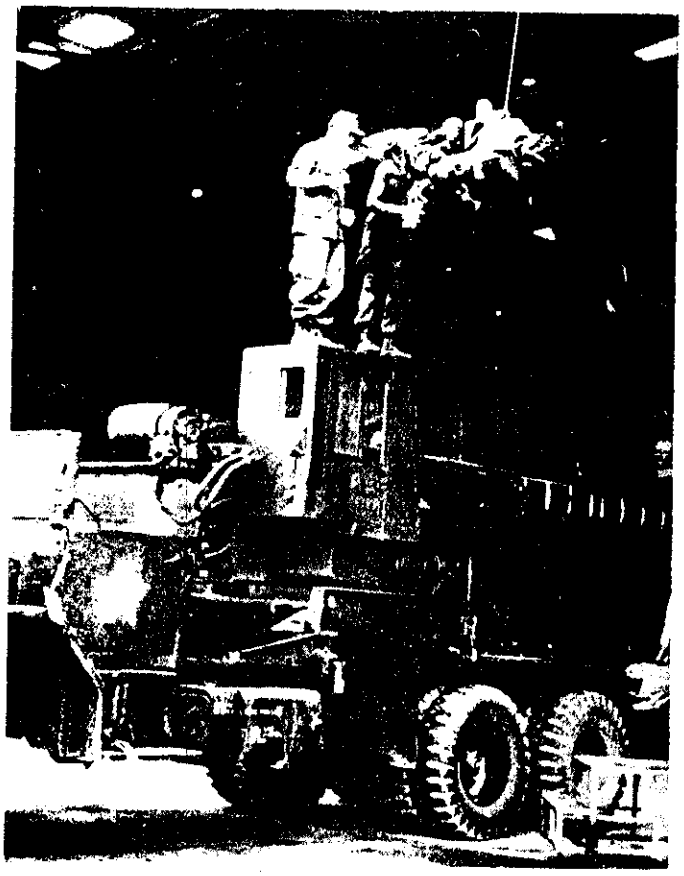


FIGURE IV-7. Five-ton Wrecker Used as Maintenance Platform for Work on CH-54A Tail Rotor.

modified to delete the six maintenance hydraulic platforms (FSN 1730-390-5618) that would be in excess to requirements upon approval of the MTOE.

(3) The total number of hand-operated grease guns authorized in TOE 1-259G and 55-500E is ten. This number is inadequate because two are required aboard each of the nine authorized aircraft to permit fast and adequate servicing in the field and at home station. Eighteen hand-operated grease guns (BOI, two per aircraft) requested by MTOE 1-259G is considered adequate.

(4) There are no tow vehicles authorized in TOE 1-259G or 55-500E. The maintenance section accomplished the towing requirements for the 22,000-pound CH-54A helicopter by use of their 3/4-ton truck and two warehouse tractors (see Figure IV-8). The warehouse tractors were hand-receipted from a logistical unit for 180 days. Three tractors, wheeled warehouse, 4,000 lb DBP, FSN 3930-724-8146 or equivalent, are required. MTOE 1-259G makes provision for this shortcoming and is considered adequate.

(5) The company is authorized two floodlight sets which are mounted on telescoping stands. These sets are inadequate in number authorized and in mobility. The system requires the use of generators as a separate package, and electrical wiring as required from the generator to the telescoping light stands. Performance of 24-hour maintenance and the necessity of keeping aircraft in individual revetments approximately ½ mile from the maintenance hangar require increased use of light in multiple locations as well as requiring mobility of the sets. Nine floodlight sets, portable model, NF-2, USAF, FSN 6230-752-2082 are required (see Figure IV-9). These items have a self-contained generator, are wheel mounted, and can be towed by a vehicle throughout the maintenance and revetment area. MTOE 1-259G has made provision for this shortcoming, and is therefore considered adequate.

(6) TOE 1-259G does not authorize an external electrical power source. Items authorized by TOE 55-500E do not have sufficient direct current (DC) power and do not have an alternating current (AC) capability. The CH-54A requires an AC-DC external power source to perform adequate maintenance and operational checks, including trouble-shooting the electrical and related systems. At the present time, the maintenance personnel use the onboard auxiliary power plant (APP) as a power source and, in some cases, start the aircraft engine to accomplish electrical checks. Consequently, when the aircraft APP or the engine is running, other maintenance being performed on the aircraft must come to a halt. If maintenance is being performed on the APP or on the engine, the electrical maintenance cannot accomplished. Three generator sets, gasoline engine, 28 VDC, 500 amp, 115/200V AC, 400 cps, 4 wire, 3 phase, USAF, FSN 6115-635-5595 or equivalent, are required. MTOE 1-259G has made provision for this shortcoming and is considered adequate.

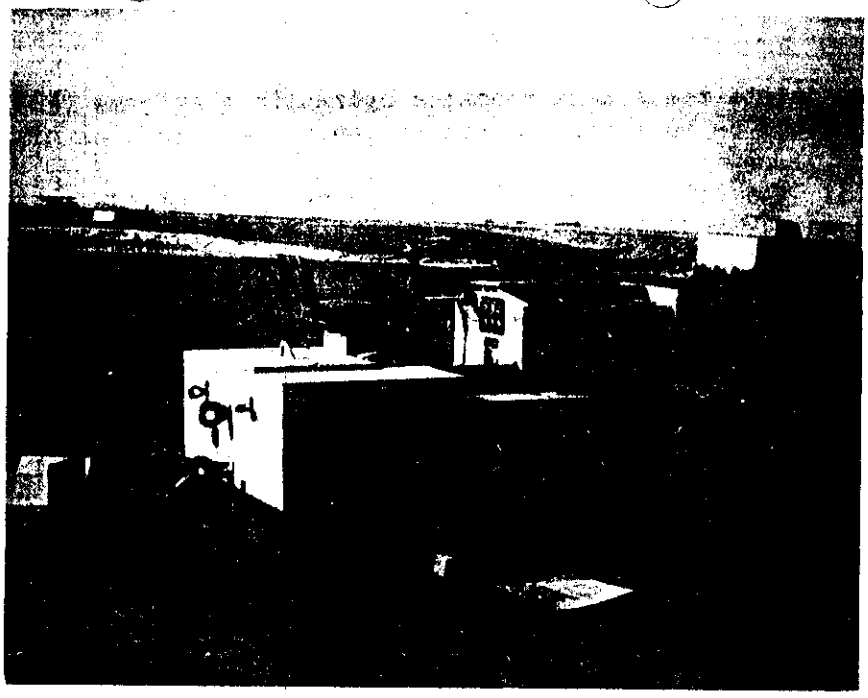


FIGURE IV-8. Wheeled Warehouse Tractor. Used to Tow CH-54A.

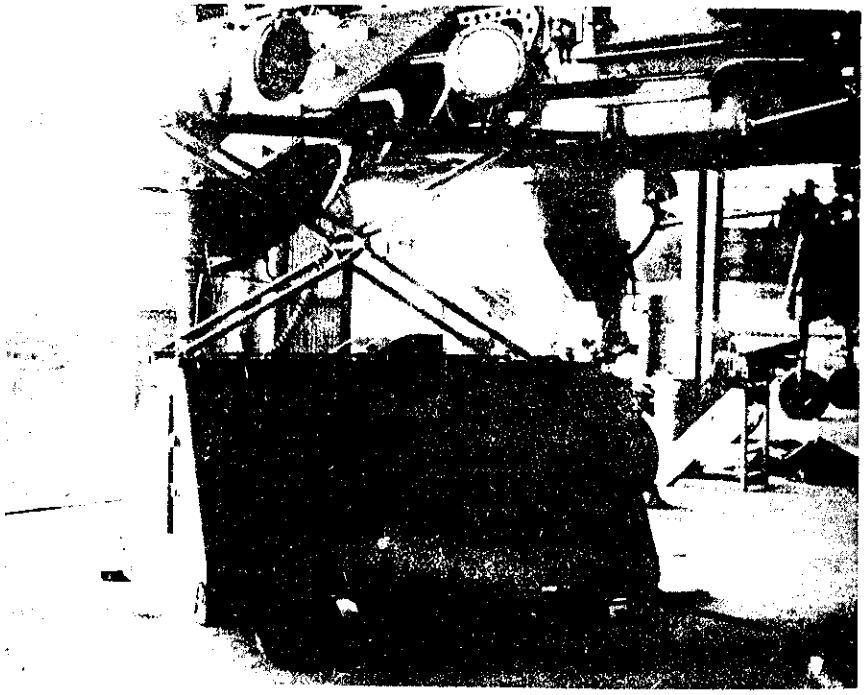


FIGURE IV-9. Floodlight Set, Portable Model, NF-2.

28. FINDINGS

a. The 273d Company commander consolidated personnel and equipment of his unit with that of the 652d Transportation Detachment (HHC).

b. MTOE 1-259G was endorsed by the other two CH-54A helicopter companies in RVN and submitted to USARV Headquarters.

c. The executive officer substantially assisted the commander in administrative and command functions.

d. A full-time supply officer was required for the company supply functions.

e. All aspects of organizational maintenance in the automotive section were adequately met by the assigned personnel.

f. The number of personnel authorized and assigned under TOE 1-259G to the flight operations section was insufficient to conduct an around-the-clock operation.

g. The aft-facing pilot was not used during the period of the evaluation.

h. One enlisted crew member was inadequate to perform flight engineer duties, and mechanics from the maintenance section were used as assistant flight engineers.

i. Transportation requirements to accomplish command and control functions and resolve field maintenance problems were met with the CH-54A helicopter.

j. No maintenance stands were authorized that would provide adequate height to perform maintenance on the tail rotor gear box and stabilizer.

k. Maintenance platforms authorized in TOE 1-259G and TOE 55-500E were insufficient in number.

l. The number of maintenance platforms requested in MTOE 1-259G is excessive to actual requirements.

m. The ten hand-operated grease guns authorized in TOE 1-259G and 55-500E are not adequate.

n. No tow vehicles were authorized.

o. The presently authorized floodlight sets are inadequate in number and mobility.

p. TOE 1-259G does not authorize an external power source.

SECTION V

OBJECTIVE 4 - LOGISTICAL SUPPORT REQUIREMENTS

29. AIRCRAFT MAINTENANCE

a. Organization and Procedure

(1) Maintenance personnel of the 273d Company and attached 652d Transportation Detachment (HHC) were consolidated. Therefore, organizational and direct support maintenance was organic to the company and functioned under the control of a single manager. All direct support maintenance requirements were placed on Maintenance Request Work Orders, DA Form 2407, and scheduled through the maintenance section and various shops organic to the company. Work order requirements beyond the capability of the company were also placed on work orders (DA Form 2407) and submitted to the 330th Transportation Company, Aircraft Maintenance (GS). Record of all work orders completed were compiled on Maintenance Request Register, DA Form 2405. The 273d Company had a maintenance flow as shown in Figure V-1.

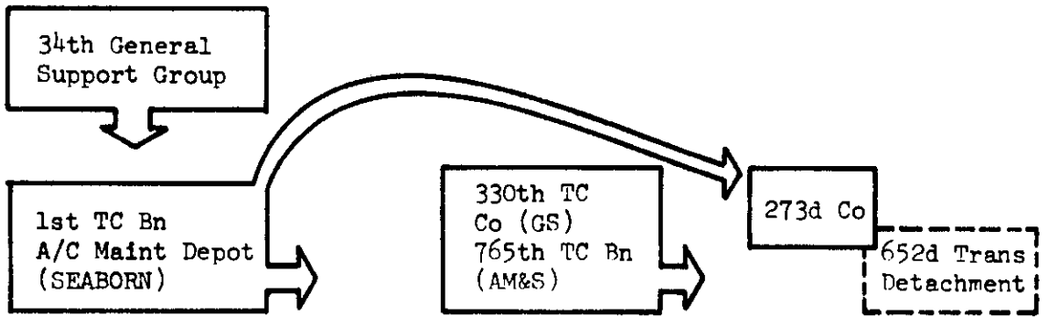


FIGURE V-1. Maintenance Support Structure.

(2) In accordance with maintenance doctrine, additional levels of qualified maintenance support such as backup direct support and general support are required to be established. The 330th Transportation Company was designated as the general support maintenance unit for the 273d Company, but had only limited capability for CH-54A helicopter airframe repair,and virtually no overall general support level capability due to lack of tools, equipment, and qualified CH-54A maintenance personnel.

(3) However, data gathered during the evaluation disclosed that only a limited requirement exists for maintenance above the current capability of the 273d Company's maintenance organization other than depot level maintenance. Presently, the only in-country depot level maintenance support available to the CH-54A helicopters is component repair, overhaul, and inspection. This support is provided by the 1st Transportation

Battalion (Aircraft Maintenance Depot) (SEABORN), located onboard the US Navy Ship CORPUS CHRISTI BAY.

(4) Prior to the start of the evaluation, a CH-54A helicopter was involved in an aircraft accident sustaining major structural damage (see Figure V-2). No in-country repair capability existed and the aircraft was evacuated to CONUS.

