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DEFENSE INTELLIGENCE AGENCY

Eastern Area Office

LOGISTIC REQUIREMENTS STUDY

OF THE

VIET CONG AND NORTH VIETNAMESE ARMY IN SOUTH VIETNAM

SUMMARY

The extent and adequacy of the data base pertaining to VC/NVA logistic requirements in South Vietnam has improved greatly since the preparation of earlier studies and has provided valid documentation in almost all areas of the problem.

Although there are no indications that lack of supplies or materiel have seriously or widely curtailed enemy operations, the VC/NVA forces in South Vietnam are increasingly dependent on externally provided supplies. This dependency is attributed to the introduction of major NVA units with a resultant increase in the technical sophistication of enemy forces and a significant change in the ability of the Communists to meet their ration (food) requirements from in-country sources. The throughput capacity of the enemy LOC's appears adequate to meet external supply requirements.

Based on the data available and the methodology developed for this study, it is estimated that communist forces in South Vietnam require 165-185 Short Tons per Day (STPD) to meet their total logistical requirements and that the external requirement is 50-70 STPD.

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PROBLEM

To develop methodology applicable to the determination of enemy logistic requirements and to arrive at an estimate of the current logistic requirements of the VC/NVA forces in South Vietnam.

ASSUMPTIONS

1. That VC/NVA combat and combat support units and personnel are the only enemy elements requiring significant logistical support from outside South Vietnam.

2. That due to the nature of the combat in South Vietnam and the organization and tactics of enemy forces, POL (Class III) and Chemical and Engineer (Class II and IV) requirements are negligible logistically and need not be computed in this study.

3. That the Viet Cong are capable of manufacturing large quantities of mines and grenades and some mortars and rocket launchers but are not producing more sophisticated weapons or ammunition.

FACTS BEARING ON THE PROBLEM

1. NVA units infiltrated into South Vietnam do not retain their standard Tables of Organization and Equipment (TO/E) and VC units are not consistently organized under any standardized TO/E.

2. The amount and types of supplies available to the VC/NVA in caches in South Vietnam, Laos and Cambodia cannot be established with any degree of certainty.

3. Weapons in the hands of the Viet Cong are increasingly of Chinese and Soviet origin with a decline in the proportion of U.S., French and "other country" manufactured ordnance.

4. The force level of the combatants and the level of combat increased significantly in 1966 (the period generally under review) over 1965.*

CONCLUSIONS

1. The present logistic study is based primarily on data from interrogation reports, captured enemy documents and studies prepared by other agencies. It is considered signficantly more valid than earlier efforts. There are still portions of the study, however, wherein the data base has proven inadequate to provide necessary depth and detail of information. This is notable in the factors involving enemy medical and signal requirements, the level of combat activity of enemy units and the amount of ammunition expended in combat engagements. Certain major conclusions pertaining to VC/NVA logistics have become apparent as the study progressed. These are:

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* Based on numerous indicators of varying credibility, some of which require considerable caveating. The following factors, however, are either demonstrable or well-substantiated:

	1965	1966	% Increase
US/RVN/FWF Infantry-type Bns in SV	178	257	44%
VC/NVA Infantry-type Bns in SV	98	149	50%
VC/NVA Casualties (KIA only)	35,436	55,524	56%
US/RVN/FWF Casualties (KIA and WIA)	49,823	70,400	41%
Weapons lost by VC/NVA forces	11,695	18,606	59%

SOURCE: DIA Southeast Asia Fact Book, Jan 67

a. Although there are no indications that supply problems have widely or seriously curtailed enemy operational plans, the VC/NVA forces are increasingly dependent upon external resupply introduced over multiple and frequently interdicted or threatened LOC's.

b. A significant portion of the VC/NVA external supply requirements are in Class I (rations) resulting from enemy inability to move sufficient rice from the Delta area to forces deployed in the South Vietnamese highlands.

c. The increased dependency on external supply is attributable to the major injection of NVA units into the area with a resultant increase in the technical sophistication of enemy forces, and the increase in Free World Force strength and ground and air action.

d. The throughput capacity of enemy LOC's is apparently adequate to meet external supply requirements with land routes providing the most significant contribution.

e. Enemy logistical problems vary from unit to unit and area to area depending upon access to in-country rice supplies and proximity to terminal points of the LOC's.

2. Following are the logistic estimates determined by this study and expressed in Short Tons per Day (STPD):

a. Determination by Class of Supply and level of combat.

	1:15 Combat Level		1:30 Combat Level		1:45 Combat Level	
	Total	External	Total	External	Total	External
Class I (Rations)	121.92 T	29.45 T	121.92 T	29.45 T	121.92 T	29.45 T
Class II & IV (Signal, Medical and Weapons	31.41 T	11.06 T	31.41 T	11.06 T	31.41 T	11.06 T
Class V (Ammunition)	31.04 T	31.04 T	15.52 T	15.52 T	10.34 T	10.34 T
TOTAL	184.37 T	71.55 T	168.85 T	56.05 T	163.67 T	50.85 T

b. Determination of the level of combat or the extent to which the enemy forces are engaged in any given period of time (discussed in detail in Annex C) is one of the most difficult and one of the most critical factors in a logistic study. It is dependent upon a decision, based inevitably on imprecise data, as to the number of contacts with the enemy, the size of the enemy unit involved and the time span of the engagement. NIE 14.3-66 was prepared based on an assumption of one-day-in-thirty (1:30), i.e., each enemy unit involved in combat, for an average of one day in each thirty. Using the factors and methodology employed in the present study, a figure of 1:15 was developed. Recognizing the lack of exact data involved, however, computations are shown above for 1:15 and also for 1:30 and 1:45. This estimative range would place the VC/NVA external logistic requirement at 50-70 STPD.

