What is the evidence on the scale of effect of B-52 attacks in producing VC/NVA casualties? In disrupting VC/NVA operations? How valid are estimates of overall effect?

ARC LIGHT is the code name given to high altitude tactical bombing raids flown in Southeast Asia by B-52 bombers. The missions are carried out by 105 B-52s based on Guam, Thailand (U-Tapao), and Okinawa (Kadena), supported by KC-135 tankers from Okinawa and Taiwan. At present, an average of 1600 ARC LIGHT sorties per month are authorized with the sortie rate scheduled to range between 1400 and 1800 depending on combat intensity. Each B-52 delivers 26 to 30 tons of high explosives per sortie, depending on where the plane is based.

The B-52 ARC LIGHT force in Southeast Asia provides a flexible theater reserve with the firepower equivalent of a multidivision ground force. Retention of sorties under centralized control permits quick support of subordinate commanders. Reconstitution of this reserve is accomplished in a matter of hours by upcoming sorties. It also permits the weight of B-52 to be shifted between in-country and out-of-country targets are required.

About one-half of the strikes are against known or suspected enemy base camps, supply caches, and headquarters. The remainder are targeted against known enemy troop concentrations or in support of tactical operations, e.g., in support of the defense of an outpost such as Dak To and Khe Sanh.

During CY 1968, the B-52s flew 20,600 sorties, of which 16,450 were directed against in-country targets. Included in the in-country bombing are several noteworthy campaigns. At Khe Sanh during January-March, 2,179 B-52 sorties delivered 61,012 tons of bombs. In mid-June, B-52s flew 5,378 sorties and delivered 150,584 tons of ordinance to disrupt Viet Cong/North Vietnamese Army (VC/NVA) operations around Saigon. Recently, B-52 strikes have been shifted to the Laotian lines of communication to assist in blocking the flow of traffic entering Laos through the Mu Gia and the Ban Karai/Ban Labory Passes. Since November 1, 1968, 2,301 B-52 sorties have been flown over Laos.

The variable 1400/1800 rate replaced a level 1800 sortie rate on 1 Jan 1969. To date SAC has continued to fly at the 1800 sortie rate. The JCS are expected in the near future to recommend that the variable rate be dropped and 1800 be approved.
EFFECTIVENESS

It is generally agreed that a feasible method for analyzing ARC LIGHT effectiveness has not yet been devised. It is not possible to make any definitive statements regarding the effectiveness of ARC LIGHT. Field commanders are lavish in their praise. COMUSMACV recently stated that ARC LIGHT was his strategic reserve and had the equivalent combat punch of two divisions. No one has been able to quantitatively support such claims (or disprove them). Hard evidence on the effectiveness of the ARC LIGHT program is difficult to find. Certainly some strikes are highly effective. Some are clearly wasted. The majority have an undetermined impact.

QUALITATIVE

Many qualitative statements of effectiveness can be cited. For example, at Khe Sanh ARC LIGHT has been credited with blunting the enemy’s offensive plans. MACV states that prisoners of war reports indicated that some enemy battalions sustained from 50 percent to 75 percent casualties from B-52 attacks alone. Estimates of total enemy killed and wounded at Khe Sanh by B-52s ranged from 2,000 to 10,000 men.

During August and September an enemy force with an estimated strength of 6,000 to 8,000 attempted to overrun the Duc Lap Special Forces Camp in Quang Duc Province. ARC LIGHT strikes were ordered. Of the 800 enemy killed in action there, MACV states that about 300 were attributed to B-52 strikes.

In mid-June there was evidence of an imminent attack on Saigon. The enemy had placed three VC/NVA regiments in Binh Duong Province and the 9th Viet Cong Regiment in Han Nghia Province. B-52s attacked their staging areas, base camps, and resupply points. The enemy did not launch the anticipated attack or make good his threat of 100 rockets a day for 100 days against Saigon. MACV states that there is evidence that, harrassed by day and night bombing as well as by aggressive ground actions, the enemy was forced to split into small units and in many cases, withdraw to safe areas in Cambodia.