FIGURE V-2. CH-54A Evacuated to CONUS for Repair.

b. Float Aircraft

Float aircraft are normally assigned to the backup direct support or to the general support maintenance unit, to be loaned or issued to the supported units upon the loss, or due to prolonged maintenance delay, of TOE authorized aircraft. Since the 330th Transportation Company did not have the qualified personnel to fly or maintain the CH-54A float aircraft, the float was assigned to the 273d Company (authority: VOCG, 1st Aviation Brigade) and was used by the company to perform missions. The float aircraft flew a total of 187 hours during the evaluation period.

c. Battle Damage

During the evaluation there were no combat losses of CH-54A aircraft in the 273d Company due to enemy action. A total of 6 aircraft sustained 11 hits from small arms fire. All aircraft were inspected and flown back to home base except one. This aircraft sustained damage to a drive shaft requiring replacement of that part prior to being flown from the forward area. In addition to combat damage sustained from small arms fire, one aircraft sustained eight hits from two friendly anti-personnel mines that were detonated in a landing zone. As the aircraft came to a 40-foot hover, the rotor wash caused the mines to explode, sending small metal fragments into the aircraft. The aircraft returned to home base where an inspection revealed that three main rotor blades were damaged. One hole was made in the aft pilot compartment and numerous small holes were discovered throughout the left side of the aircraft. On two occasions small arms fire entered the area of the fuel cells. On both occasions these hits were located in an area where self-sealing was available. The holes resealed themselves with minimum loss of fuel and new cells were installed at home base. Damage sustained as a result of friendly anti-personnel mines and enemy ground fire was repaired within the company maintenance organization, placing an insignificant workload on the maintenance section and sheet metal shop.

d. Aircraft Availability

(1) Records of the 273d Company indicated that, during the evaluation, ten CH-54A aircraft (including one float) were programmed to fly 400 hours per month but actually flew an average 467 hours per months. The company's operational requirements dictated by the tactical situation in the III and IV CTZs were the major factors influencing the number and phasing of hours flown. The average monthly aircraft status is presented in Figure V-3. The availability criterion established by USARV for the CH-54A aircraft was 64 percent. Aircraft status in percent of aircraft OR, NORS, or NORM is calculated by dividing the appropriate number of hours OR, NORS, or NORM by the total number of hours for a specified period of time (in this case, one month).

MONTH	OR	NORS	NORM
November	54%	18%	28%
December	64%	9%	27%
January	51%	5%	44%

FIGURE V-3. Aircraft Status.

(2) Each aircraft was inspected after the day's operation, and maintenance was performed each night to prepare the aircraft for the next day. Most maintenance, except that which was absolutely essential (safety of flight), was entered in Aircraft Inspection and Maintenance Record (DA Form 2408-13) and Uncorrected Fault Record (DA Form 2408-14), and was deferred to the next intermediate or periodic inspection.

e. Scheduled Inspections

(1) Programming and coordinating maintenance to support tactical operations presented a continuous challenge to the company maintenance officer. Operational considerations often took precedence over deferrable maintenance, and an irregular workload was the result (see Figures V-4 and V-6). The maintenance data revealed that MMHR averaged 9,361 per month, for an average of 20.8 MMHR per flight hour. It was also noted that total MMHR for each flying hour increased as average monthly flying hours per aircraft decreased. This reverse trend is attributed to the correction of accumulated deferred maintenance whenever operational requirements permitted. However, the average MMHR per flying hour increased with accumulative flying hours. The average MMHR per accumulated flying hour by week is presented in Figure V-5.

	NOV	DEC	JAN
Organizational MMHR	5251	4800	4102
Direct support MMHR	2421	5652	5767
Total MMHR	7672	10452	9959
CH-54A flying hours (273d Co)	553:10	456:45	389:35
Average flying hours per aircraft	55.3	45.7	38.9
Organizational MMHR for each flying hour	9.5	10.5	10.8
Direct support MMHR for each flying hour	4.4	12.4	14.8
Total MMHR for each flying hour	13.9	22.9	25.6

FIGURE V-4. Monthly Maintenance Data.

(2) Daily inspections required an average of six MMHR. Normally a maintenance team met each aircraft on its return from the day's operation and performed all of the maintenance necessary to place the aircraft in a flyable status for the next day.

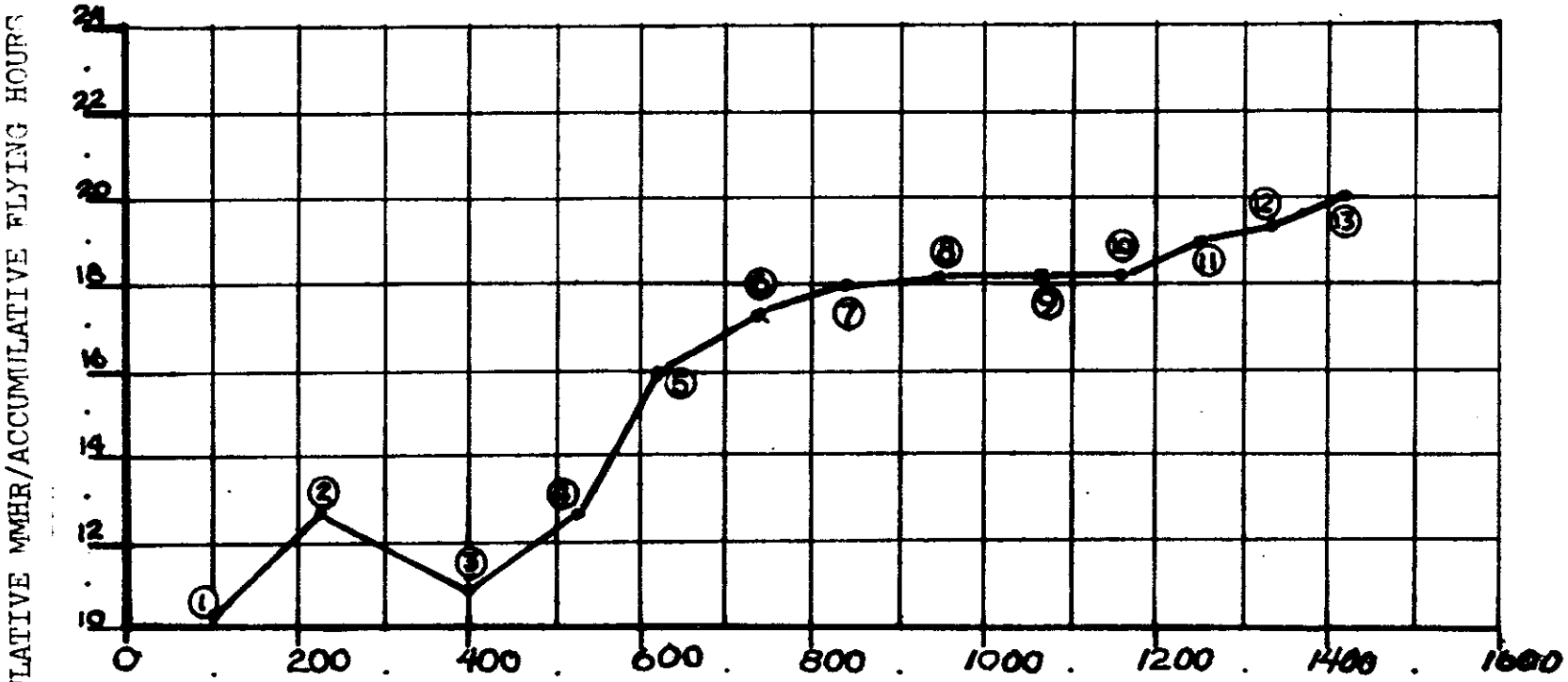


FIGURE V-5. Average MMHR per Accumulated Flying Hours By Week

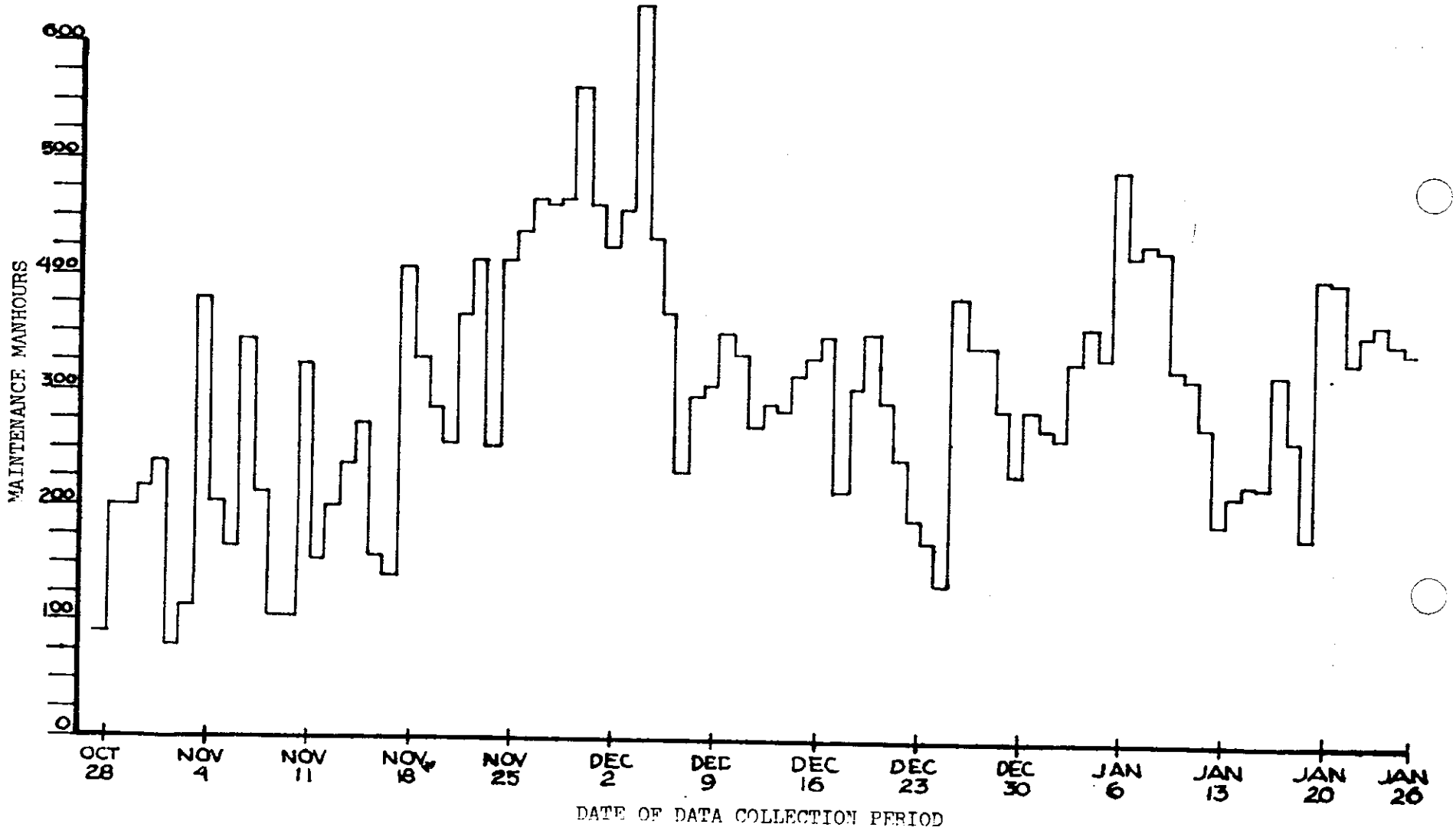


FIGURE V-6. Daily Maintenance Manhour Requirements

(3) There were 36 intermediate inspections performed. Intermediate inspections after every 25 flying hours required an average of 52 MMHR. The aircraft undergoing intermediate inspection were down for an average of one day.

(4) There were 14 periodic inspections performed during the evaluation period. A periodic inspection averaged 1,356 MMHR, and 17 days downtime for completion. Based on the past experience of company maintenance personnel, 1356 MMHR is considered normal for a CH-54A periodic inspection which includes correction of deferred maintenance listed in 2408-13 and -14; 7 to 8 days are considered normal downtime for the aircraft. The manpower management geared to shortage of parts was the primary factor affecting the high average downtime during this evaluation. A normal company maintenance practice was to transfer serviceable parts from the aircraft due for periodic inspection to the aircraft completing a periodic, or to other aircraft down for parts (cannibalization). Manpower was concentrated on those aircraft which required only extensive maintenance. For those that required maintenance as well as parts, such as aircraft undergoing periodic inspection, a minimum crew was used to avoid work stoppage prior to receiving parts. Details on cannibalization are covered later in this section.

30. OTHER MAINTENANCE

Backup maintenance support for all equipment, less aircraft, was collocated with the 273d Company (Vung Tau and Long Binh Post), and no special means of transportation was required to move the equipment to the supporting maintenance shop. The static situation under which the 273d Company operated presented little opportunity to use much of the organic equipment under field conditions. The vehicles and generators down for parts or maintenance for an extended period had no effect on the ability of the company to perform its mission.

31. SUPPLY

The 273d Company supply section was responsible for all TOE and installation supply, ammunition and rations, items authorized by the table of allowance (CTA 50-901), and expendable administrative supplies. Supplies requested directly from the source of supply by the various sections of the company consisted of POL and aircraft repair parts.

a. Company Supply

(1) Requests for all TOE and installation supplies, items authorized by the table of allowance (CTA 50-901), and expendable administrative supplies were submitted on DA Form 2765-1 (request for issue or turn-in) and DA Form 3161. The requisitions were hand-carried by the company supply personnel to their source of supply, the 490th Supply Service Company, Vung Tau.

(2) The 273d Company's Document Register for Supply Actions, DA Form 2064, indicated that 653 requisitions were outstanding at the beginning of the evaluation (28 October 1968). On 29 December 1968, all outstanding requisitions of the 273d Company were cancelled by the 490th Supply Service Company due to the relocation of the 273d Company from Vung Tau to Long Binh. Examinations of the Company Document Register revealed that, out of the 653 outstanding requisitions, only 53 were filled and 600 were cancelled. Requisition experience of the company supply from 28 October to 29 December 1968 is shown in Figure V-7.