DISCUSSION

1. General. Communist forces in South Vietnam have passed from the early stages of classic guerrilla warfare to the employment of main force combat units in coordinated attacks and ambushes throughout the country. Their logistical problems, however, are still largely those of a semi-isolated military force with tenuous and frequently threatened or disrupted lines of communications. The means and techniques employed to alleviate this situation prior to mid-1965 are now less dependable. Free World Force ground and air action in base areas and in areas containing vital overland communication routes have reduced the enemy's sanctuary or war zone security in which to plan operations and also to reorganize and resupply his units. LOC's in North Vietnam and Laos have been interdicted and rolling stock lost, the internal supply system has been disrupted, more weapons are now captured from the VC/NVA than are lost to them, caches have been seized, the extent of control of the civilian population has decreased and the movement of supplies both into and within South Vietnam has become increasingly difficult. Despite the impact of these developments on logistics, there is no acceptable evidence that supply shortages have seriously or widely curtailed enemy plans or operations. It must be assumed, however, that logistics is a matter of growing concern to the VC/NVA and that increasing effort and manpower are being devoted to the resupply of communist forces in South Vietnam.

2. Concept and limitations. This study addresses itself to the logistical requirements of VC/NVA forces in South Vietnam. Since there are no indications that inadequate logistics are seriously restricting enemy operations, it is assumed that communist forces, through a combination of in-country procurement, existing caches and resupply from external sources, are meeting their present logistical needs. It is the enemy's external requirements rather than the means and routes through which they are obtained that is of primary concern in this study, although note will be made of the latter.

The development of the factors, methodology and computations for the VC/NVA logistical requirements has been restricted by a lack of precise data. Determination of exact logistical computations is dependent upon standardized basic loads, a standardized logistical resupply system and known expenditure rates. NVA forces entering South Vietnam apparently undergo a mission modification of their TO/E, Viet Cong units do not conform to a standardizated TO/E, the enemy's logistical resupply system is effective but improvised and the nature of the combat precludes an exact determination of expenditures. Although appropriate note will be made of the depth and adequacy of data base on various points, the facts noted above are cited as an over-all caveat for the development and acceptance of this study.

Nevertheless, it is believed that considerable progress has been made over previous logistical studies. The data base has increased in volume and detail and there is more tangible evidence on which to base estimates of food consumption, enemy basic loads of ammunition and to arrive at acceptable TO/E's. Interrogation reports and translations of captured enemy documents as well as data and studies produced by various commands and agencies have been examined in the compilation of material for this study. The methodology employed has been kept relatively simple, since only with the development and acceptance of more precise data can the methodology become more sophisticated and the computations more exact.

3. Internal resupply. Two factors have contributed to the increased dependency of the communist forces in South Vietnam on external sources of supply. The first is the entry of NVA regular-force units into the conflict and, coincident with this, the increased technical sophistication of enemy forces. Although classic guerrilla warfare is still practiced by irregulars and guerrilla tactics are frequently employed by major force units, the Communists are no longer capable of maintaining their stocks primarily by guerrilla-style in-country seizure and coercion. NVA units brought with them their own family of weapons, and VC main force elements are increasingly armed with Chinese and Soviet manufactured equipment. Since U.S. manufactured 7.62-mm ammunition is not compatible with communist weapons, this as well as other types of Class V (ammunition) must be introduced from external sources to supply both enemy forces.

Despite the requirement for external materiel by their Main Force units, the VC continue to maintain an in-country capability for limited types of military items. Of particular importance to Local Force and irregular elements are the regional workshops which are able to produce mortars, rocket launchers, mines and grenades. Medical supplies are also obtainable to a large extent in-country. The tonnage of medical items required is not great and the Viet Cong are capable of satisfying most of their needs through purchase, theft or capture. Some signal equipment or components for the manufacture of crude but effective signal equipment are also obtainable in the same manner.

The second factor which has notably increased the tonnage of supplies required from external sources is the increased difficulty faced by the enemy in internal movement of rice from the Delta area to troops in the rice-deficit north. Although within South Vietnam as a whole there are probably sufficient rice and supplementary rations for the VC/NVA, Free World Forces have disrupted the internal supply route capabilities through interdiction and movement control enforcement from south to north. Within the Delta area the enemy is self-sustaining through taxation and seizure of rice. The inland waterways in the area provide a network of interprovincial supply routes over which the Communists are capable of moving foodstuffs relatively unhampered. Because of the lack of waterways control there is no way of estimating the quantity or frequency of supply

movement on the waterways. This movement may be either surreptious or under cover of normal civilian marketing channels.