In the four northern provinces of South Vietnam (I Corps Tactical Zone) and the demilitarized zone, B-52 strikes have been used in supporting US and South Vietnamese ground forces with heavy firepower in preparation for and during operations. B-52s were effective in frustrating enemy efforts to overrun the Special Forces Camp at Thuong Duc and in support of friendly helicopter assaults into heretofore inaccessible areas such as the A Shau Valley.
In the delta region of South Vietnam (IV Corps Tactical Zone), B-52 strikes are scheduled in advance of US and South Vietnamese combat sweep operations, to permit the entry of friendly ground forces into former enemy strongholds with little or no resistance. In the delta, the constant threat of B-52 strikes has forced the enemy to disperse his forces and move almost every day, making it more difficult for him to mass for an operation. The necessity for frequent movement and dispersal has greatly increased the enemy's command and control problems.

Intelligence derived from documents, prisoners of war, and reliable agents, confirms that B-52 strikes have prevented high level infrastructure planning conferences from occurring, made local recruiting of laborers and village guerrillas difficult, exposed caches of supplies and munitions, and have forced the enemy to move in small groups. Frequent comments by prisoners of war and ralliers indicate that the B-52 strike is the one weapon most feared by enemy troops.

**QUANTITATIVE**

The only quantitative measures of effectiveness available deal with the damage inflicted by ARC LIGHT strikes. These measures (enemy killed, structures destroyed, days a pass is closed to traffic, trucks destroyed, etc.) are indirect in the sense that their effect on the enemy's ability and desire to pursue the war is not known. Part of the difficulty in relating damage inflicted to real progress is due to the fact that the enemy can often delay his attack until he has built up the needed forces or repaired the damaged lines of communication.

The JCS estimate that 41,250 enemy were killed in 1968 by all in-country B-52 strikes. This is an average of 2.5 enemy killed per sortie.\(^1\) (This is equivalent to the 13.75 killed per B-52 strike where each strike includes an average of 5.5 sorties).

Office of the Secretary of Defense estimates of enemy killed by ARC LIGHT are much lower than those of the JCS. As shown below, they are derived from a different data base during a different time period. It is felt that Bomb Damage Assessment (BDA) reports provide the most comprehensive source of data on ARC LIGHT casualty and destruction results. There are three sources of BDA. The first, ground follow-up, is the most thorough, even though there frequently is a time lapse between the B-52 strike and the follow-up, allowing the enemy to conceal his losses. The other two sources, aerial photographs and aerial visual reconnaissance, provide some information but are often

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\(^1\) This statistic is based on ground follow-ups of 103 B-52 strikes during the period 1 Jan-31 Jul 1968 which revealed 714 killed by air, or about 6 killed by air per strike. Also, in 50 prisoner of war interrogations, enemy soldiers who had undergone B-52 attacks indicated that their units had suffered 989 killed, 357 wounded, and 74 desertions attributable to ARC LIGHT strikes. Other prisoner and rallier reports concerning 22 specific ARC LIGHT strikes indicated a total of 435 killed, 235 wounded and 23 desertions.
limited by jungle cover and there is the unsolvable problem of multiple countings. BDA of some type is received on about 60% of ARC LIGHT missions, but only 18% of the total missions are followed up by ground teams. Missions in NVN and Laos receive no ground follow-up; missions in III and IV Corps have ground follow more than half of the time. The table below shows the extent and type of BDA during the period June 1966 through October 1967.

### ARC LIGHT BOMB DAMAGE ASSESSMENT
(Jun 1966 - Oct 1967)

<table>
<thead>
<tr>
<th>Mission</th>
<th>Photo</th>
<th>Visual Recon</th>
<th>Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-52 Missions</td>
<td>1351</td>
<td>308</td>
<td>299</td>
</tr>
<tr>
<td>Percent</td>
<td>100%</td>
<td>59%</td>
<td>23%</td>
</tr>
</tbody>
</table>

More than one type of BDA was available for some missions.