Number of requisitions outstanding (start of evaluation).	653
Number of requisitions filled (28 October through 28 December 1968).	53
Number of requisitions due out (28 December 1968).	600
Average delivery days (filled requisitions).	121
Average days of due out requisitions (cancelled 29 December 1968).	191

FIGURE V-7. Company Supply Requisitions Summary

(3) Inspection of the supply document register indicated that the tool set aircraft maintenance airmobile CH-54A "A" level, which includes three maintenance platforms, was placed on requisition 7 February 1968 (DS Control #8040-4201). The three maintenance platforms, components of shop set aircraft maintenance set "B", were placed on requisition 27 March 1968 (DS Control #808-4033). On 29 December 1968, the company supply was notified of the cancellation of these requisitions and instructed to re-requisition the equipment upon relocating to Long Binh. Due to slow and unresponsive supply action, the aircraft maintenance section did not have authorized maintenance platforms which are essential to performing inspection and repair on the CH-54A aircraft (see Section IV, paragraph 27d(2)).

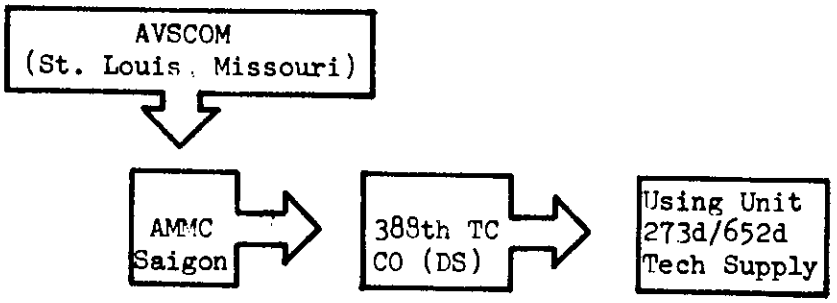
b. Petroleum, Oils, and Lubricants (POL)

POL supply support was well established at Vung Tau and Long Binh. The POL distributing facilities were located within ½ mile of the company flight line and the company used its 5,000-gallon tanker to make replenishment runs as required. POL dispensing facilities were available throughout the III and IV CTZs and the company aircraft used these facilities when operating away from the home base.

c. Aircraft Supply

(1) The PLL of the 273d Company and the authorized stockage level (ASL) of the 652d Transportation Detachment were combined.

Duplications were eliminated and a PLL/ASL of 1,680 line items was maintained. A supply flow diagram and management data relative to the 273d Company are shown in Figure V-8. USARV guides are 65 percent demand satisfaction and 80 percent demand accommodation.



ITEM	NOV	DEC	JAN
Total Requests Received	566	433	457
ASL Requests Received	459	368	395
ASL Issues	396	316	297
Fringe Requests Received	107	65	115
Fringe Issues	Ø	Ø	Ø
Total Due Out Releases	121	26	95
Total Passing Orders	170	122	108
Total Replenishment Request	161	29	75
Total ASL Lines	1680	1680	1680
Total Lines Zero Balance	317	335	183
Demand Satisfaction	81%	84.5%	75.1%
Demand Accommodation	86.2%	84.9%	86.4%

FIGURE V-8. Supply Flow Diagram and Management Data, 273d Company.

(2) Requisitioning experience of the 273d Company is shown in Figure V-9 and is compared to maximum uniform requisition processing and materiel movement time standards established by C29, AR 725-50. The number of requisitions includes requisitions submitted by the 273d Company during the evaluation and all outstanding requisitions that were recorded in Document Register for Supply Actions (DS Form 2064) at the start of the evaluation. The number of days elapsing between submission of a requisition and receipt of the part ranged from an average of 12 days for an EDP (equipment deadlined for parts) requisition to 109 days for code 05.

Requisition Priority	Number of Requisitions Outstanding and Submitted	Number of Requisitions Filled During Evaluation	Average Delivery Days	AR 725-50,C-29 Days
EDP	470	158	12	7
02	666	238	79	7
05	274	96	109	15-30
12	547	128	80	45-55

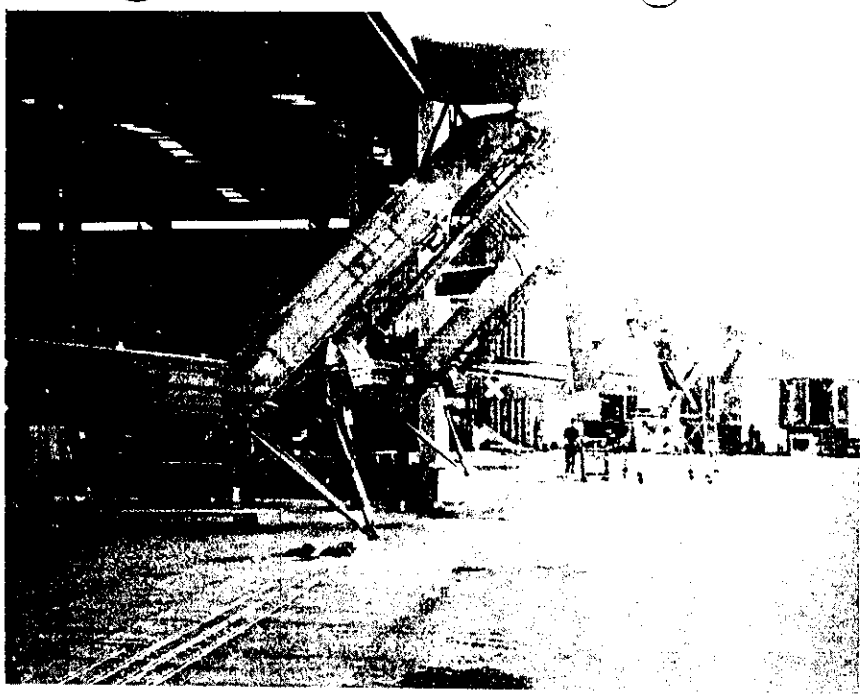
FIGURE V-9. Requisitioning Experience of the 273d Company.

(3) Cannibalization was a common practice. The urgency of the logistical heavy lift requirement with continuing demand for the maximum number of CH-54As, and the slow response of the supply system dictated this practice. There were 103 instances of cannibalization recorded during this evaluation. It was normal procedure to transfer parts from the aircraft due a periodic inspection to the aircraft completing an inspection. The EDP requisition was changed from the serial number of the gaining aircraft to that of the losing aircraft. Although the aircraft undergoing periodic inspection may have required parts, as long as maintenance was being performed, the aircraft status reflected NORM. Only when work stoppage occurred, was the status of the aircraft changed from NORM to NORS.

(4) During the evaluation there were 344 EDP requisitions submitted. Although the company had a daily average of 44 EDP requisitions outstanding throughout the evaluation period, the daily status report of the aircraft reflected a low NORS rate (see Figure V-3). The low average of aircraft NORS was the result of maintenance and supply procedures practiced by the company. Some of the aircraft listed as NORM on the daily aircraft status report had as many as 12 EDP requisitions listed against their serial numbers. Those aircraft experiencing work stoppages and listed as NORS, had between 2 and 32 EDP requisitions outstanding.

32. FACILITIES

The administrative and maintenance facilities available to the 273d Company at Vung Tau and Long Binh were comparable to airfield facilities in CONUS. Troop billets, orderly room, supply room, flight operations, communications, and aircraft maintenance and supply were all located in weatherproof buildings. High temperatures, prevalent throughout the year, and torrential rains during the wet season, made a shelter essential for aircraft maintenance. A corrugated iron hangar, open on the entrance side, fulfilled this requirement. Storage space, parts bins, tool room, office space, and shop space were included in the shelter, with adequate space and protection for extended maintenance operations. Five maintenance shop vans were parked adjacent to the hangar. The maintenance facilities of the 273d Company are shown in Figures V-10 and V-11. Protective revetments were used for parking the CH-54As as shown in Figure V-12.



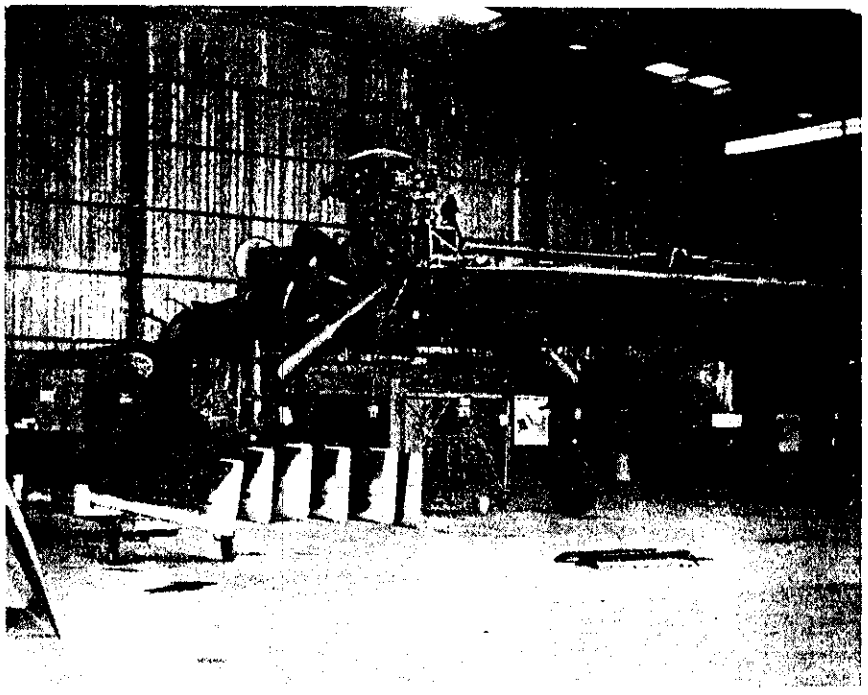
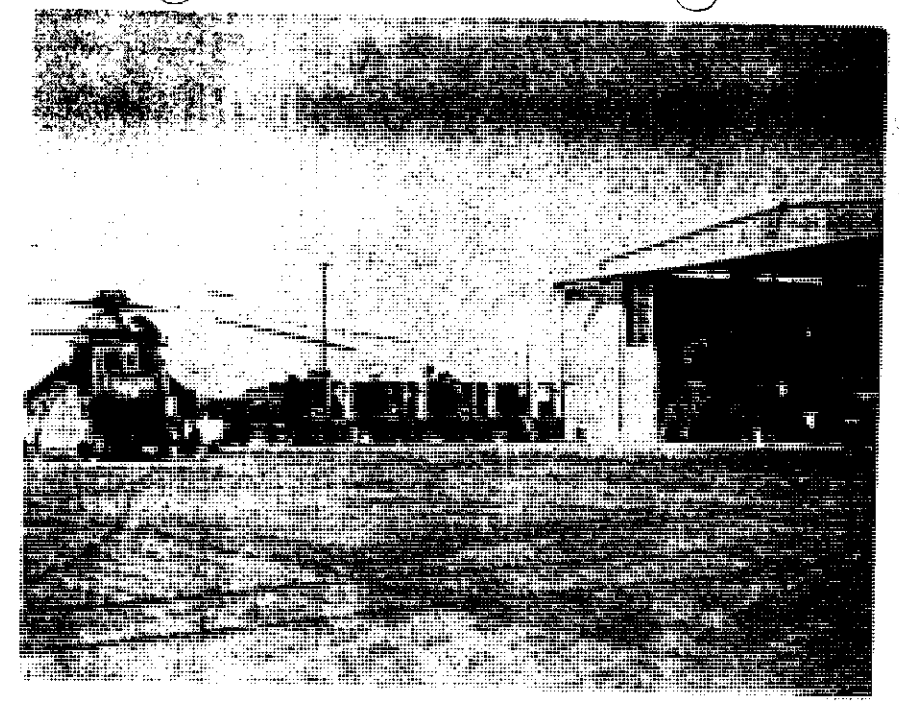


FIGURE V-10. Maintenance Facilities of the 273d Company. Shops vans can be seen in background in upper picture.



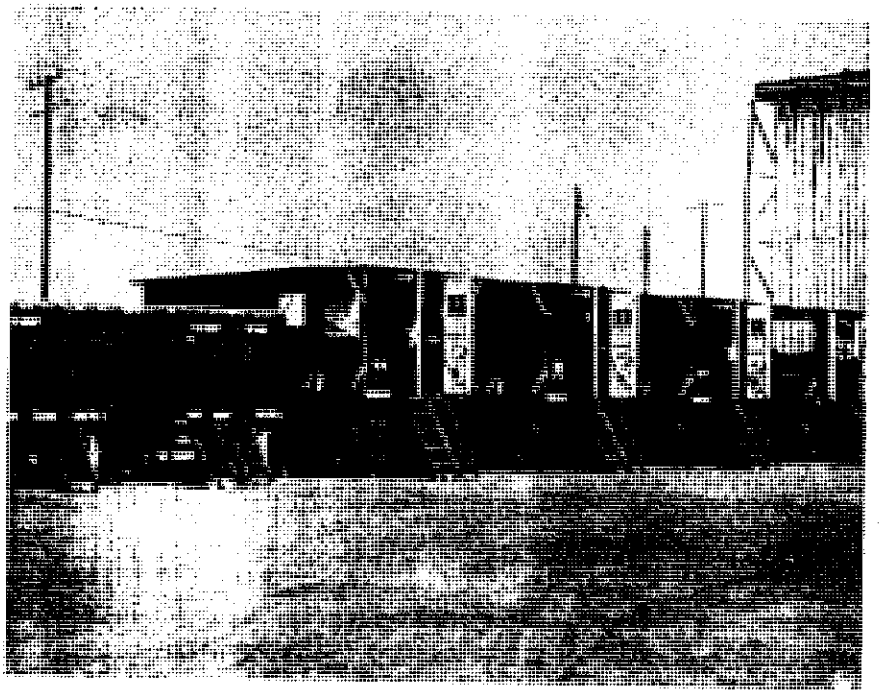


FIGURE V-11. Maintenance Shop Van Layout, 273d Company.