Local food shortages reported in the two northern corps areas have been alleviated by importation of rice from Cambodia. South Vietnam's neighbor to the west is ideal to meet communist requirements to augment their need for rice. The 700 mile border is lightly inhabited and poorly controlled. The southern half is marshland laced with waterways and north of Tay Ninh the border area is heavily forested. The nature of the border makes surveillance and control extremely difficult for Free World Forces in South Vietnam. With the arrival of NVA units in South Vietnam and a threatened ration shortage in the highlands, the Communists turned to Cambodia. Both smuggling and private traffic are normal between Cambodia and South Vietnam. The sharply increased demand for rice for communist forces in South Vietnam was met initially by official and private purchases. Sihanouk authorized an official sale of 20,000 and possibly 30,000 tons of rice for delivery to the communist forces in 1966. Although the extent to which the sale was implemented is not known for certain, it is estimated that the total amount actually shipped to the Communists in the highlands of South Vietnam and the Laotian Panhandle in 1966 could have reached 20,000 tons and possibly more. This would have provided the enemy with approximately 55 tons per day for the period. Cambodian rice is thus believed to have provided a solution to one of the Communists most serious logistical problems. In addition, it has largely freed

the supply routes from North Vietnam through Laos for the movement of other classes of supply. The actual transit of rice from Cambodia into the South Vietnamese highlands is accomplished by the use of the numerous roads, trails and waterways in the area. During the past two years the Cambodian government has been improving its road network in the remote northeastern area. Although this is part of a long range plan to provide access to the border and support isolated military outposts, it also facilitates the flow of Cambodian rice to the Communists in Laos and the South Vietnamese highlands.

4. Supply routes. In order of importance, highways, inland waterways and coastal LOC's are the most important and most extensively used transportation routes to infiltrate men and supplies from North Vietnam into the combat area. The rail line south of Vinh provides no through capacity. All major LOC's have suffered from air strikes and armed reconnaissance and the enemy has resorted to various means to counteract the effects of the strikes. These include increasing the capacities of bypass facilities on land LOC's; regulating craft concentrations and camouflaging craft, locks and transshipment facilities on inland waterway arteries; utilizing flange wheel trucks on the rail line south of Vinh; and dispersing transshipment points and vessels, and constructing crude earthen piers and other temporary devices at transshipment points for coastal LOC operations.

a. Highways. Five major routes in North Vietnam and Laos are directly associated with the movement of men and supplies into South Vietnam and it is estimated that approximately 90% of the logistic support (throughput capacity) travels via overland routes. Highway throughput capacities in the area range from 50 to 500 STPD, depending on the season, the immediate capacity of bottlenecks, the number of vehicles or other means available for a particular operational movement, the amount of recuperative effort applied, and the intensity and level of interdiction. The number of vehicles required to use these routes to full capacity would total 20,000 in NVN and 4,800 in Laos. These figures include an estimate of the number of vehicles required to carry the tonnage forward plus an equal number of empties returning on a continuous basis. Of the estimated 3,800 vehicles available in the NVN panhandle, approximately 2,000 are engaged in supply support. Based on this estimate, only 10% of the over-all available uninterdicted capacity is now being used. The Laotian vehicle estimate is 300-400, as compared to the 4,800 required for full use of the routes. Both air strikes and armed reconnaissance have been frequent and effective in slowing down or hampering vehicular traffic and forcing the enemy to resort to slower and more primitive transport means. The Communists, however, have resorted to new and varied techniques in improving bypass facilities to counteract the effects of the air strikes.

b. Inland waterways. Waterways serve as supplementary, alternate or feeder routes for the land-based LOC's since none of the streams in the area provide through movement from North Vietnam and Laos into South Vietnam. The most heavily used waterway is the intracoastal route. The north-south oriented routes permit direct utilization in support of southward movements. In addition, the east-west routes reaching the coast facilitate internal movement between interior road arteries. Waterway capacities, when uninterdicted, range from about 50 STPD on the Se Bang Hieng in Laos to 2,000 STPD on the Song Ca in North Vietnam. It is estimated that under present conditions waterway capacities could be maintained. A large inventory of shallow-draft native craft permits effective and simultaneous utilization of almost all of the waterway net at estimated capacities. NVN efforts to counteract the effects of the air strikes have been directed toward regulating waterway traffic to avoid craft concentrations, night utilization of inland waterways and the use of camouflage.

c. Coastal waterways. Due to Sea Dragon and Rolling Thunder activities north of the DMZ and Market Time operations south of the DMZ, coastal infiltration is less secure than overland lines of communication. Steel-hulled ships moving from the Haiphong area have avoided surveillance by travelling well to seaward and delivering countraband to points south of the I Corps. The enemy's use of the steel-hulled trawlers with their cargo capacity of 100-140 tons is a possible indicator of enemy concern

over logistic resupply. While it is true that the cargo-carrying capacity of the trawlers is considerable, they are relatively easily detected on coastal approach and susceptible to interdiction and loss. Their use by Hanoi might indicate the pressure of increased requirements for out-country supply and the decision by the North Vietnamese to meet this requirement by means which have an inherently high degree of danger of loss.

Coastal transshipment sites between Vinh and the DMX are points of origin for near-shore coastal infiltration routes which transit DMZ waters into SVN. The nature of these routes is such that a practicable upper limit of route capacity cannot be assigned. It is estimated, however, that the number of vessels available in this area imposes, on an average day, a 500 STPD limit on the route system. However, by diverting more vessels to the system, this limit could be rapidly increased. For example, during the TET stand-down 600-700 craft made over 800 transits and delivered an estimated 21,000 ST of cargo to the Quang Khe and Dong Hoi transshipment points.

d. Rail lines. Since January 1967 the rail line south of Vinh has been of little importance in terms of throughput capacity and has played a small role in the support of the NVN infiltration into South Vietnam.