Source: MACV-J-2 Study 68-08, "ARC LIGHT EFFECTIVENESS"

The following table summarizes Bomb Damage Assessment reports from June 1966 to October 1967. It indicates that the average ARC LIGHT mission kills 3.1 enemy and destroys 10.0 structures (huts, fortified positions, and buildings). An average mission consists of 7.2 aircraft; thus, an average of 0.43 enemy are estimated as being killed per sortie. (Note that the JCS estimate was 2.5 enemy killed per B-52 sortie). If this average enemy casualty rate is extrapolated to include all B-52 strikes, ARC LIGHT apparently has killed approximately 17,000 enemy since 1965 (3.9% of total enemy losses) and will cause 8000 deaths in 1969. ARC LIGHT has also destroyed or damaged 41,000 enemy structures (5.7% of total structures reported destroyed by all air operations).

### ARC LIGHT BOMB DAMAGE ASSESSMENT RESULTS
(Jun 1966 - Oct 1967)

<table>
<thead>
<tr>
<th>Location</th>
<th>Missions With EDA</th>
<th>Ground Follow-Ups</th>
<th>Structures Destroyed/Damaged</th>
<th>Enemy KIA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total Rptd Per/Miss</td>
<td></td>
</tr>
<tr>
<td>NVN</td>
<td>22</td>
<td>0</td>
<td>124</td>
<td>5.6</td>
</tr>
<tr>
<td>DMZ</td>
<td>92</td>
<td>2</td>
<td>1415</td>
<td>15.4</td>
</tr>
<tr>
<td>I CTZ</td>
<td>250</td>
<td>57</td>
<td>882</td>
<td>3.5</td>
</tr>
<tr>
<td>II CTZ</td>
<td>182</td>
<td>28</td>
<td>2565</td>
<td>14.1</td>
</tr>
<tr>
<td>III CTZ</td>
<td>239</td>
<td>144</td>
<td>2907</td>
<td>12.2</td>
</tr>
<tr>
<td>IV CTZ</td>
<td>16</td>
<td>15</td>
<td>159</td>
<td>9.9</td>
</tr>
<tr>
<td>Total</td>
<td>801</td>
<td>247</td>
<td>8052</td>
<td>10.0</td>
</tr>
</tbody>
</table>

Storage areas, fortifications, weapons positions, bases, camps.

Source: MACV-J-2 Study 68-08, "ARC LIGHT EFFECTIVENESS"
SECRET

UNCERTAINTIES

It is not possible to place any confidence limits on estimates of ARC LIGHT effectiveness. Even estimates of enemy deaths are difficult to obtain because:

1. VC/NVA practice of immediate removal of the wounded from the strike area and immediate burial of the dead.
2. Infrequency of immediate ground follow-up into accessible B-52 strike areas.
3. Significant numbers of B-52s are targeted against remote and inaccessible enemy base areas.
4. Aerial observation of the target area restricted by weather, terrain, and jungle canopy.
5. Blast effect of the individual B-52 weapon load (29 ton) tends to destroy some evidence.
6. Multiple countings.

Where total enemy deaths are estimated by projecting the available BDA data, a number of uncertainties can be identified. First, while the sample is reasonably large (the BDA reports cover 5,800 of the 34,000 B-52 sorties flown since 1965); it may be biased. The strikes with BDA tend to be those nearest friendly troop areas which may be the ones based on the best intelligence. The strikes against suspected enemy base camps, which may be the least productive, have few BDA reports. Second, the amount of damage reported is clearly related to the thoroughness of the BDA (more enemy deaths reported when ground follow-up is used). Thus, since we have ground follow-up on few missions, we may be understating the true impact. And third, B-52 strikes are not necessarily the cause of the reported destruction. This is especially true for those missions in support of ground operations, where artillery and tactical air were also employed.

Another source of information is reported by ralliers and prisoners of war. These reports provide substantial information about instances where ARC LIGHT strikes were highly effective. Unfortunately, this evidence is fragmentary and frequently vague regarding the place and time of the attack. Therefore, it has not been possible to utilize these reports to develop a comprehensive picture of ARC LIGHT effectiveness.