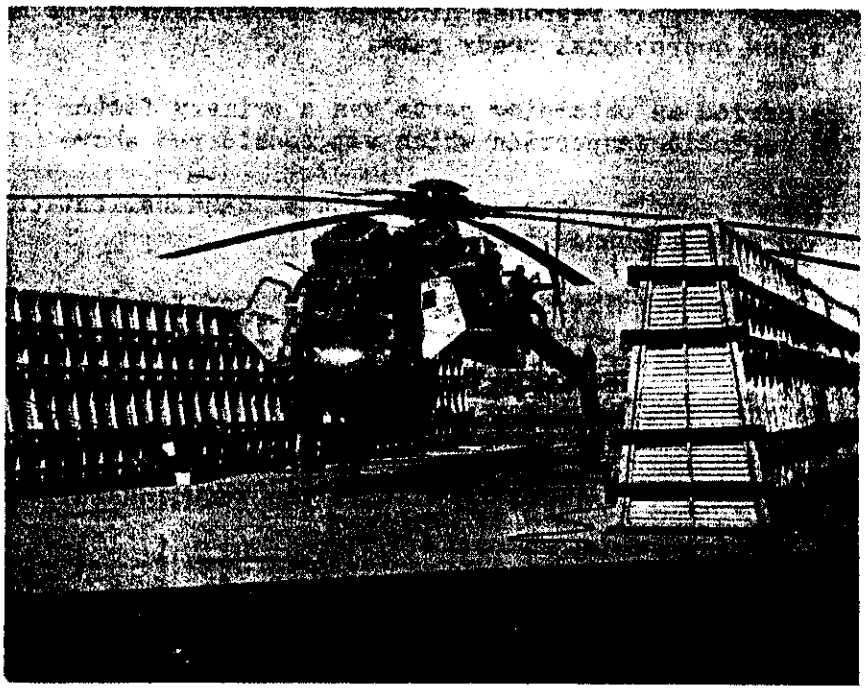


FIGURE V-12. 273d Company Aircraft Parked in Revetment.

33. FINDINGS

a. The 330th Transportation Company (GS) had a very limited capability to provide backup direct support and general support maintenance for the 273d Company.

b. There was no in-country depot level maintenance capability to restore crash damaged CH-54A helicopters except the limited facilities provided by the 1st Transportation Battalion (Aircraft Maintenance Depot) (SEABORN).

c. Battle damage sustained as a result of enemy ground fire was repaired within the company maintenance organization capability.

d. Aircraft maintenance requirements were satisfactorily accomplished using the organization and procedures employed by the 273d Company.

e. The average aircraft availability rate was below the 64 percent established as a requirement by USARV.

f. Slow aircraft supply response hindered accomplishment of maintenance and resulted in a low operational ready rate.

g. The time period in obtaining parts was a primary factor in the time consumed for periodic inspection which was considered above normal.

h. Slow aircraft supply response necessitated cannibalization which resulted in increased maintenance manhours.

i. Cannibalization of aircraft during inspections resulted in a deceptively low average NORS rate of 11 percent.

j. The 273d Company was based at Vung Tau and Long Binh Post Airfields where facilities were comparable to fixed bases in CONUS.

k. The 273d Company was operating without the required maintenance stands which were not issued.

SECTION VI

CONCLUSIONS AND RECOMMENDATIONS

34. CONCLUSIONS

a. The unique capabilities of the CH-54A helicopter were not fully exploited.

b. Elimination of the shortcomings noted in the installation and operation of the AN/ARC-54 (FM) radio will improve the mission reliability of the CH-54A.

c. The cargo hoist cable tension indicators required frequent repair and/or calibration to ensure reliable readings.

d. A requirement exists for an integral internal cargo compartment in heavy lift helicopters that can accommodate personnel and light cargo in addition to the external cargo capability.

e. An improvement in maintenance efficiency (approximately 15 percent) could be obtained by the assignment of replacement maintenance personnel who had prior school training or practical experience on the CH-54A.

f. Within present gross weight limitations, the techniques of employment resulted in adequate heavy airlift support for units within III and IV CTZs.

g. The majority of tasks accomplished by the 273d Company were routine resupply missions not specifically requiring a CH-54A Heavy Lift Helicopter.

h. The feasibility of implementing ship-to-shore and retrograde, over the beach, movement of supplies by heavy lift helicopters in RVN, should be determined.

i. The authorized personnel strength requested in MTOE 1-259G for the Company Headquarters, Flight Operations Platoon, and Maintenance Platoon is adequate except for an insufficient number of assistant flight engineers.

j. The authorized equipment requested in MTOE 1-259G is adequate with the exception of quantities and types of maintenance platforms.

k. The backup direct support and general support maintenance for the CH-54A in RVN is marginal.

l. An in-country depot level maintenance capability to restore crash damaged CH-54A helicopters is not required.

m. An increase in responsiveness by the logistic supply system to CH-54A supply demand would result in an increase in the Company maintenance efficiency.

n. The single fixed base type operation of the 273d Company during the period of evaluation was a factor contributing to the satisfactory accomplishment of the company's assigned mission.

o. When equipped in accordance with MTOE 1-259G, the 273d Company will have the capability for fragmented operations by separate flight platoons as required.

35. RECOMMENDATIONS

It is recommended that:

a. The AN/ARC-54 (FM) radio junction box located at station 210 be relocated to an area where it will be less susceptible to damage.

b. An investigation be initiated to determine the feasibility of relocating the AN/ARC-54 (FM) antenna and/or antenna coupler to an area of the aircraft less susceptible to vibration.

c. CH-54A cable tension indicator calibration requirements be established and included in TM55-1520-217-20 P.

d. Future requirements for heavy lift helicopters include the capability of internal loading without a scheduled aircraft configuration change.

e. Mechanics with previous CH-54A experience be assigned to Heavy Helicopter Companies equipped with the CH-54A.

f. The feasibility of establishing a single depot supply control management system in RVN for CH-54A low density items be investigated by USARV.

g. The unique capabilities of heavy lift helicopters to perform ship-to-shore cargo movement operations be exploited.

h. A USARV study be conducted to determine the feasibility, potential cost savings, cargo rigging requirements, and supply movement control measures necessary to rapidly implement ship-to-shore resupply operations directly to base camp supply areas by heavy lift helicopters.

i. A USARV study be conducted to determine the feasibility of expediting shore-to-ship retrograde movement of cargo (T Day movement).

j. A Department of Army study be conducted to determine the optimum mix of cargo type helicopters (CH-54A, CH-47, or other) in the Army inventory when exploiting ship-to-shore cargo movement operations with heavy lift helicopters.

k. MTOE 1-259G be further modified to include nine additional assistant flight engineers (MOS 67X20, E5).

l. MTOE 1-259G be further modified to delete six maintenance platforms, hydraulic, (Section III, paragraph 07, line item number M02470).

m. MTOE 1-259G, with the above recommended changes, be approved.

ANNEX A

GLOSSARY

1. ABBREVIATIONS

AAE - Army Aviation Flement
AC - Alternating Current
A/C - Aircraft
ACTIV - Army Concept Team in Vietnam
ADAO - Assistant Division Aviation Officer
APP - Auxiliary Power Plant
ASH - Assault Supnort Helicopter
ASL - Authorized Stockage List
BOI - Basis of Issue
CH - Cargo Helicopter
CONUS - Continental United States
CPS - Cycles per Second
CTZ - Corps Tactical Zone
DA - Department of the Army
DC - Direct Current
DS - Direct Support
EDP - Equipment Deadline for Parts
FFV - Field Force, Vietnam
FM - Frequency Modulation
FSB - Fire Support Base
FSE - Forward Support Element
FSN - Federal Stock Number
GCA - Ground Controlled Approach
GS - General Support
JP-4 - Aviation Jet Fuel
KP - Kitchen Police
LZ - Landing Zone
MMHR - Maintenance Manhours
MOS - Military Occupational Speciality
MTOE - Modification Table of Organization and Equipment
nm - nautical mile
NORM - Not Operationally Ready, Maintenance
NORS - Not Operationally Ready, Supply
OJT - On-the-Job Training
OR - Operationally Ready
PLL - Prescribed Load List
POL - Petroleum, oils, and lubricants
PZ - Pickup Zone
RPG - Rocket Propelled Grenade
RTT - Radio Teletypewriter
RVN - Republic of Vietnam
SOP - Standing Operating Procedures

TC - Transportation Corps
TM - Technical Manual
TOE - Table of Organization and Equipment
USACDC - US Army Combat Developments Command
USAF - US Air Force
USARV - US Army, Vietnam
VHF - Very High Frequency
VOCG - Verbal Orders of Commanding General

2. DEFINITIONS

a. Blivet - A collapsible container used to transport liquids.

b. Cannibalization - A maintenance practice involving the transfer of serviceable parts from a nonflyable aircraft to another aircraft that could be classified as flyable upon installation of these parts.

c. Dead-Head Time - Non-productive flight time, normally used to refer to flight time going to and from the working area.

d. Flying hours - Time that is logged on an aircraft while airborne between take-off and landing.

e. Pod - An enclosed airframe structure, which is attachable to a CH-54A helicopter, for carrying personnel or cargo.

f. Radius-of-Action - The maximum distance an aircraft can travel away from its base along a given course with normal combat load and return without refueling, allowing for all safety and operating factors.

g. Ship-to-Shore Trans-shipment - Operation where cargo is airlifted by helicopter from a ship to a land supply depot or another means of transportation.

h. Shortcoming - An imperfection or malfunction occuring during the life cycle of equipment, which should be reported and which must be corrected to increase efficiency and to render the equipment completely serviceable.

i. Sortie - One sortie is one aircraft making one take-off and one landing.

j. Supplies:

(1) Class I - Supplies, such as rations, forage and post exchange supplies, that are consumed at an approximately uniform daily rate under all conditions.

(2) Class II - Clothing, organizational equipment, and vehicles, including spare parts for which allowances for initial issue to individuals and organizations are fixed by tables of allowances and TOEs.

(3) Class III - Fuels and lubricants.

(4) Class IV - Items not otherwise classified and for which initial issue allowances are not prescribed by approved issue tables. Normally, such supplies include fortification and construction materials, special machinery and equipment, and other special supplies, as well as additional quantities of items identical to those authorized for initial issue (Class II), such as additional vehicles.

(5) Class V - Ammunition of all types (including chemical), explosive, antitank and antipersonnel mines, fuzes detonators, and pyrotechnics.

k. Tactics - The employment of units in combat. The ordered arrangement and maneuver of units in relation to each other and/or to the enemy in order to utilize their full potentialities.

l. Task - A sortie in which a useful load is delivered.

m. Technique - Method of performance of any act, especially the detailed methods used by troops or commanders in performing assigned tasks. Technique refers to the basic methods of using equipment and personnel. The phrase "tactics and technique" is often used to refer to the general and detailed methods used by commanders and forces in carrying out their assignments.

n. Ton-nautical mile - One ton transported over one nautical mile (e.g., 3 tons X 30 nm = 90 ton-nm).

ANNEX B

MTOE 1-259G

(TRUE COPY)

MTOE 1-259G
USARPAC
UIC: WD8NAA

MODIFICATION TABLE OF
ORGANIZATION AND EQUIPMENT
NO. 1-259G

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C. 20310

AVIATION HEAVY HELICOPTER COMPANY

Designation: 273d Assault Support Helicopter Company (Heavy)
355th Assault Support Helicopter Company (Heavy)
478th Assault Support Helicopter Company (Heavy)

SECTION I. General:
Organization
Equipment
II. Organization (Personnel):
Distribution
Recapitulation
Remarks
III. Equipment
Distribution
Remarks

SECTION I

GENERAL

ORGANIZATION

1. MISSION: No Change

2. ASSIGNMENT: No Change

3. CAPABILITIES: a. No Change

(1) Necessary communication to sustain flight following only for organic aircraft.

(2) No Change

(TRUE COPY)

(3) Deleted capability of establishing air traffic control.

(4) No Change

(5) No Change

b. No Change

c. No Change

d. No Change

e. No Change

f. No Change

g. This unit can perform Organizational and Direct Support Maintenance on all organic aircraft. Organizational Maintenance all other equipment.