5. Logistical significance of enemy force dispositions. The geographical distribution of enemy forces in relation to local internal supply capabilities and external supply LOC's undoubtedly

results in logistical situations which vary between units. This is inherent in an over-all logistical supply system which is dependent on different sources of supply and numerous LOC's to move these supplies. Although it is not within the scope of this study to make a regional analysis of the impact of this situation on the enemy forces, certain generalizations may be noted. Approximately 60% of the communist strength is located in I and II Corps zones and is at least partially dependent upon external sources for their food ration. The same units, however, are more readily serviced by supply routes emanating from North Vietnam which provide other classes of supply, notably the critical Class V (ammunition). Units in the south have relatively little difficulty in maintaining their stock levels of Class I (rations) but are farthest removed from the sources of other externally provided items. Location adjacent to the DMZ, the Laotian or the Cambodian border will also obviously affect the resupply situation for individual units. The data presented in this study has been compiled to arrive at over-all logistical requirements for enemy forces in South Vietnam and local estimates would require the introduction of data specific to the area.

ANNEX A

CLASS I

(Rations)

FACTORS

1. Consumption rate. The daily consumption rate for VC/NVA forces in South Vietnam is estimated at 2 pounds/day/man. Interrogation reports and captured documents indicate that there are variables involved including reported differences between combat and administrative units. The figure of 2 pounds/man/day, however, is considered reasonably sound and suitable for general application throughout the area and for all types of units.

2. Strength of enemy forces in South Vietnam. Strength figures for enemy forces are taken from periodic MACV reports. The figures used in this study are shown as follows:

Enemy Strength

Month	VC	NVA	Total
Apr	79,948	28,660	107,608
May	78,848	35,410	114,258
Jun	79,458	39,680	119,138
Jul	83,747	42,460	126,207
Aug	83,117	47,400	130,517
Sep	83,667	47,500	131,167
Oct	81,358	45,630	126,988
Nov	80,580	47,070	127,650

Enemy Strength

(I and II Corps)

Month	VC	NVA	Total
Apr	13,975	28,660	42,635
May	22,695	32,910	55,605
Jun	22,755	33,410	56,165
Jul	24,190	37,960	62,150
Aug	23,900	42,900	66,800
Sep	22,160	43,000	65,160
Oct	21,020	40,120	61,140
Nov	20,420	41,320	61,740

3. Internal vs external sources of ration supply. The determination of the proportion of rations (primarily rice) required from external sources is influenced more by factors peripheral to the study than on specific reports from prisoners and documents. As noted in para 3, DISCUSSION, it is believed that there is probably sufficient rice in South Vietnam to meet the enemy's basic Class I requirements. The inability of the VC/NVA to move sufficient quantities of rice from the growing areas of the south to the deficit areas of the north has resulted in shortages in the latter area. This deficit is met by the introduction of rice from external sources. Although some rice is probably brought into the area from North Vietnam through the DMZ and Laos, the primary source is believed to be Cambodia. The 20,000 tons estimated for 1966 for

delivery from that country to the South Vietnamese highlands and the Laotian Panhandle is considered adequate to compensate for internal shortages. For the purpose of this study it is estimated that enemy forces in the two northern corps' zones receive one-half (1 pound/man/day) of their rations from external sources. This figure is based to some extent on individual reports from the area but more directly by an application of the Cambodian figures to the enemy strength.

METHODOLOGY

Following is the methodology employed in computing Class I requirements:

Enemy strength	x	Ration requirements (2 lbs/man/day)	=	Total requirement
Enemy strength (I and II Corps)	x	Ration requirements (1 lb/man/day)	=	External requirement

COMPUTATIONS

Total Requirements

Month	VC	NVA	Total
Apr	78.96 T	28.66 T	107.62 T
May	79.85 T	32.90 T	112.75 T
Jun	79.56 T	33.40 T	112.96 T
Jul	83.20 T	42.50 T	125.70 T
Aug	83.12 T	47.40 T	130.52 T
Sep	83.67 T	47.50 T	131.17 T
Oct	81.36 T	45.63 T	126.99 T
Nov	80.58 T	47.07 T	127.65 T
AVERAGE:	81.28 T	40.63 T	121.92 T

External Requirements

Month	VC	NVA	Total
Apr	6.98 T	14.33 T	21.31 T
May	11.34 T	16.45 T	27.79 T
Jun	11.38 T	16.70 T	28.08 T
Jul	12.10 T	18.90 T	31.00 T
Aug	11.95 T	21.45 T	33.40 T
Sep	11.08 T	21.50 T	32.58 T
Oct	10.51 T	20.06 T	30.57 T
Nov	10.21 T	20.66 T	30.87 T
AVERAGE:	10.69 T	18.76 T	29.45 T

ANNEX B

CLASS II & IV

Medical, Signal, Ordnance (Weapons)

FACTORS

The DIA Logistical Study of May 1965 based its computations for VC/NVA Class II and IV medical and signal requirements on an application of World War II logistical figures. Weapon replacements were developed by applying a factor of 5% per year requirement for the total weapon inventory. It was further assumed that NVA forces were dependent upon external sources for Class II and IV and that VC elements obtained most of their signal and medical logistical supplies in-country by seizure, purchase or manufacture. Despite detailed research of the DIA data base, it has not been found possible to develop necessary usable data on basic loads; expenditures resulting from capture, loss and normal usage; and the amount of weapons, medical and signal materiel introduced from external sources. With the knowledge, therefore that the presently employed estimative approach requires further development, the earlier (1965) factors have been applied in this study. The figures used are .5119 lbs/man/day for NVA forces and the same for the VC total requirements. The external requirement for the VC is .0119 lbs/man/day (weapons only). Strength figures employed are those noted in Annex A.