In conclusion, there is general agreement that ARC LIGHT strikes have been effective on numerous occasions in preempting enemy attacks, blocking lines of communication, and supporting troops in combat with sizeable enemy forces. However, OSD feels that there are no quantitative measures of effectiveness and the available data is of uncertain quality and limited quantity.
What effect is the Laotian interdiction bombing having:

a. In reducing the capacity of the enemy logistic system?
b. In destroying materiel in transit?

The intensity of the US bombing campaign in Laos has more than doubled with the cessation of air strikes against North Vietnam on November 1, 1968 (15,178 attack sorties were flown in December 1968; 6,722 were flown in Laos in December 1967). Jet sorties previously used to attack targets in NVN were shifted primarily to interdiction missions in the Laotian Panhandle. Also, in early November, the Air Force began a new interdiction campaign in Laos (COMMAND HUNT) designed to reduce or impede enemy truck traffic during the good weather months in Laos (November to May).

In addition to the destruction of trucks and supplies, the current campaign attempts to limit enemy traffic primarily by creating and sustaining a number of "non-bypassable" choke points on the key roads in Laos. About 45 percent of the attack sorties are devoted to this objective.

SEE ANSWERS AT TABS A AND B.
QUESTION 28a

What effect is the Laotian interdiction bombing having:
a. In reducing the capacity of the enemy logistic system?

With the bombing halt in North Vietnam on November 1, 1968, it was no longer possible to interdict the flow of supplies before they reached Laos. A large-scale program to interdict the flow was undertaken by B-52's and other tactical aircraft, with heavy weight concentrated on key choke points in Laos, just south of the Mu Gia and Ban Karai Passes. However, relatively large quantities of supplies still entered Laos. In fact, the normal seasonal traffic appeared to continue. Road watch teams stationed south of Mu Gia Pass reported truck traffic entering Laos that was identical to the seasonal buildup last year (an average of 10 trucks per day in November, 20 in December, and about 25 in January during both years). IGLOO WHITE sensors on roads south of the interdiction points strongly suggested that trucks were moving supplies south of our two key choke points; special intelligence sources also indicated normal throughput traffic. The enemy was apparently using porters, or by-passing them altogether.

In the latter part of November 1968, most of the trucks entered through a newly constructed by-pass around the two Ban Pha Nop interdiction points south of the Mu Gia Pass. After its discovery, this by-pass was interdicted frequently; however, it was more difficult to keep interdicted than the two points chosen originally.

One measure of success in reducing the enemy's throughput capability is the better-than 75 percent closure of the Ban La Boy/Ban Karai complex since October 1, 1968. However, the enemy was still able to complete a well-camouflaged road around the Ban La Boy Ford south of the Ban Karai Pass on 14 December 1968. This allowed another large influx of trucks prior to its interdiction by ARC LIGHT and tactical air strikes.

The current bombing campaign has forced the enemy to pay a high price to keep his supply lines open through Laos to South Vietnam.

Construction of camouflaged by-passes in mountainous terrain has required a sizeable expenditure of manpower and equipment. Road repair crews were harassed continually with cluster-type bombs and anti-personnel mines. Photographs show the enemy was forced to porter supplies around the interdicted points.

As the bombing progressed, destruction of the jungle canopy made the enemy more vulnerable to attack. As a result of the air strikes, enemy traffic was delayed and his resupply efforts from time to time
was disrupted. Trucks moved in smaller convoys to lessen vulnerability and were more widely dispersed in revetted "stalls." Well-developed truck parks, with repair and support facilities, were denied the enemy by intensive bombing attacks. Improved intelligence collection methods and better integration of information made it easier to locate and attack the enemy. In addition to these factors, enemy logistic requirements have been increasing. The enemy antiaircraft reaction has doubled, probably causing expenditure on the order of 100 tons per week in ammunition and logistic support of antiaircraft artillery battalions. Additional engineer, construction, and antiaircraft artillery battalions have been employed to defend and maintain the road networks.