4. BASIS OF ALLOCATION: No Change

5. CATEGORY: No Change

6. MOBILITY: No Change

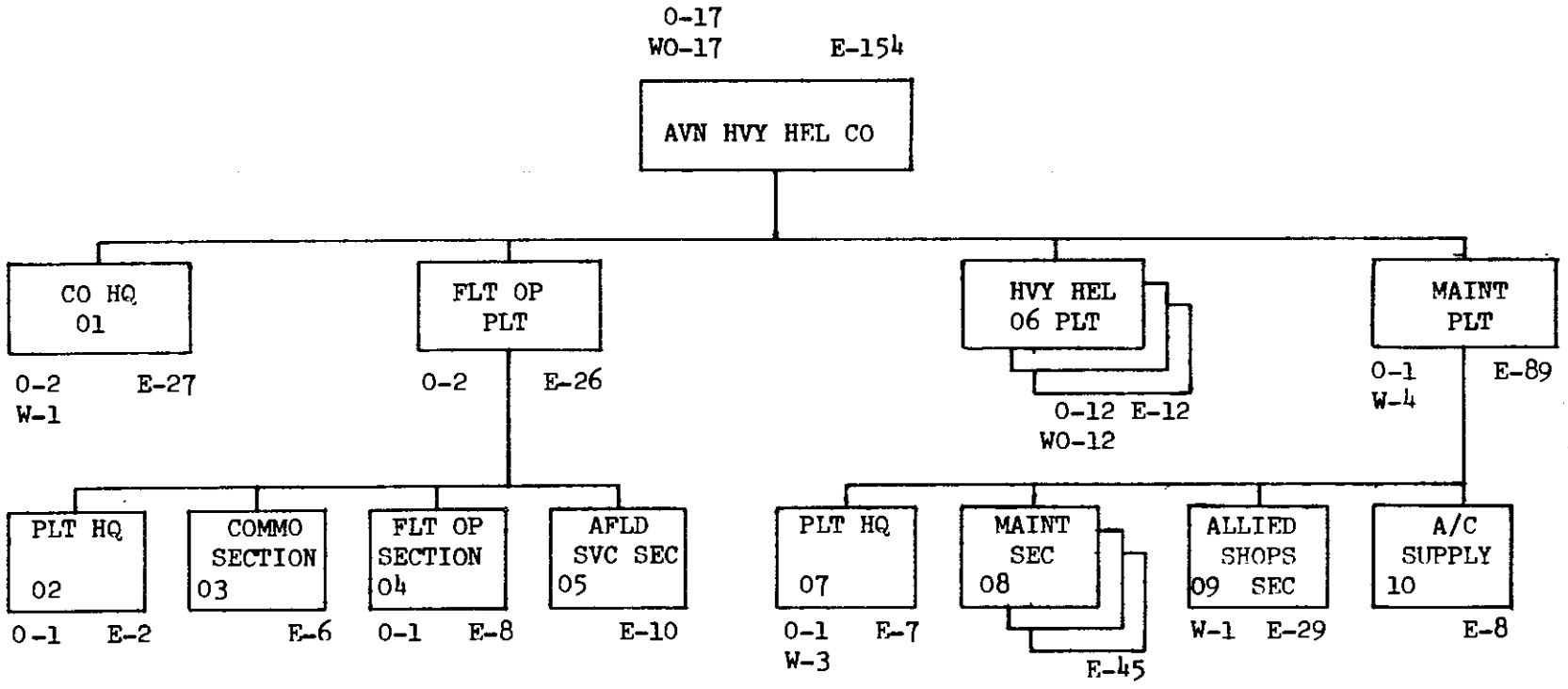
EQUIPMENT

NO CHANGE

This MTOE effective on the date announced by DA and reflected in Command General Order.

(TRUE COPY)

AVIATION HEAVY HELICOPTER COMPANY



B-3

(TRUE COPY)

MODIFICATION TABLE OF ORGANIZATION AND EQUIPMENT

NO. [redacted]

SECTION II - PERSONNEL ALLOWANCES

CMD [redacted]PAC

UIC [redacted]

INDEX

PAR a	LINE b	DESCRIPTION (TRUE COPY) c	GRADE d	MOS e	BR f	STRENGTH LEVELS 1 g	h	i	j	k	l
		SRC 012590600									
		WD@NAA									
		WGOYAB									
01		Company Headquarters									
	03	Mess Steward	E-6	94M40	MC	0					M1
	05	Motor Sgt	E-5	63C40	MC	0					M1
	07	Company Clerk	E-4	71H20		0					M1
	09	Powerman	E-4	52B20		2				42	A1
	10	Unit Supply Spec	E-4	76K20		2				01	A1
	11	Wheel Veh Mech	E-4	63B20		4					A2
	12	Wrecker Operator	E-4	63B20		0					M1
	14	Powerman Helper	E-3	52A10		0					M1
	16	Executive Officer		01983		1					A1
	17	Supply Officer	WO	0761A		1					A1
	18	Mess Steward	E-7	94E40	MC	1					A1
	19	Motor Sergeant	E-6	63C30	MC	1					A1
	20	Sr First Cook	E-6	94E40		1					A1
	21	Company Clerk	E-5	71H20		1					A1
	22	Sr Precise Power Gen Spec	E-5	52B30		1					A1
	23	Sr Wheel Veh Mech	E-5	63C30		1					A1
	24	Clerk Typist	E-4	71H20		1				01	A1
	25	Records Clerk	E-4	71B20		1					A1
	26	Repair Parts Clerk	E-4	76D20		1					A1
						30					

(TRUE COPY)

DA FORM 8955 1 JUL 65

MODIFICATION TABLE OF ORGANIZATION AND EQUIPMENT

SECTION II - PERSONNEL ALLOWANCES

NO. MTOE 1-259G
CMD USARPAC
UIC WDUBRA

INDEX	LINE	DESCRIPTION (TRUE COPY)	GRADE	MOS	BR	STRENGTH LEVELS 1	REMARKS 1	2	3
a	b	c	d	e	f	g	j	k	l
04		Flight Operations Section							
	03	GCA Equip Rpmn	E-5	26D20		0			M1
	04	Sr Air Traffic Con Op	E-5	93B20		0			M2
	05	Sr Flight Opn Sp	E-5	71P20		2			A1
	06	Air Traffic Control Op	E-4	93B20		0			M2
	07	Flight Opn Sp	E-4	71P20		4		42	A2
	08	ATC Op Helper	E-4	93B20		0			M2
	09	Flight Opn Apprentice	E-3	71P20		1			A1
						9			
06		3 Hwy Hel Platoons							
	03	Helicopter Pilot	WO	062D0		12		13	M3
						36			
07		Maint Platoon Hq							
	02	Acft Repair Tech	WO	0671C		3		13	A2
	03	Platoon Sgt	E-7	67Z40		0			M1
	04	Rotary Wing Tech Insp	E-6	67X30		4		43	A2
	05	Acft Parts Sp	E-4	76H20		0			M2
	06	Avienics Equip Rpmn	E-4	35K20		0			M3
	07	Equip Reports Clerk	E-4	71T20		0			M1
	09	Signal Parts Sp	E-4	76U20		0			M1
	10	Supply Clerk	E-3	76A10		0			M1
	11	Acft Maint Chief	E-8	67Z50	MC	1			A1
	12	Repair Foreman	E-7	67Z40	MC	1			A1
						11			

(TRUE COPY)

DA FORM 2955, 1 JUL 65

INDEX R	LINE	DESCRIPTION (TRUE COPY)	GRADE	MOS	LOC	STRENGTH LEVELS	
a	b	c	d	e	f	g	
08		3 Maint Sections					
	02	Sr Hel Rpmn	E-5	67X20		18	A9
	03	Hel Rpmn	E-4	67X20		18	A9
						45	
		SRC 55500E6JE0500					
09		Allied Shops					
	01	Acft Maint Tech	WO	0671C		1	A1
	02	Acft Repair Foreman	E-7	67Z40	MC	1	A1
	03	Avienics Elec Equip Sp	E-5	35M20		2	A2
	04	Machinist	E-5	44E20		1	02 A1
	05	Sr Airframe Rpmn	E-5	68G20		2	A2
	06	Sr Avienics Equip Mech	E-5	35K20		1	02 A1
	07	Sr Electric Rpmn	E-5	68F20		2	A2
	08	Sr Engine Rpmn	E-5	68B20		2	A2
	09	Hydr Rpmn	E-5	68H20		1	02 A1
	10	Sr Pwr Trn Rpmn	E-5	68D20		1	02 A1
	11	Sr Rotor Prop Rpmn	E-5	68E20		1	02 A1
	12	Acft Elec Rpmn	E-4	68F20		2	A2
	13	Afrm Rpmn	E-4	68G20		2	A2
	14	Avionics Equip Mech	E-4	35K20		2	A2
	15	Engine Rpmn	E-4	68B20		2	A2
	16	Equip Reports Clerk	E-4	71T20		1	01 A1
	17	Hydr Sys Rpmn	E-4	68H20		2	A2
	18	Pwr Tng Rpmn	E-4	68D20		1	A1
	19	Rotor Prop Rpmn	E-4	68E20		1	A1
	20	Tool Rm Keeper	E-3	68A10		2	12 A2
						30	
		(TRUE COPY)					

MODIFICATION TABLE OF ORGANIZATION AND EQUIPMENT

SECTION II - PERSONNEL ALLOWANCES

NO. MTOE 1-2590
CMD USARPAC
UIC WDSHAA

INDEX R a	LINE b	DESCRIPTION (TRUE COPY) c	GRADE d	MOS e	BR f	STRENGTH LEVELS 1 g	h	i	REMARKS 1 k	2	3 l
		SRC 55500E6JE0500									
10		Acft Supply									
	01	Repair Parts Supply Sp	E-6	76T40	MC	1					A1
	02	Acft Parts Sp	E-5	76T20		2					A2
	03	Acft Parts Sp	E-4	76T20		3				02	A3
	04	Equip Reports Clerk	E-4	71T20		1				01	A1
	05	Signal Parts Sp	E-4	76G20		1				40	A1
						8					
				Total		188					
		RECAPITULATION									
		OFFICER				17					
		WARRANT OFFICER				17					
		ENLISTED				154					
		AGGREGATE				188					
		REMARKS									
	01	Also Light Truck Driver									
	02	Also Heavy Truck Driver									
	05	Also Armorer									
	11	Armed with Pistol Automatic Cal .45									
	12	Armed with Launcher 40MM, Remark 11 applies									
	13	Armed with revolver Cal .38, 4 in BBL									
	40	Operates Fork Lift 6000lb									
	41	Remark 01 applies to 3 EM									
	42	Remark 01 applies to 1 EM									
	43	Remark 01 applies to 3 EM, Remark 02 applies to 1 EM									

(TRUE COPY)

DA FORM 2955, 1 JUL 65

MODIFICATION TABLE OF ORGANIZATION AND EQUIPMENT

(TRUE COPY)

SECTION III - EQUIPMENT ALLOWANCES

NO. 1-259G
CMD USARPAC
UIC WD8MAA

AR	LINE ITEM NO. ECC	BASIC	CMD	DESCRIPTION	EQUIPMENT LEVELS 1			RMK
a	b			c	d	e	f	g
01				Company Headquarters				
	B15688		2	Bag, Water Sterilization	2			A1
	B29464		8	Barber Kit w/case	2			A1
	B49272		3	*Bayonet Knife w/scabbard for M-16	30			A30
	B49546		3	*Bayonet Knife w/scabbard for M-14	0			M18
	D82099		2	Chain Assy SGL Leg 5/8x16'	3		700	A1
	E00533		1	*Charger, Radiac Det DD-1578/PD	0			M1
	H73666		2	Flashlight Plastic RT Agl 2 Cell	100		800	A40
	H83817		8	Food Containers Insulated	8			A3
	J71304		8	Goggles, Sun, Wind & Dust	6		506	A1
	K31786		2	*Helicopter, Utility UH-1D	1			A1
	L92386			*Machine gun, 7.62MM light	6			A2
	M75714		1	*Mount, Tripod MG	6			A2
	Q20935		1	Radiac Meter IM 93/UD	0			M2
	Q21483		1	Radiac Meter IM 174/PD	0			M1
	R75709		8	Repair Kit Tentage	2			900
	R91244		3	*Revolver Cal .38: 4 in barrel	3			A2
	R94977		3	*Rifle 5.56MM	27			A27
	R95114		3	*Rifle 7.62MM	0			M17
	S58674		8	Screen, Latrine w/pins & pole	2			900
	S70243		3	*Semi Trailer Low Bed Wrecker 12 ton	1			A1
	V31211		1	*Telephone Set TA 312/PT	4			A2
	W30949		8	*Tool Kit Aircraft Mechanics General	1			A1
	W33004		8	*Tool Kit Automotive Mech	11		212	A5

a b (TRUE COPY) c d e f g

DA FORM 2956, 1 JUL 65

*Reportable under AR 220-1.

MODIFICATION TABLE OF ORGANIZATION AND EQUIPMENT

(TRUE COPY)

SECTION III - EQUIPMENT ALLOWANCES

NO. 1-2590
CMD USARPAC
UIC WD8MAA

AR	LINE ITEM NO. ECC	BASIC	CMD	DESCRIPTION	EQUIPMENT LEVELS 1			RMK
a	b			c	d	e	f	g
	W34648	8		Tool Kit carpenters	2			A1
	X60696	2		*Truck Tractor Wrecker 5-ton 6x6 lwb w/wn	1			A1
02				Flight Opn Platoon HQ				
	B49272	3		*Bayonet, Knife w/scabbard for M-16	3			A3
	B49546	3		*Bayonet, Knife w/scabbard for M-14	0			M3
	R94977	3		*Rifle 5.56MM	2			A2
02	R95114	3		*Rifle 7.62MM	2			M2
03				Communications Section				
	B49272	3		*Bayonet, Knife w/scabbard for M-16	6			A6
	B49546	3		*Bayonet, Knife w/scabbard for M-14	0			A6
	Q90063	1		*Radio Teletypewriter Set; AN/GRC-46	0			M1
	Q91301	1		*Radio Teletypewriter Set; AN/VSQ-2	1			A1
	R94977	3		*Rifle 5.56MM	6			A6
	R95114	3		*Rifle 7.62MM	0			M6
04				Flight Operations Section				
	B49272	3		*Bayonet, Knife w/scabbard M-16	9			A9
	B49546	3		*Bayonet, Knife w/scabbard M-14	0			M12
	B50696	1		*Beacon Radio AN/TRN-24	0			M1
	B50868	1		*Beacon Radio Set AN/GRN-6	0			M1
	L61665	2		X Light glide angle airport approach	0			M1
	L65775	2		X Light traffic aircraft	0			M1
	N97015	3		Pistol Pyrotechnic	0			M1
	Q17058	1		*Radar Set AN/TPN8	0			M1
	R94977	3		*Rifle 5.56MM	8			A8
	R95114	3		*Rifle 7.62MM	0			M11
	W495811	1		*Tool Kit Radar Rpmn	0			M1

a b (TRUE COPY) c d e f g

DA FORM 2956, 1 JUL 65

*Reportable under AR 220-1.