METHODOLOGY

(See explanation in FACTORS above)

COMPUTATIONS

	Total Requirements			External Requirements		
Month	VC	NVA	Total	VC	NVA	Total
Apr	20.21 T	7.33 T	27.54 T	.47 T	7.33 T	7.80 T
May	20.44 T	8.87 T	29.31 T	.48 T	8.87 T	9.35 T
Jun	20.34 T	9.95 T	30.29 T	.40 T	9.95 T	10.35 T
Jul	21.40 T	10.70 T	32.10 T	.40 T	10.70 T	11.10 T
Aug	21.27 T	12.13 T	33.40 T	.49 T	12.13 T	12.62 T
Sep	21.40 T	12.15 T	33.55 T	.49 T	12.15 T	12.64 T
Oct	20.82 T	11.67 T	32.49 T	.48 T	11.67 T	12.15 T
Nov	20.62 T	12.04 T	32.66 T	.47 T	12.04 T	12.51 T
AVERAGE:	20.81 T	10.60 T	31.41 T	.46 T	10.60 T	11.06 T

ANNEX C

CLASS V

Ammunition

FACTORS

1. Strength of enemy forces. See Annex A.

2. TO/E for VC and NVA units in South Vietnam. The TO/E's employed in this study are based on data obtained from interrogation reports and captured enemy documents. Since NVA units entering South Vietnam are modified for infiltration and Viet Cong units do not conform to a standard TO/E, analysis of numerous source documents has been required to arrive at a usable TO/E for the two enemy forces. Enclosures 1 and 2 show the organization, strength and weapons of the VC and the NVA as determined by this evaluation and employed in this study.

3. "Type" VC/NVA Battalion Weapons and Ammunition List. Since in many combat actions in South Vietnam the enemy is reported as "unknown," it is not considered practical to select specifically the VC or the NVA TO/E as a basis for computations for each individual action. A Weapons Allowance and Basic Ammunition List has been prepared which is a synthesis of the weapons and ammunition carried by VC and NVA battalions. This list (enclosure 3) is applied for each combat engagement regardless of whether the enemy force is reported as "unknown" or identified as VC or NVA.

4. Basic load. The Basic Load of a "type" VC/NVA battalion is shown in enclosure 3 as part of the Weapons Allowance and Basic Ammunition List. It is based on interrogation reports and captured enemy documents available in the Washington area. A considerable variation was found among the various sources and the figure used represents an average of the reported basic loads in the more credible and detailed documents. The weight per round was multiplied by the basic load of rounds per weapon. The total weight of the basic load of the "type" battalion has been computed as 2.5 T and this figure is employed in the Class V computations.

5. Battalion slice. The concept of a battalion slice is used as a means of factoring-in the basic load and expenditure for non-battalion elements of regiment and division. Concurrently with combat action by an infantry battalion, it is assumed that a portion of the available ammunition of support elements of the division and/or regiment is also expended. Using the weapons and the ammunition basic load shown for the VC and NVA regimental and division elements (enclosures 1 and 2) and the Weapons and Basic Load List for the "type" VC/NVA infantry battalion, a battalion slice has been determined for battalions which are subordinate to and supported by both regimental and division elements. These are identified in the study as "division-type battalions." In addition, separate computations have been made for nondivisional battalions which are assumed to have the equivalent of regimental-level combat and administrative support.

The battalion slice is determined by dividing the total tonnage of the major unit, i.e., division or regiment, by the number of infantry battalions it contains. This battalion-slice then represents ammunition available for expenditure by the infantry battalion itself plus a proportionate share of the Class V load of the supporting division and/or regimental units. The methodology and figures for these computations are shown as follows:

a. Basic ammunition load. (Derived from TO/E's enclosures 1 and 2 and "Type" VC/NVA Battalion Weapons and Ammunition List enclosure 3.)

"Type" Infantry Battalion	2.5 T
Regimental Headquarters	3.92 T
NVA Division Headquarters	16.31 T
VC Division Headquarters	4.32 T

b. Unit tonnage.

Infantry Regiment	11.42 T
(2.5 T x 3 Inf Bns + 3.82 T Regt Hq)	
NVA Infantry Division	50.57 T
(11.42 T x 3 Inf Regt + 16.31 T Div Hq)	
VC Infantry Division	38.58 T
(11.42 T x 3 Inf Regt + 4.32 T Div Hq)	

c. Battalion-slice.

NVA Division-type battalion	5.62 T
(50.57 T - 9 divisional infantry battalions)	
NVA non-Divisional battalion ...	3.8 T
(11.42 T - 3 battalions)	
VC Division-type battalion	4.28 T
(38.58 T - 9 divisional infantry battalions)	
VC non-Divisional battalion ...	3.8 T

6. Battalion equivalents. In computing the level of combat it is necessary to know the number of battalions (confirmed, probably and possible) and also the number of battalion equivalents represented by the strength of the separate companies and platoons in the VC force. The latter figure is arrived at by dividing the total personnel strength of VC separate companies and platoons by a figure of 460 representing an average battalion strength. A total of the NVA battalions, the VC battalions and the VC battalion equivalents provides the number of battalion/battalion equivalents in South Vietnam.