But in spite of evidence that aerial attacks reduced the flow of enemy supplies to very low levels; notably in the periods 1-11 November and 1-15 December at Mu Gia Pass, and 1 November - 15 December and 7-24 January at Ban Karai Pass, intelligence reports indicate that the enemy has made a major effort to insure the continued forward movement of supplies for enemy forces in Laos and South Vietnam, and that the enemy has pushed through sufficient tonnages to provide the bulk of his external supply requirements. Although it is still too early to tell, experience during the first months of intensified operations in Laos indicates that the current campaign may not significantly limit enemy supply flows into South Vietnam. The external supply requirements of VC/NVA forces in South Vietnam are so small relative to enemy logistic capacity that it is unlikely any air interdiction campaign can reduce it below the required levels. Estimates of external enemy requirements from North Vietnam range from 30 to 50 short tons per day (10-15 truckloads). \(^1\)

If truck sightings are any indication of supply flow, a comparison between 1967 and 1968 sightings, as shown below, indicates that activity on the Laotian roads has not been effectively reduced by the current campaign.

**TRUCK SIGHTINGS IN LAOS PANHANDLE**

<table>
<thead>
<tr>
<th>MONTH</th>
<th>1967</th>
<th>1968</th>
</tr>
</thead>
<tbody>
<tr>
<td>October</td>
<td>992</td>
<td>1043</td>
</tr>
<tr>
<td>November</td>
<td>4249</td>
<td>4395</td>
</tr>
<tr>
<td>December</td>
<td>6046</td>
<td>5519</td>
</tr>
</tbody>
</table>

\(^1\) The exact magnitude of the supply flows and requirements is still not known with certainty.
QUESTION 28b:

What effect is the Laotian interdiction bombing having:
b. In destroying materiel in transit?

It is estimated that nearly 8,000 tons of enemy supplies have been destroyed in Laos in the period 1 November 1968 - 23 January 1969. Visual sightings report a total of 1,682 trucks destroyed, 706 trucks damaged, and a total of 13,130 secondary explosions and fires caused by aerial attacks. The following table shows the breakout by type of damage and time period.

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Type of Damage</th>
<th>Number</th>
<th>Tons Destroyed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 30 November</td>
<td>Trucks destroyed</td>
<td>344</td>
<td>567</td>
</tr>
<tr>
<td>1 - 31 December</td>
<td>Trucks destroyed</td>
<td>637</td>
<td>1,051</td>
</tr>
<tr>
<td>1 - 23 January</td>
<td>Trucks destroyed</td>
<td>701</td>
<td>1,157</td>
</tr>
<tr>
<td></td>
<td>Sub Totals</td>
<td></td>
<td>2,775</td>
</tr>
<tr>
<td>1 - 30 November</td>
<td>Trucks damaged</td>
<td>143</td>
<td>59</td>
</tr>
<tr>
<td>1 - 31 December</td>
<td>Trucks damaged</td>
<td>220</td>
<td>90</td>
</tr>
<tr>
<td>1 - 23 January</td>
<td>Trucks damaged</td>
<td>343</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td>Sub Totals</td>
<td></td>
<td>289</td>
</tr>
<tr>
<td>1 - 30 November</td>
<td>Fires/Explosions</td>
<td>3,219</td>
<td>1,207</td>
</tr>
<tr>
<td>1 - 31 December</td>
<td>Fires/Explosions</td>
<td>4,811</td>
<td>1,804</td>
</tr>
<tr>
<td>1 - 23 January</td>
<td>Fires/Explosions</td>
<td>3,659</td>
<td>1,372</td>
</tr>
<tr>
<td>1 November</td>
<td>ARC LIGHT</td>
<td>1,441</td>
<td>540</td>
</tr>
<tr>
<td>23 January</td>
<td>Fires/Explosions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sub Totals</td>
<td></td>
<td>7,987</td>
</tr>
</tbody>
</table>

Total Tons Destroyed

SOURCE: Joint Chiefs of Staff (Data for DIA is in substantial agreement)