MODIFICATION TABLE OF ORGANIZATION AND EQUIPMENT

(TRUE COPY)

SECTION III - EQUIPMENT ALLOWANCES

NO. 1-259G
CMD USARPAC
UIC WD8NAA

AR	LINE ITEM NO. ECC	BASIC	CMD	DESCRIPTION *	EQUIPMENT LEVELS 1			RMK
a	b			c	d	e	f	g
	Y54680	1		Wind Measuring Set AN/PMQ-3D	0			M1
05				Airfield Service Sec				
	B49272	3		*Bayonet, Knife w/scabbard for M-16	10			A10
	B49546	3		*Bayonet, Knife w/scabbard for M-14	0			M10
	R94977	3		*Rifle 5.56MM	10			A10
	R95114	3		*Rifle 7.62MM	0			M10
06				3 Hvy Helicopter Plat				
	B49272	3		*Bayonet knife w/scabbard for M-16	36			A36
	R91244	3		*Revolver Cal for .38: 4in BBL	33			M3
	B49546	3		*Bayonet, knife w/scabbard for M-14	0			M39
	R94977	3		*Rifle 5.56MM	3			A3
	R95114	3		*Rifle 7.62MM	0			M3
07				Maintenance Platoon HQS				
	A26647	2		Airconditioner & trailer mtd A/C driver 26,500 BTN FSN 4120-240-2070	3			A3
	B49272	3		*Bayonet, knife w/scabbard for M-16	11			A11
	B49546	3		*Bayonet, knife w/scabbard for M-14	0			A14
	C53286	8		Cabinet, tool and spare parts	12			A2
	D65002	8		Case Field, office machine	2			A1
	D65276	8		Case Field Office Machine	2			A1
	F97915	8		Desk, Field Plywood	3			A3
	G21061	2		Dispensing pump hand driven	1		900	A1
	H42068	8		Filing Cabinet Cap Size	6			A6
	H42342	8		Filing Cabinet Letter size	6			A5
	H51915	2		Filter separator LOD: fuel	1			A1
	M79221	2		Floodlight Set Elec	2			A1

a b (TRUE COPY) c d e f g

DA FORM 2956, 1 JUL 65

*Reportable under AR 220-1.

MODIFICATION TABLE OF ORGANIZATION AND EQUIPMENT

(TRUE COPY)

SECTION III - EQUIPMENT ALLOWANCES

NO. 1-259G
CMD USARPAC
UIC WD8NAA

AR	LINE ITEM NO. ECC	LINE ITEM NO. BASIC	LINE ITEM NO. CMD	DESCRIPTION	EQUIPMENT LEVELS 1			RMK
a	b			c	d	e	f	g
	Z27949	2		Floodlight Set Portable model NF 2	9			A9
	J47068	2		*Generator Set 5KW	2			A1
	J43918	2		Generator Set Gas Eng 1.5 KW	2		900	A2
	Z75504	2		Generator, Mobile Stand FSN 49209123983	3			A3
	J71304	8		Goggles sun, wind, dust	4		506	A3
	L63994	2		Light Set General Illuminum, 25 outlet	4			900
	M01100	1		Maint Kit, Electronic	0			M1
	M02470	2		Maint Platform Hyd	12			A12
	M80002	1		Multimeter AN/URM105	0			M2
	P96640	2		Pumping assy flammable liquid	3			A3
	Q20935	1		Radiac Meter IM 93/UD	0			M1
07	Q53926	1		*Radio Set AN/VRC-46	2			A1
	R91244	3		*Revolver Cal .38 4in barrel	4			A2
	R94977	3		*Rifle 5.56MM	7			A7
	R95114	3		*Rifle 7.62MM	0			M12
	U93477	8		Table folding legs	8			A8
	V1995Q	2		Tank Unit Liquid Dispensing	3			A3
	V48441	8		*Tent, Frame Type Maint	5			900
	V75012	1		Test Set Electrical TS 914/U	0			M1
	V48989	8		Tent General Purpose Medium	2			900
	V76108	1		Test Set Electron TV 7/U	0			M1
	W30812	2		Tool Kit A/C Insp Technical	4			A2
	W33278	1		Tool Kit Battery Service TK 90/G	0			M1
	W49581	8		*Tool Kit Radar and Radio RPMN	0		236	M3
	W89557	2		*Tractor, wheeled whrse, 40001b DBP FSN 3930-724-8146	3			A3

a b (TRUE COPY) c d e f g

DA FORM 2956, 1 JUL 65

*Reportable under AR 220-1.

MODIFICATION TABLE OF ORGANIZATION AND EQUIPMENT
(TRUE COPY)
SECTION III - EQUIPMENT ALLOWANCES

NO. 1-259G
CMD USARPAC
UIC WD6MAA

AR	LINE ITEM NO. ECC	BASIC	CMD	DESCRIPTION	EQUIPMENT LEVELS 1			RMK
a	b			c	d	e	f	g
	W95400	2		*Trailer, Cargo 1/4 ton	2			A1
	W95537	2		*Truck, cargo 3/4 ton	1			A1
	X39735	2		*Truck, cargo 3/4 ton 4x4 w/e	1			A1
	X40146	2		*Truck, cargo 2 1/2 ton 6x6 LWB	1			A1
	X60833	2		*Truck Utility 1/4 ton w/e	2			A1
	X80074	8		Typewriter non port 13" carr	2			A1
	X80348	8		Typewriter non port 20" carr	2			A1
08				Three Maint Sections				
	B49272	3		*Bayonet knife w/scabbard for M-16	45			A45
	B49546	3		*Bayonet knife w/scabbard for M-14	0			M27
	J71304	8		Goggles, Sun, Wind & Dust	37			A13
	R94977	3		*Rifle 5.56MM	34			
	R95144	3		*Rifle 7.62MM	0			M18
	V48998	8		Tent, General Purpose Medium	3			900
	W30949	2		*Tool Kit A/C Mech Gen	42			A18
	W98270	8		Trailer platform whse	6			A3
09				Allied Shops Section				
	B49272	3		*Bayonet knife w/scabbard for M-16	30			A30
	D65002	8		Case Field Office Machine	1			A1
	E69516	2		Compressor RCP 60 cy, 4 CFM, 3000 PSI	1	Comp HMD Set B		A1
	E70338	2		Comp RCP Pur drive 175 PSI	1	Comp HMD Set B		A1
	H40814	8		File Visible Index 50 pockets, lift hand	4			A4
	J46110	2		Gen Set Gas Eng 3KW 28V DC	1			A1
	J48713	1		Gen Set 5KW 400 CPI-3PHAK	1			A1
	J49055	2		Gen Set 7.5KW DC	1	Comp HMD Set B		A1

a b (TRUE COPY) c d e f g

DA FORM 2956, 1 JUL 65

*Reportable under AR 220-1.

MODIFICATION TABLE OF ORGANIZATION AND EQUIPMENT

(TRUE COPY)

SECTION III - EQUIPMENT ALLOWANCES

NO. 1-259G
CMD USARPAC
UIC WDBMAA

a	LINE ITEM NO. ECC	BASIC	CMD	DESCRIPTION * c	EQUIPMENT LEVELS d	e	f	RMK g
	J71304	8		Goggles Sun, Wind & Dust	6		506	A6
	L44575	3		*Launcher grenade: 40MM	2		800	A2
	M01100	1		Maint Kit Electronics MK 693/A	1			A1
	M80002	1		Multimeter AN/URN 105	2			A2
	M80276	1		Multimeter ME26 B/U Gen Pur	1			A1
	M80413	1		Multimeter ME30 A/U Gen Pur	1			A1
	M81372	1		Multimeter TS-352 B/U	2			A2
	N30256	1		Oscilloscope AN/USM-140A	1			A1
09	N96741	3		*Pistol Cal .45	2			A2
	R91244	3		*Revolver Cal .38 4 in BBL	1			A1
	R94977	3		*Rifle 5.56MM	29			A29
	T18358	2		*Shop Set Grd Handling Set B	1			A1
	T21509	2		*Shop Set A/C Maint B-1	1			A1
	T21646	2		*Shop Set A/C Maint B-2 Inst El Hy	1			A1
	T21783	2		*Shop Set A/C Maint Sheet Metal & Weld	1			A1
	T21920	2		*Shop Set A/C Maint Mach & Eng	1			A1
	T22057	2		*Shop Set A/C Maint prop & rotor	1			A1
	T23564	2		Shop Set A/C Maint paint shop	1			A1
	V48989	8		Tent, General Purpose Medium	1			900
	V75012	1		Test Set Electrical TS 914/U	1			A1
09								
	V76108	1		Test Set Electron Tube TV-7/U	1			A1
	W30675			*Tool Set Airframe Rpmn	4			A4
	W33278	1		Tool Kit Battery Set WTk-90/G	1			A1
	W36703	2		Tool Kit Elect Rpmn AA	4			A4
	W38073			Tool Kit Eng & Pwr Tn Rpmn	6			A6

(TRUE COPY)

DA FORM 2956, 1 JUL 65

*Reportable under AR 220-1.

MODIFICATION TABLE OF ORGANIZATION AND EQUIPMENT

(TRUE COPY)

SECTION III - EQUIPMENT ALLOWANCES

NO. 1-259G
CMD USARPAC
UIC WD8NAA

PAR	LINE ITEM NO. ECC	BASIC	CMD	DESCRIPTION	EQUIPMENT LEVELS 1	2	3	RMK
a	b			c	d	e	f	g
	W43279		2	Tool Kit Hyd Rpmn	3			A3
	W49444		2	Tool Kit Prop & Rotor Rpmn	2			A2
	W43581		8	*Tool Kit, Radar & Radio Rpmn	5		236	A5
	W95811		2	*Trailer, Cargo 1 1/2 ton 2 wheel	1		927	A1
	X4009		2	*Truck Cargo 2 1/2 ton 6x6	1		927	A1
	X59326		2	*Truck Tractor 5 ton	5		925	A5
	X80074		8	Typewriter non portable 13 in Carr	1			A1
10				Aircraft Supply				
	B49272		3	*Bayonet Knife w/scabbard for M-16	8			A8
	D65276		8	Case Field Office Machine 34"	1			A1
	H41020		8	File Visible Index, Cabinet 7,8,9 slds	10			A10
	J71304		8	Goggles, Sun, Wind	3			A3
	R94977		3	*Rifle 5.56MM	8			A8
	S74832		2	*Semi Trailer Repair Parts Shop Van 6 Ton	2			A2
	U32924		8	Steel strappling and sealing hand 3/8 to 2" strap	1			A1
	U93477		8	Table Folding Legs Wood	4			A4
	V48989		8	Tent, General Purpose Medium	1			900
	W95811		2	Trailer Cargo 1 1/2 ton	1			A1
	X40609		2	*Truck Cargo 2 1/2 ton	1			A1
	X59326		2	*Truck Tractor 5 ton	2		925	A2
	X80348		8	Typewriter non portable 20" carr SRC 55-500E80				
				REMARKS				
		212		1 per wrecker Op, w/veh mech, w/veh H Powerman, Powerman H.				
		506		1 per truck				

a	b	(TRUE COPY) c	d	e	f	g

DA FORM 2956, 1 JUL 65

*Reportable under AR 220-1.

MODIFICATION TABLE OF ORGANIZATION AND EQUIPMENT

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SECTION III - EQUIPMENT ALLOWANCES

NO. 1-259G
CMD USARPAC
UIC WD8NAA

PAR	LINE ITEM NO. ECC	LINE ITEM NO. BASIC	LINE ITEM NO. CMD	DESCRIPTION	EQUIPMENT LEVELS 1			RMK
a		b		* c	d	e	f	g
		900		WAEHTOC authorization established only by MTOE UPD AR 310-31				
		800		MBI as directed by CO				
a		b		(TRUE COPY) c	d	e	f	g

DA FORM 2956, 1 JUL 65

*Reportable under AR 220-1.

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JUSTIFICATION

MTOE 1-259G
USARPAC
UIC WD8NAA

DESIGNATION: 273d Assault Support Helicopter Company (Hvy)

1. SRC Changes: Delete SRC 55-500E 80. Added units incorporated in SRC 01259G600. Increase result of merging of SRC 55-500E 80 with SRC 01259G600

2. Detailed Changes.

a. Personnel

GR	MOS	BR	CHANGES REQR	AUTH	ELEMENT	SRC	PARA	LN	REMARKS
03	01983		A1	A1	Company Headquarters	SRC 0125G600	01	16	The size and complexity of equipment within this unit warrants an authorized position for an executive officer. The grade of CPT will enable better and more widespread command and control when employed in a separate platoon concept. Also will provide increased laison and coordination with supported units. This position does not constitute any increase in officer positions due to the deletion of the Maintenance Detachment Commander.

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GR	MOS	BR	CHANGES REQR	CHANGES AUTH	ELEMENT	SRC	PARA	LN	REMARKS
WO	0761A		A1	A1	Company Headquarters		01	17	A non-rated supply officer will serve as the unit property book supply officer. This officer will release aviation personnel from performing this highly technical time consuming, admin function. This unit has TOE property valued in excess of 24 million dollars. This will not constitute an increase in WO strength due to deletion of three (3) WO in para 06 LN03
WO	0671C		A2	A2	Maint Platoon HQS		07	02	Addition of two maintenance qualified warrants provides each maintenance section with a qualified maintenance expert. The concept of separate platoon operations will require fragmentation of the maint sections to insure proper supervision of these fragmented sections these additional technician are required.
WO	0671C		A1	A1	Allied Shops		09	01	Positioned transferred TOE 55-500E
WO	0062D		M3	M3	3 Hvy Hel Platoons		06	03	Deleted to provide warrant spaces for added 2 Maint WO and 1 Supply Officer.
E7	94B40		A1	A1	Company HQS		01	18	Upgraded to E7 per DA authority
E6	94B40		M1	M1	Company HQS		01	03	DA authority
E6	94B40		A1	A1	Company HQS		01	20	Transfered TOE 55-500E.
E5	93B20		M2	M2	Flight Opn Sec	01259G600	04	04	Deletion of GCA and navigational equipment from TOE necessitates deletion of personal allied with this equipment.