Following are figures used for this study:

Month	NVA Battalions		VC Battalions		VC Battalion Equivalents		Total VC/NVA Battalion Equivalents
Apr	50	+	89	+	74	=	213
May	60	+	93	+	77	=	230
Jun	63	+	95	+	77	=	235
Jul	73	+	94	+	83	=	250
Aug	81	+	95	+	82	=	258
Sep	82	+	96	+	80	=	258
Oct	86	+	94	+	82	=	262
Nov	92	+	93	+	81	=	266

7. Level of combat.

a. The frequency of engagement or level of combat is one of the most difficult factors to determine with any acceptable degree of accuracy. For the purpose of this study the COMUSMACV Monthly Evaluation Reports were selected since they contain both J2 and J3 information in some detail on monthly combat activity. Use of this information has required considerable evaluation and judgement in arriving at the necessary number of days of combat for each battalion equivalent in South Vietnam for each month. In some instances the size of the enemy unit is listed, i.e., regiment, battalion, etc., but frequently the enemy is "unknown." In this case an evaluation is required based on the reported number of enemy KIA, prisoners, weapons captured, etc., to estimate the size of the enemy unit confronted. The days of combat for each action also require an evaluation since there is no precise means of determining whether an action covering a week's duration actually consisted of seven days of continuous conflict or days of active combat interspersed with light action or no contact. Again, based on the

information available, an estimate was made of the number of days of combat reflected for each reported action in the COMUSMACV Monthly Evaluation report. When assessments had been made on each action, a total of days of combat for enemy forces was compiled for the month.

b. The number of days of combat for the month is divided by the number of battalion equivalents in South Vietnam during the period to arrive at the average number of days of combat for each enemy battalion/battalion equivalent:

Month	VC/NVA Battalion Days of Combat for the month*		VC/NVA Battalion Equivalents		Average days of combat for each battalion
Apr	235 days	÷	213	=	1.10 days
May	319 days	÷	230	=	1.38 days
Jun	486 days	÷	235	=	2.06 days
Jul	559 days	÷	250	=	2.23 days
Aug	437 days	÷	258	=	1.69 days
Sep	761 days	÷	258	=	2.94 days
Oct	1,609 days	÷	262	=	6.14 days
Nov	928 days	÷	266	=	3.48 days

* Based on analysis of MACV Monthly Evaluation Reports (see para 7.a. above.)

A further division using 30 (days/month) provides the level of combat as indicated:

Month	Days/month		Average days of combat for each battalion		Level of combat
Apr	30	÷	1.10 days	=	1:27
May	30	÷	1.38 days	=	1:21
Jun	30	÷	2.06 days	=	1:14
Jul	30	÷	2.23 days	=	1:14
Aug	30	÷	1.69 days	=	1:18
Sep	30	÷	2.94 days	=	1:10
Oct	30	÷	6.14 days	=	1:5
Nov	30	÷	3.48 days	=	1:9
			Average:		1:15

c. Based on the procedure and the figures indicated above, it was determined that the average VC/NVA level of combat for the eight months examined was one-day-in-fifteen (1:15). It is realized, however, that this figure is based on less than satisfactory in-put data and should, if possible, be refined employing more precise information. For this reason, additional factors of 1:30 and 1:45 have also been computed to indicate the effect this would have on the enemy's ammunition consumption and on the total externally supplied requirements for VC/NVA forces. It is noteworthy, however, that the computations above reflect a marked and relatively consistent trend toward an increase in the level of combat for the period examined. This same increase is suggested by analysis of other factors as noted previously.

8. Expenditure of Class V per engagement. Research of data base documents and studies available in DIA has failed to provide sufficient information to develop an improved estimate of the portion of the enemy's basic load expended in a day of combat. For the purpose of this study an expenditure rate of 1/3 the basic load for each day of combat has been employed. This factor was used in earlier studies on this subject.

METHODOLOGY

For the purpose of review and reference, following is the methodology described above and employed in the computation of Class V requirements:

Battalion days of combat for given month	÷	Number of battalion equivalents	=	Days of combat for given month for each battalion equivalent
Days of combat for given month for each battalion equivalent	÷	30 (days/month)	=	Level of combat for given month
Number of NVA Division-type Battalions	x	Battalion slice	=	NVA Division-type tonnage
Number of NVA non-Division Battalions	x	Battalion slice	=	NVA non-Division tonnage
Number of VC Division-type Battalions	x	Battalion slice	=	VC Division-type tonnage
Number of VC non-Division Battalions	x	Battalion slice	=	VC non-Division tonnage
Sum of tonnage (preceeding four steps)	x	Expenditure of Class V per engagement	=	Tonnage expended per day of combat
Tonnage expended per day of combat	÷	Level of combat	=	Daily Class V expenditure

COMPUTATIONS

The final computations employing the methodology described above and the factors developed, are shown as follows in Short Tons:

NVA TONNAGE

Month	NVA Div Bns	Bn Slice	NVA Div Bn Ton	NVA non-Div Bns	Bn Slice	NVA non-Div Ton	Total NVA Tonnage
Apr	35 x	5.62 T =	196.7 T	15 x	3.8 T =	57.0 T	253.7 T
May	44 x	5.62 T =	247.3 T	16 x	3.8 T =	60.8 T	308.1 T
Jun	47 x	5.62 T =	264.1 T	16 x	3.8 T =	60.8 T	324.9 T
Jul	56 x	5.62 T =	314.7 T	17 x	3.8 T =	64.6 T	379.3 T
Aug	56 x	5.62 T =	314.7 T	25 x	3.8 T =	95.0 T	409.7 T
Sep	56 x	5.62 T =	314.7 T	26 x	3.8 T =	98.8 T	413.5 T
Oct	59 x	5.62 T =	331.6 T	27 x	3.8 T =	102.6 T	434.2 T
Nov	64 x	5.62 T =	359.7 T	28 x	3.8 T =	106.4 T	466.1 T