It has not been possible to estimate accurately the materiel destroyed in truck parks. Most of these targets are well hidden under foliage and RDA is seldom available. More than 30 of these truck park areas have been heavily attacked. It is estimated that each contained from 20 to 50 trucks and may have contained between 50 to 500 tons of supplies, in addition to repair facilities. It is possible also that storage, housing, medical and petroleum, oil, and lubricant facilities and bunkers, as well as communications equipment and arms were destroyed.
These estimates indicate destruction of about 95 tons of supplies per day in Laos since November 1, 1968. While this is impressive, it is not what really counts. The critical factor is the amount that reaches South Vietnam. Another equally critical factor is the amount of supplies already stored in South Vietnam. Much of the material destroyed was probably not destined for South Vietnam but was for consumption or storage in Laos. Since we have no control over imports to North Vietnam or inputs to Laos, it appears that the enemy can continue to push sufficient supplies through Laos to South Vietnam in spite of relatively heavy losses inflicted by air attacks.
With regard to the bombing of North Vietnam:

a. What evidence was there on the significance of the principal strains imposed on the Democratic Republic of Vietnam (e.g., in economic disruption, extra manpower demands, transportation blockages, population morale)?

b. What was the level of logistical throughput through the southern province of North Vietnam just prior to the November bombing halt? To what extent did this level reflect the results of the US bombing campaign?

c. To what extent did Chinese and Soviet aid relieve pressure on Hanoi?

d. What are current views on the proportion of war-essential imports that could come into North Vietnam over the rail or road lines from China, even if all imports by sea were denied and a strong effort even made to interdict ground transport? What is the evidence?

e. What action has the Democratic Republic of Vietnam taken to reduce the vulnerability and importance of Hanoi as a population and economic center (e.g., through population evacuation and economic dispersal)?

SEE ANSWERS AT TABS A, B, C, D AND E
QUESTION 29a

What evidence was there on the significance of the principal strains imposed on the Democratic Republic of Vietnam (e.g., in economic disruption, extra manpower demands, transportation blockages, population morale)?

Economy

By the time offensive air operations against NVN were stopped on 1 November 1968, most of the heavy industry and more than half of the electrical power generating capacity had been destroyed. Dispersion of industry and redistribution of labor resulted in serious inefficiencies, which were aggravated primarily by the constant disruption of lines of communication. As domestic economic requirements became more difficult to satisfy, NVN became more dependent on external assistance. What NVN was unable to produce itself (guns, missiles, ammunition, trucks, food, etc.) or was destroyed by US air raids (cement, POL, steel, etc.) was imported from abroad. Seaborne imports during 1965 totaled nearly 2 million metric tons, up from 1.4 million metric tons during 1967. Food imports nearly doubled during 1968, and accounted for about one-third of all imports. Likewise, imports of fertilizer and petroleum products increased.

The economic (monetary) impact of the bombing is shown in the following table:

<table>
<thead>
<tr>
<th>Costs ($ Million)</th>
<th>Benefits ($ Million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Destroyed Capital Stock</td>
<td>215</td>
</tr>
<tr>
<td>Lost Current Production</td>
<td>400(^a)</td>
</tr>
<tr>
<td>Destroyed Facilities</td>
<td>153</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td><strong>768</strong></td>
</tr>
<tr>
<td><strong>Foreign Economic Aid</strong></td>
<td><strong>1210</strong></td>
</tr>
<tr>
<td><strong>Foreign Military Aid</strong></td>
<td><strong>1845</strong></td>
</tr>
<tr>
<td><strong>Total Benefit</strong></td>
<td><strong>3055</strong></td>
</tr>
</tbody>
</table>

While air strikes destroyed about $770 million worth of capital stock, military facilities, and current production, NVN received about $3,000 million worth of foreign economic and military aid from Communist Bloc countries. Thus, in terms of total economic and military resources available to support the war, NVN is better off today than it was in 1965.

It is generally agreed that the bombing did not significantly raise the cost of the war to NVN. This was because production facilities outside of NVN were not targetable and ample external aid was available from

\(^a\) Estimate based on growth rates prior to 1965.
the Communist Bloc nations. The Soviet Union, Communist China, and Eastern European nations provided the bulk of the combat equipment and material used by enemy units in South Vietnam. The cost of this support to North Vietnam was negligible.