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GR	MOS	BR	CHANGES REQR	AUTH	ELEMENT	SRC	PARA	LN	REMARKS
E4	93B20		M2	M2	Flight Opn Sec		04	06	DO
E4	93B20		M2	M2	Flight Opn Sec		04	08	DO
E3	76A10		M1	M1	Maint Plt HQS		07	10	Re-identified and assigned in para 10 Acft Supply
E4	76D20		A1	A1	Company Headquarters		01	27	Position added per USARV Reg 11-14, Change 1, App III dtd 13 Apr 67 to maintain equipment records for ord items of equip and act as motor pool dispatcher
E4	76G20		M1	M1	Maint Plat HQS		07	09	Deletion of position and reassignment in par 10, acft supply
E4	76G20		A1	A1	Acft Supply		10	05	Reassignment of position.
E4	76H20		M2	M2	Maint Plat Hq		07	05	Re-identified and reassigned to par 10 Aircraft Supply
E4	76K20		A1	A1	Company HQS		01	10	Transferred TOE 55-500 E
E6	76T40		A1	A1	Aircraft Supply		10	01	Chief of the acft supply section.
E5	76T20		A2	A2	Aircraft Supply		10	02	Transferred TOE 55-500E. Upgrade of one E4 to E5. Authority AR 611-201
E4	76T20		A3	A3	Aircraft Supply		10	03	Reassignment of position. One space transferred TOE 55-500E.
E4	71L20		A1	A1	Company HQS		01	26	Position added per USARV Reg 11-14, Change 1, APP III, dtd 13Apr67 for the purpose of maintaining a separate PLL for the unit

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GR	MOS	BR	CHANGES REQR	CHANGES AUTH	ELEMENT	SRC	PARA	LH	REMARKS
E5	71H20		A1	A1	Company HQS		01	21	Upgraded to E5 per DA authority
E4	71H20		M1	M1	Company HQS		01	07	DA authority
E4	71H20		A1	A1	Company HQS		01	25	Transferred TOE 55-500E.
E4	71P20		A1	A1	Flight Opn Sec		04	05	Increase of one to provide Opn Section with 24 hour capability
E4	71P20		A2	A2	Flight Opn Sec		04	07	Increase of one to provide Opn section with 24 hour capability
E3	71P20		A1	A1	Flight Opns Sec		04	09	Increase of one to provide Opn section with 24 hour capability
E4	71T20		M1	M1	Maint Plat Hq		07	07	Delete and reassign to paragraph 09
E4	71T20		A1	A1	Acft Supply		10	04	Transferred TOE 55-500E
E4	71T20		A1	A1	Allied Shops		09	16	Reassignment of position
E3	68A10		A2	A2	Allied Shops		09	20	Transferred TOE 55-500E
E5	68E20		A2	A2	Allied Shops		09	08	Transferred TOE 55-500E
E4	68E20		A2	A2	Allied Shops		09	15	Transferred TOE 55-500E
E5	68D20		A1	A1	Allied Shops		09	10	Transferred TOE 55-500E
E4	68D20		A1	A1	Allied Shops		09	18	Transferred TOE 55-500E
E5	68E20		A1	A1	Allied Shops		09	11	Transferred TOE 55-500E
E4	68E20		A1	A1	Allied Shops		09	19	Transferred TOE 55-500E

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GR	MOS	BR	CHANGES REQR	CHANGES AUTH	ELEMENT	SRC	PARA	LN	REMARKS
E5	68F20		A2	A2	Allied Shops		09	07	Transferred TOE 55-500E
E4	68F20		A2	A2	Allied Shops		09	12	Transferred TOE 55-500E
E5	68G20		A2	A2	Allied Shops		09	05	Transferred TOE 55-500E
E4	68G20		A2	A2	Allied Shops		09	13	Transferred TOE 55-500E
E5	68H20		A1	A1	Allied Shops		09	09	Transferred TOE 55-500E
E4	68H20		A2	A2	Allied Shops		09	17	Transferred TOE 55-500E
E6	67X30		A2	A2	Maint Plat HQ		07	04	Transferred TOE 55-500E
E5	67X20		A9	A9	Maint Sec		08	02	Transferred TOE 55-500E, Reidentified 67T20 as 67X20, Required for 24 hr opn or a plat concept type operation.
E4	67X20		A9	A9	Maint Sec		08	03	Transferred TOE 55-500E, Reidentified 67T20 as 67X20, Rqd for 24 hr operation or opn under platoon concpet.
E8	67Z50		A1	A1	Maint Plat HQ		07	12	Transferred TOE 55-500E Overall supervisor for the 93 highly skilled maint technicians. This individual will coordinate all maint and provide a stron backup to the company first sgt for overall company supervision. Must supervise all administration of maintenance reports to higher headquarters. Coordinate parts requisitions. Grade provides a man with years of experience required and sound judgement necessary to perform the job.
E7	67Z40		M1	M1	Maint Plat HQ		07	03	Deletion and re-identify as Repair Foreman

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GR	MOS	HR	CHANGES REQR	CHANGES AUTH	ELEMENT	SRC	PARA	LN	REMARKS
E7	67Z40		A1	A1	Maint Plat HQ		07	13	Re-identification of position
E7	67Z40		A1	A1	Allied Shops		09	02	Repair Foreman Transferred TOE 55-500E
E4	63B20		A1	A1	Company HQ		01	12	Transferred TOE 55-500E
E4	63B20		A2	A2	Company HQ		01	11	Transferred TOE 55-500E
E6	63C40		A1	A1	Company HQ		01	19	Up graded present position to E6
E5	63C40		M1	M1	Company HQ		01	05	Deletion. Up graded to E6
E5	63C30		A1	A1	Company HQ		01	23	Transferred TOE 55-500E
E3	32A10		M1	M1	Company HQ		01	14	Deletion of position. Reassigned to par 01 ln 09.
E5	52B30		A1	A1	Company HQ		01	22	Transferred TOE 55-500E Upgraded to E5
E4	52B20		A1	A1	Company HQ		01	09	Transferred TOE 55-500E
E5	44E20		A1	A1	Allied Shop		09	04	Transferred TOE 55-500E
E4	35K20		M3	M3	Maint Plat HQ		07	06	Deleted and reassigned par 09
E4	35K20		A1	A1	Allied Shop		09	06	Deleted and reassigned par 09
E4	35K20		A2	A2	Allied Shop		09	14	Deleted and reassigned par 09
E5	35M20		A2	A2	Allied Shop		09	03	Transferred TOE 55-500E

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GR	MOS	BR	CHANGES REQR	AUTH	ELEMENT	SRC	PARA	LN	REMARKS
E5	26D20		M1	M1	Flight Opns		04	03	Position deleted. Deletion of GCA and navigational equipment from TOE necessitates deletion of personnel allied with this equipment.

b. Equipment

SHORT DESCRIPTION	REQR	AUTH	ELEMENT	SRC	PARA	LN	REMARKS
Bag Water Sterilization	A1	A1	Company Hqs	012590600	01		Transfer TOE 55-500E
Barber Kit, w/case	A1	A1	Company Hqs		01		Transfer TOE 55-500E
Bayonet Knife w/scabbard (M-14)	M129	M129	Company Hqs		01Qty18		Unit was issued
			Flight Operations Plat		02Qty 3		M-16 bayonets
			Communications Sec		03Qty 6		prior to deployment
			Flight Operations Sec		04Qty12		from CONUS
			Airfield Svc Sec		05Qty10		
			3 Hvy Hel Plat		06Qty39		
			Maint Plat Hq		07Qty14		
			3 Maint Sec		08Qty27		
Bayonet Knife w/scabbard (M-16)	A188	A188	Company Headquarters		01Qty30		
			Flight Operations Plat		02Qty 3		Fifty-nine (59)
			Communications Sec		03Qty 6		transferred from
			Flight Operations Plat		04Qty 9		Maint Det M16
			Airfield Svc Sec		05Qty10		bayonet replaces
			3 Hvy Hel Plat		06Qty36		M14 bayonet
			Maint Plat Hq's		07Qty11		
			3 Maint Plat Sections		08Qty45		
			Allied Shops		09Qty30		
			Acft Supply		10Qty 8		
Chain Assy. Sgl leg	X1	A1	Company Headquarters		01		one (1) Transfer TOE 55-500E

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SHORT DESCRIPTION	REQU	AUTH	ELEMENT	SRC	PARA LN	REMARKS
Charger Radiac 1579/PD	M1	M1	Company Headquarters		01	Not issued 4th Army MSG #404790 All radiac equipment deleted requirement does not exist for this equipment. Requires excessive maintenance due to environment.
Flashlight Right Angle 2 cell	A40	A40	Company Headquarters		01	Forty (40) Transfer TOE 55-500E
Food Container Insolated	A3	A3	Company Headquarters		01	Three (3) Transfer TOE 55-500E
Goggles, Sun and Wind	A26	A26	Company Headquarters Maint Plat Hqs 3 Maint Sec Allied Shops Acft Supply		01Qty1 07Qty3 08Qty13 09Qty6 10Qty3	Twenty-six (26) Transfer TOE 55-500E
Helicopter Utility UH-1D	A1	A1	Company Headquarters		01	CH-54 companies in RVN support operations throughout one and sometimes two Corps area. As organized the company has no assigned aircraft with which to economically perform liason, investigate distant maintenance problems nor transport repair parts when required. Utilization of the CH-54 for most of these missions is not feasible due to the aircraft and in all cases is economically unsound. As an example the CH-54 burns 3,000 lbs of fuel per hour compared to a rate of 500lbs per hour for the UH-1D at present, the unit is relying on borrowing a suitable

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SHORT DESCRIPTION	REQR	AUTH	ELEMENT	SRC	PARA LN	REMARKS
						aircraft to perform these missions. The resultant lack of responsiveness and control has adversely effected the mission effectiveness of the unit. On numerous occasions, vital liason and field maintenance missions have been unnecessarily delayed due to the fact the unit has no organi UH-1D. The addition of a UH-1D would require no increase in authorized helicopter pilots or maintenance personnel with the required skills that are in the unit.
Machine Gun 7.62 Lt.	A2	A2	Company Headquarters		01	Transfer TOE 55-500E
Mount, tripod	A2	A2	Company Headquarters		01	Transfer TOE 55-500E
Radiac Meter IM 93/UD	M3	M3	Company Headquarters Maint Plat Hq's		01Qty2 07Qty1	Not issued 4th Army MSG #404790
Radiac Meter IM 174/PD	M1	M1	Company Headquarters		01	Not issued 4th Army MSG #404790
Revolver Cal 38	M3	M3	3 Hvy Hel Plat		06	Transferred to another section
Revolver Cal 38	A5	A5	Company Headquarters Maint Plat HQS Allied Shops		01Qty2Two (2) 07Qty2Transfer TOE 09Qty1 55-500E	
Pistol Cal 45	A2	A2	Allied Shops		09	Transfer TOE 55-500E

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SHORT DESCRIPTION	REQR	AUTH	ELEMENT	SRC	PARA LN	REMARKS
Rifle 7.62 M	M79	M79	Company Headquarters		01Qty17	M16 issued as substitute
			Flight Operations Plat		02Qty2	Item prior to leaving CONUS
			Communications Sec		03Qty6	
			Flight Operations Sec		04Qty11	
			Airfield Operations Sec		05Qty10	
			3 Hvy Hel Plat		06Qty3	
			Maint Plat HQS		07Qty12	
			3 Maint Sections		08Qty18	
Rifle 5.56 (M-16)	A134	A134	Company Headquarters		01Qty27	
			Flight Operations Plat		02Qty2	Fifty-five (55)
			Communications Sec		03Qty6	Transfer TOE 55-500E
			Flight Operations Sec		04Qty8	M16 replaces M14 in RVN
			Airfield Service Sec		05Qty10	
			3 Hvy Hel Plat		06Qty3	
			Maint Plat HQS		07Qty7	
			3 Maint Sections		08Qty34	
			Allied Shops		09Qty29	
			Acft Supply		10Qty8	
Semi trailer low bed wrecker 12 ton	A1	A1	Company Headquarters		01	Transfer TOE 55-500E
Telephone Set 312	A2	A2	Company Headquarters		01	Transfer TOE 55-500E
Tool Kit Aircraft Mech General	A1	A1	Company Headquarters		01	Maintenance of UH-1D
Tool Kit Auto Mech	A5	A5	Company Headquarters		01	Two (2) Transfer 55-500E Three added for wrecker operator and two (2) additional powerman, BCI is one (1) per individual. This is in accordance with AR 310-34.