VC TONNAGE

Month	VC Div Bns	Bn Slice	VC Div Bn Ton	VC non-Div Bns	Bn Slice	VC non-Div Ton	VC Bn Equiv	Bn Slice	VC Bn Equiv Ton	Total VC Tonnage
Apr	42 x	4.28T =	179.76T	47 x	3.8T =	178.60T	74 x	3.8T =	281.20T	639.56 T
May	41 x	4.28T =	175.48T	52 x	3.8T =	197.60T	77 x	3.8T =	292.60T	665.68 T
Jun	45 x	4.28T =	192.60T	50 x	3.8T =	190.00T	77 x	3.8T =	292.60T	675.20 T
Jul	43 x	4.28T =	184.04T	21 x	3.8T =	193.80	81 x	3.8T =	307.80T	685.64 T
Aug	45 x	4.28T =	192.60T	50 x	3.8T =	190.00	82 x	3.8T =	311.60T	694.20 T
Sep	45 x	4.28T =	192.60T	51 x	3.8T =	193.80	82 x	3.8T =	311.60T	698.00 T
Oct	45 x	4.28T =	192.60T	49 x	3.8T =	186.20	82 x	3.8T =	311.60T	690.40 T
Nov	45 x	4.28T =	192.60T	43 x	3.8T =	182.40	81 x	3.8T =	307.80	682.80 T

Month	Total NVA Tonnage		Total VC Tonnage		Total Tonnage		Portion of Basic Load per/day/ combat		Tonnage per/ day/combat
Apr	253.7 T	+	639.56 T	=	893.26T	x	1/3	=	297.75 T
May	308.1 T	+	665.68 T	=	973.78 T	x	1/3	=	324.59 T
Jun	324.9 T	+	675.20 T	=	1000.10 T	x	1/3	=	333.36 T
Jul	379.3 T	+	685.64 T	=	1064.94 T	x	1/3	=	354.98 T
Aug	409.7 T	+	694.20 T	=	1103.90 T	x	1/3	=	367.96 T
Sep	413.5 T	+	698.00 T	=	1111.50 T	x	1/3	=	370.50 T
Oct	434.2 T	+	690.40 T	=	1124.60 T	x	1/3	=	374.86 T
Nov	466.1 T	+	682.80 T	=	1148.90 T	x	1/3	=	382.96 T

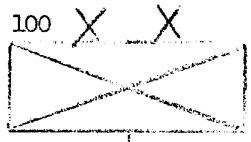
CLASS V REQUIREMENT

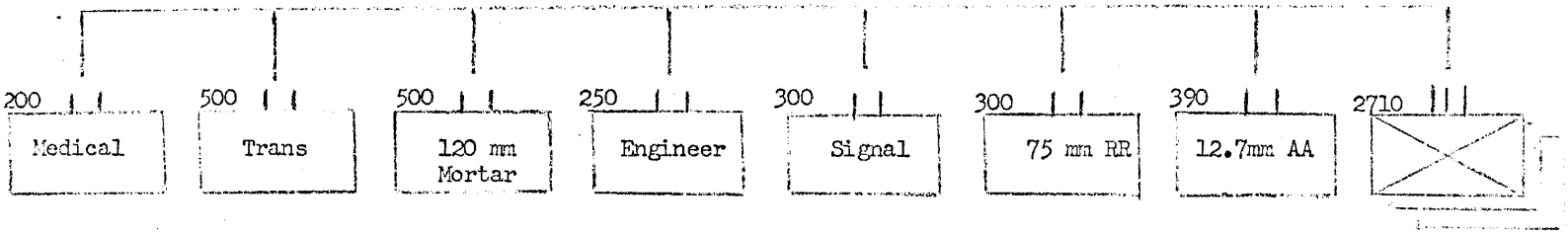
Month	Tonnage per/ day/combat		Level of Combat		STPD Class V Requirement
Apr	297.75 T	÷	1:27	=	11.03 STPD
May	324.59 T	÷	1:21	=	15.47 STPD
Jun	333.36 T	÷	1:14	=	23.81 STPD
Jul	354.98 T	÷	1:14	=	25.35 STPD
Aug	367.96 T	÷	1:18	=	20.44 STPD
Sep	370.50 T	÷	1:10	=	37.05 STPD
Oct	374.86 T	÷	1:5	=	74.9 STPD
Nov	382.96 T	÷	1:9	=	42.55 STPD
				AVERAGE:	31.04 STPD

For the eight month period under review the average daily requirement was 31.04 STPD. The average level of combat was 1:15. Projecting these figures, the enemy requirement for 1:30 would have been 15.52 STPD and for 1:45 it would be 10.34 STPD.

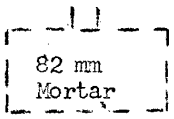
DIVISION

Basic Ammunition Load:
NVA - 16.31 T + 3 regts (11.42 T ea)
= 50.57 T
VC - 4.32 T + 3 regts (11.42 T ea)
= 38.58 T





Medical	Trans	120 mm Mortar	Engineer	Signal	75 mm RR	12.7mm AA	
20 Pistols 20 SMG 10 Rifles	10 Pistols 50 SMG 60 Rifles	12 Pistols 40 SMG 40 Rifles 3 AR 18 120mm Mortar	50 SMG 60 Rifles	25 Pistols 50 SMG 50 Rifles	12 Pistols 30 SMG 20 Rifles 3 AR 18 75mm RR	12 Pistols 20 SMG 45 Rifles 9 AR 27 12.7AAA	Basic load of Class V = 11.42 T ea