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SHORT DESCRIPTION	REQR	AUTH	ELEMENT	SRC	PARA LN	REMARKS
Tool Kit Carpenter	A1	A1	Company Headquarters		01	Transfer TOE 55-500E
Truck, Tractor 5 Ton 6x6 XLWB w/wn	A1	A1	Company Headquarters		01	Transfer TOE 55-500E
Beacon Radio AN/TRN24	M1	M1	Flt Opns Sec		04	Items not required dut to deletion of ATC personnel and GCA Rpm. Unit of this nature based at an established airfield.
Beacon Set Radio AN/GRN-6	M1	M1	Flt Opns Sec		04	DO
Light Glide Angle Airport Approach	M1	M1	Flt Opns Sec		04	DO
Light Traffic Aircraft	M1	M1	Flt Opns Sec		04	DO
Pistol Pyrotechnic	M1	M1	Flt Opns Sec		04	DO
Radar Set AN/TPN8	M1	M1	Flt Opns Sec		04	DO
Tool Kit Radar Radio Rpm	M1	M1	Flt Opns Sec		04	DO
Tool Kit Radar Radio Rpm	A2	A2	Allied Shops		09	Transfer TOE 55-500E
Wind Measuring Set	M1	M1	Flt Opns Sec		04	Not required due to deletion of ATC personnel
Radio Teletypewriter Set AN/GRC-46	M1	M1	Communications Section		03	DA Authority

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SHORT DESCRIPTION	REQR	AUTH	ELEMENT	SRC	PARA LN	REMARKS
Radio Teletypswriter Set AN/VSQ-2	A1	A1	Communications Section		03	DA Authority
Cabinet, Tool and Spare Parts	A2	A2	Maintenance Plat HQS		07	Two (2) Transfer TOE 55-500E
Case Field Office Machine 22 1/2x13 1/4x17	A2	A2	Maintenance Plat HQS Allied Shops Section		07Qtyl 09Qtyl	One (1) ea case field office machine transferred from Maint Det, Case field office machine 22 1/2"L. One ea added to store one ea typewriter nonportable 20" carriage.
Case Field Office Machine 22 1/2x13 1/4x33	A2	A2	Maintenance Plat HQS Acft Parts Supply		01Qtyl 10Qtyl	One (1) ea case field machine transferred fro Maint Det Case field office machine 34"L. One (1) ea added to store on ea typewriter nonportable 20" carriage.
Desk Field Plywood w/Stool	A3	A3	Maint Plat HQS		07	One (1) transfer TOE 55-500E, Two (2) additio al required, one (1) for quality control section for use in maintaining maintenance forms, records, MWO's, EIR's, and numerous maint reports, one (1) for maint clerk for preparation of numerous aircraft status reports, recurring reports and related administrative functions. At present hand made desks are being used and are insufficien as two (2) and sometimes three (3) supervisor are using the same desk
Dispensing Pump Hand Driven 12gp 100 Rev	A1	A1	Maint Plat HQS		07	Transfer TOE 55-500E

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SHORT DESCRIPTION	REQR	AUTH	ELEMENT	SRC	PARA LN	REMARKS
Filing Cabinet Cap size	A6	A6	Maint Plat HQS		07	Two (2) transfer TOE 55-500E. Four additional required. Two (2) for quality control for storage of AIR's, aircraft forms, inspection files and related records that must be maintained. Two (2) for maint office for storage of all correspondence, reoccuring reports, numerous maint directives and related material presently using wooden packing crates for storage and filing
Filing Cabinet Letter size	A5	A5	Maint Plat HQS		07	Five (5) additional required for tech supply for storage of ASL and PLL, status cards, fringe reports and tech supply directives, reports and related correspondence.
Filter Separator 3 leg 50GPM	A1	A1	Maint Plat HQS		07	Transfer TOE 55-500E
Flood Set Electric	A1	A1	Maint Plat HQS		07	Transfer TOE 55-500E
Generator Set 5KW	A1	A1	Maint Plat HQS		07	Transfer TOE 55-500E
Generator Set 1.5KW	A2	A2	Maint Plat HQS		07	One (1) transfer TOE 55-500E, one (1) add to power light set gen illum 25 outlet. Generator and light set will be used to illuminate the maintenance tents. Approx 50% of A/C maintenance is performed at night and presently lighting is inadequate. presently commercial power is used in some areas, however this will not be available if the unit would move a platoon is detached to an elsewhere area. The right crew consists of approx 30 personnel.

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SHORT DESCRIPTION	REQR	AUTH	ELEMENT	SRC	PARA LN	REMARKS
Launcher Grenade 40mm	A2	A2	Allied Shops		09	Transfer TOE 55-500E
Maint Platform Hydr	A12	A12	Maint Plat HQS		07	Twelve (12) added for the performance of maintenance on CH-54A aircraft. All maint performed on the CH-54A fuselage except that done on the transmission or engine deck requires the use of maint platforms. At present, maint personnel are standing on the hoods of 3/4 & 2 1/2 ton trucks, in order to perform the proper maint, two (2) to four (4) stands will remain in the hanger, the remaining will be on the flight line. Maint is performed twenty-four (24) hours per day on the nine (9) assigned aircraft by approx 30 personnel on the night crew and approx 60 personnel on the day crew.
Pump assembly flammable liquid	A3	A3	Maint Plat HQS		07	One (1) transfer TOE 55-500E, two (2) added BOI one (1) per platoon Used to refuel A/C and will accompany the flight platoon if detached from the parent unit to an elsewhere area.
Radio Set AN/VRC46	A1	A1	Maint Plat HQS		07	One (1) added. There are numerous times when maintenance personnel are required to communicate with an A/C regarding maint problems in the field . This radio is necessary to insure prompt and responsive advice to aircraft maint problems.

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SHORT DESCRIPTION	REQR	AUTH	ELEMENT	SRC	PARA LN	REMARKS
Table, Folding Legs	A12	A12	Maint Plat HQS		07 Qty 8	Eight (8) table, folding added, to be used as suitable work areas for maintenance personnel to include technicians, supervisors, clerical personnel, helicopter repairmen and crew members. Presently using home made benches, boxes and station property.
			Acft Supply		10Qby4	Four (4) transfer TOE 55-500E
Tank Unit Liquid Dispensing	A1	A1	Maint Plat HQS		07	One (1) transfer TOE 55-500E
Tool Kit A/C Insp Tech	A2	A2	Maint Plat HQS		07	Transfer TOE 55-500E
Tractor, wheeled whrse	A3	A3	Maint Plat HQS		07	Three (3) added. At this time there is no suitable TOE vehicle to tow the CH-54. The 22,000 lb weight of the A/C exceeds the capability of the 3/4 ton truck and the larger trucks are not compatable for towing. A/C are towed on a daily basis to and from the maintenance hanger and the revetments. Unit presen has two (2) of these tractors on hand on an experimental basis.
Trailer, Cargo 1/4 ton	A1	A1	Maint Plat HQS		07	Transfer TOE 55-500E
Trailer, Cargo 3/4 ton	A1	A1	Maint Plat HQS		07	Transfer TOE 55-500E
Truck Cargo 3/4 ton	A1	A1	Maint Plat HQS		07	Transfer TOE 55-500E

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					of reports, files & correspondence peculiar to tech supply operations, which include maint of some 1000 line items of ASL.
Typewriter 20" Carr	A2	A2	Maint Plat HQS Aircraft Supply	07Qtyl 10	Transfer TOE 55-500E one (1) added. Rqr for use in the preparation of reports whose formats are too large to fit in a 13" carr. Also reqr as a back up in the preparation of files and correspondence peculiar to tech supply operations.
Airconditioner Trl Mtd	A3	A3	Maint Plat HQS	07	Three (3) airconditioners added. Reqr to cool off the attic and tailboom sections of the CH-54. Due to the climate in the theater the attic section reaches temperatures well above 120°F. It is vertually impossible for an individual to work in this area for more than 4 or 5 minutes without emerging to cool off. The equipment in the attic section requires a daily check and approx four (4) personnel work daily from one (1) to two (2) hours in this section. This unit presently has one smsh item on hand on an experimental basis.

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Compresser RCP Pwr Driven 175 PSI	A1	A1	Allied Shops	09	One (1) entered as component of shop set "B" transferred from Maint Det. DA CIR 725-11
File Visible Index 50 Pockets Left Panel	A4	A4	Allied Shops	09	Transfer TOE 55-500E
Generator Set Gas Eng 3KW 28V DC	A1	A1	Allied Shops	09	Generator Set gas engine 2KW 28V DC. One added. Required for the operation of the AFCS line & bench test sets.
Generator Set 5KW 400CRP 1-3PH AK	A1	A1	Allied Shops	09	Generator set gas driven 5KW 1-3PH AC. One (1) added. Required for the operation of the AFCS line bench test sets.
Generator Set Gas 7.5KW DC	A1	A1	Allied Shops	09	Generator set gas driven 7.5KW DC. One (1) entered as component of shop set "B" transferred from the Maint Det. DA Cir 725-11.

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Oscilloscope AN/USM-140A	A1	A1	Allied Shops	09	Oscilloscope AN/USM-140A. One (1) ea added. Required in conjunction with operation of the AFCS line & bench test set.
Shop Set Gnd Handling Set B	A1	A1	Allied Shops	09	Transfer TOE 55-500E
Shop Set A/C Maint B-1	A1	A1	Allied Shops	09	Transfer TOE 55-500E
Shop Set A/C Maint B-2 Elect Hyd	A1	A1	Allied Shops	09	Transfer TOE 55-500E
Shop Set A/C Maint Sheet Metl & Weld	A1	A1	Allied Shops	09	Tranafer TOE 55-500E
Shop Set A/C Maint Mech & Eng	A1	A1	Allied Shops	09	Transfer TOE 55-500E
Shop Set A/C Maint Prop & Rotor	A1	A1	Allied Shops	09	Transfer TOE 55-500E

(TRUE COPY)

					added. Reqr as an external power source to perform adequate maint & operational checks of A/C elec systems for trouble shooting to be performed without having the start the engines auxillary power plant consequently allowing for maint to be performed simultaneously. BOI one (1) per flight platoon.
Stand Maint Type B-2	A4	A4	Maint Plat HQS	07	Four (4) ea added. There are presently no hydraulic test stands authorized either the company or maint det of sufficient height to permit inspec of the tail rotor gear box mounting or the stabilizer area. To properly perform required maint and inspections of this area the B2 type maint stand is a definite necessity. BOI one (1) ea maint section one (1) each maint platoon headquarters.

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SHORT DESCRIPTION	REQR	AUTH	ELEMENT	SRC	PARA LN	REMARKS
Shop Set A/C Maint Paint Shop	A1	A1	Allied Shops		09	Transfer TOE 55-500E
Tool Set Arfm Rpmn	A4	A4	Allied Shops			Transfer TOE 55-500E
Tool Kit Electric Rpmn AA	A4	A4	Allied Shops		09	Tool Kit Electrical repairman. Two (2) ea transferred from the maint det. Two (2) ea added due to the addition of the two (2) electrical repairman over previous authroization. These additional kits will be required for the two (2) additional electrical repairman to perform the adequate degree of maint on electrical systems.
Tool Kit Eng & Pwr Tn Rpmn	A6	A6	Allied Shops		09	Tool Kit Engine & Pwr Trn Rpmn. Five (5) ea transferred from Maint Det. One (1) ea added for (1) additional power train repairman added to the MTOE. Tool Kit required in order for the additional Pwr. Rpmn to perform required Maintenance.
Tool Kit Hyd Rpmn	A3	A3	Allied Shops		09	Tool Kit Hyd. Rpmn. Two (2) ea transferred from Maint Det. One (1) ea added for one (1) additional Sr Hydraulic Rpmn added to the MTOE. Tool Kit required in order for the additional Rpmn to perform required Maintenance.
Tool Kit Prop & Rotor	A2	A2	Allied Shops		09	Transfer TOE 55-500E
Trailer Cargo 1 1/2ton	A2	A2	Allied Shops Aircraft Supply		09Qty1 10Qty1	Transfer TOE 55-500E
Truck Tractor 5 ton	A7	A7	Allied Shops Aircraft Supply		09Qty3 10Qty2	Transfer TOE 55-500E

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SHORT DESCRIPTION	REQR	AUTH	ELEMENT	SRC	PARA LN	REMARKS
File Visible Index Cabinet 7,8,9 slides	A10	A10	Aircraft Supply		10	Transfer TOE 55-500E
Semi Trl Repair Parts Shop Van 6 Ton	A2	A2	Aircraft Supply		10	Transfer TOE 55-500E
Steel Strapping and Sealing Hand 3/8 to 2" Strap	A1	A1	Aircraft Supply		10	Transfer TOE 55-500E
DISCRETIONARY ITEMS						
Light Set Gen Illuniation 25 outlet	A4	A4	Maint Plat HQS		07	Light Set General illumination, 25 outlet, one (1) ea added, transferred from Maint Det. One (1) ea added to provide adequate lighting for personnel working in the Maint admin areas during the hours of darkness.
Repair Kit Tentage	A2	A2	Company Headquarters		01	One (1) ea added, transferred from Maint Det
Screen, Latrine w/pins & Poles	A2	A2	Company Headquarters		01	One (1) ea added, transferred from Maint Det
Tent, Frame Type Maint	A2	A2	3 Maintenance Sections		07	Transfer TOE 55-500E.
Tent, General Pur Med	A7	A7	Maint Platoon HQS		07Qty2	Two (2) added to house the Maint Plat HQS Personnel and to provide a suitable working area for the personnel due to the increase of personnel transferred from the Maint Det

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SHORT DESCRIPTION	REQR AUTH	ELEMENT	SRC	PARA LN	REMARKS
		3 Maint Sections		08Qty3	Three (3) added to provide suitable work area for the personnel in the three Maint sections
		Allied Shops		09Qty1	One (1) ea added, transferred Maint Det.
		Aircraft Supply		10Qty1	One (1) ea added, transferred Maint Det.

GRADE	MOS	BR	TOTAL	CHANGE (+/-)	TOTAL
E-4	71P20		0	A1	1
E-4	71T20		1	A1	2
E-5	68A10		0	A2	2
E-5	68B20		0	A2	2
E-4	68B20		0	A2	2
E-5	68D20		0	A1	1
E-4	68D20		0	A1	1
E-5	68E20		0	A1	1
E-4	68E20		0	A1	1
E-5	68F20		0	A2	2
E-4	68F20		0	A2	2
E-5	68G20		0	A2	2
E-4	68G20		0	A2	2
E-5	68H20		0	A1	1
E-4	68H20		0	A2	2
E-6	67X30		0	A2	2
E-5	67X20		9	A9	18
E-4	67X20		9	A9	18
E-8	67Z50		0	A1	1
E-7	67Z40		1	A1	2
E-4	63B20		3	A1	4
E-5	63C40		1	M1	0
E-6	63C40		0	A1	1
E-5	63C30		0	A1	1

*Augmentation

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