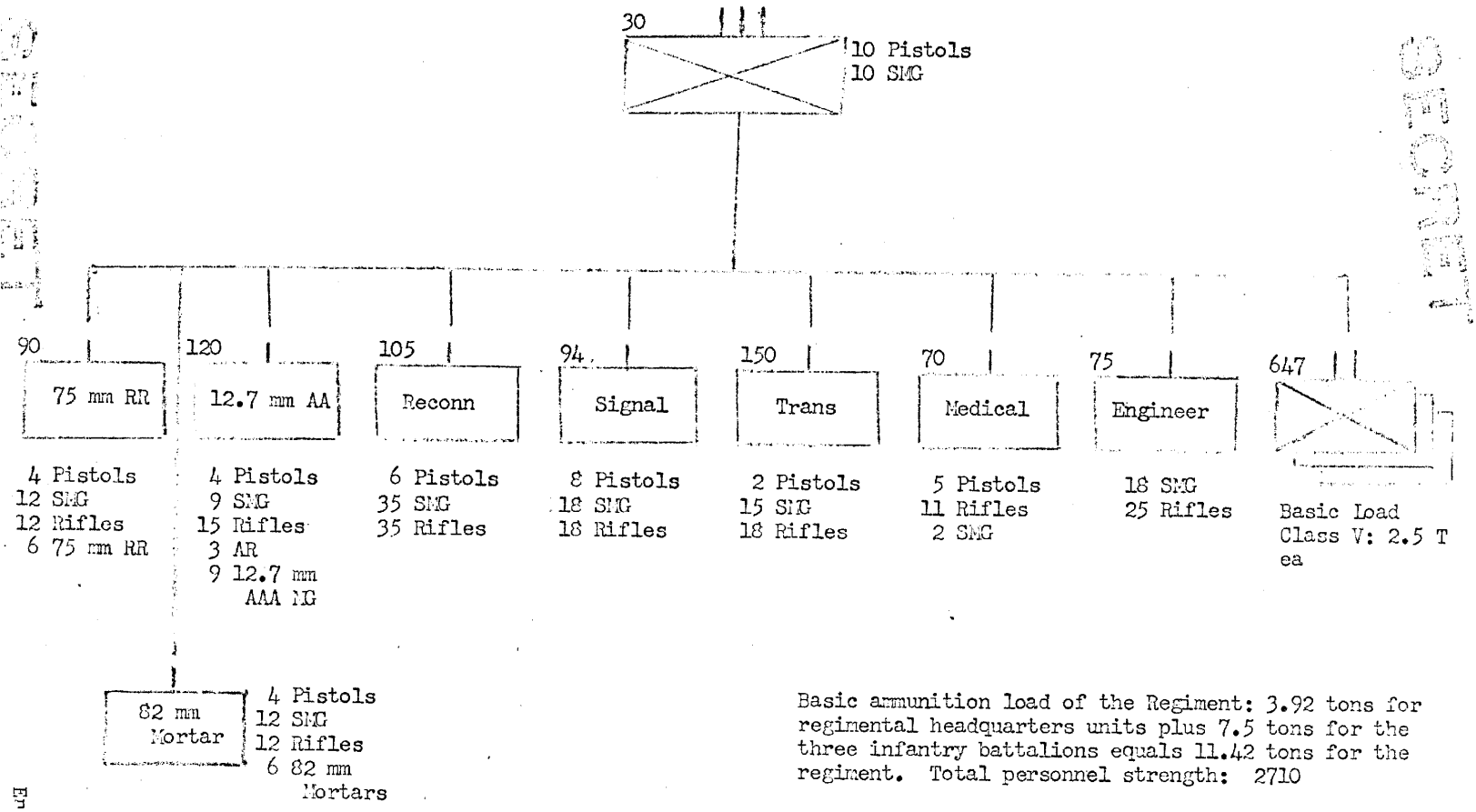


12 Pistols
35 SMG
40 Rifles
18 82mm Mortar

82 mm Mortar Bn replaces the 120 mm Mortar Bn in VC units.

Enclosure 1

REGIMENT



Basic ammunition load of the Regiment: 3.92 tons for regimental headquarters units plus 7.5 tons for the three infantry battalions equals 11.42 tons for the regiment. Total personnel strength: 2710

Enclosure 2

VC/NVA

WEAPONS ALLOWANCE AND BASIC AMMUNITION LIST

TYPES OF WEAPONS	NUMBER OF WEAPONS	ROUNDS PER WEAPON	WEIGHT PER ROUND	BASIC LOAD PER WEAPON
Pistol	25	35	0.3 oz	16.40 lbs
Carbine	188	40	0.6 oz	282.00 lbs
Rifle	102	110	0.6 oz	420.70 lbs
Rifle, assault	17	650	0.6 oz	414.40 lbs
Gun, submachine	100	180	0.3 oz	337.50 lbs
Gun, light machine	17	650	0.6 oz	414.40 lbs
Gun, heavy machine 12.7mm	2	1800	4.5 oz	1012.50 lbs
Launcher, rocket 40-mm	12	8	4.0 lbs	384.00 lbs
Mortar, 60-mm	11	20	3.0 lbs	660.00 lbs
Mortar, 81/82-mm	5	20	7.6 lbs	760.00 lbs
Rifle, recoilless,57-mm	3	8	12.0 lbs	288.00 lbs
		TOTAL:		4989.90 lbs
				(2.5 ST)

NOTE: The list excludes weapons infrequently reported and some items such as hand grenades due to vagueness of of reporting on expenditures.

Enclosure 3