Another major impact of the bombing of North Vietnam was a shift within the labor force. Workers moved from food production to the repair of bomb-damaged facilities. The resulting food shortage created further disruption at the ports by adding food imports to an already overburdened military goods traffic. The economy of the country was further upset by the relocation of industry and by the move of over 30,000 of their most highly trained workers from the Hanoi area. In addition, it was estimated that over 400,000 people fled from Hanoi and Haiphong during the height of the bombing.

Extra Manpower Demands

Manpower dislocations were apparent at the height of the air war. Women were assuming a greater proportion of the workload, and 40,000 Chinese Communist construction troops and antiaircraft artillery units were moved into the country. Extra manpower was required for air defense, road and rail repair, logistical movement, industrial relocating, and rebuilding. A labor force of between 475,000 and 600,000, including women and children, was required in these areas to offset the effects of the air strikes. About 110,000 military personnel were assigned to air defense duties. This drain, plus the increasing number of combat losses, necessitated a lowering of military induction standards with a like effect on the standards within their Armed Forces. Evidence from interrogation of North Vietnamese fishermen along the coast and from recent prisoners of war reflects the enormity of the manpower drain. Fifty-one year-old villagers were conscripted for military duty in South Vietnam. Many received no more than a few days training. The apprentice, technical, high school, and college entry classes were reduced sharply.

In spite of these extra demands, it appears that NVN has enough manpower to continue the war at the high casualty rates sustained in 1968. Most of the additional labor requirements have been met through normal population growth and through the use of their large pool of unemployed and underemployed citizens.

Transportation

The interdiction of major lines of communication made the flow of material throughout the country more costly and time consuming. The bombing may have killed up to 5% of the 285,000 infiltrating troops (about 14,200 men in 1968). Although there are considerable uncertainties about this estimate, these losses would represent less than 3% of the 700,000 regular and militia troops remaining in North Vietnam and are relatively small compared to the 180,000 VC/NVA reportedly killed in South Vietnam in 1968. Infiltration losses of this magnitude would not appreciably limit VC/NVA force levels or activity rates in SVN.
degree to which interdiction was effective in reducing support of military forces in the south is difficult to measure. The difficulties brought on by the bombing were evident, however, in that the North Vietnamese were forced to build over 1,200 miles of alternate highways and bypasses, employ alternate and less efficient modes of transport, restrict movement to nighttime, and import large quantities of trucks and locomotives.

While the transportation blockage heavily taxed the capability of North Vietnam to support the troops in South Vietnam, the flow of supplies continued. The rail transit time from Hanoi to Vinh more than tripled, and rail traffic became almost non-existent from Vinh southward. As a result, truck travel from Hanoi to Laos and the demilitarized zone areas increased 100 percent. But these effects simply increased the time necessary to move supplies; they did not deny supplies to the VC/NVA in South Vietnam.

Morale

The bombing undoubtedly had adverse effects on the people of NVN. Individual citizens suffered many hardships. While the total supply of goods in NVN increased, individual standards of living declined. Food was rationed and consumer goods were scarce; and air raid warnings disrupted the lives of the populace and forced many to leave their homes. Moreover, it has been estimated that approximately 52,000 civilians were killed in NVN by US air strikes.

Still, there is no evidence to suggest that these hardships reduced to a critical level NVN's willingness or resolve to continue the conflict. On the contrary, the bombing actually may have hardened the attitude of the people and rallied them behind the Government's programs. Firm population controls and a steady flow of propaganda from Hanoi have been credited with helping to maintain popular support for the regime. There is some evidence, however, indicating that morale and support for the war in NVN has declined significantly since the bombing halt. Whatever their feelings about the war, the people of NVN have lacked either the will or the means to make any dissatisfaction evident.

The bombing also impacted heavily on the morale of the North Vietnam soldiers moving to South Vietnam. Bombing made the journey difficult and hazardous, a fact reported by many prisoners after capture.
What was the level of logistical throughput through the southern province of North Vietnam just prior to the November bombing halt? To what extent did this level reflect the results of the US bombing campaign?

Estimates of the flow of supplies from the southern province of NVN to Laos vary widely. This is because we have no reliable means of measuring this flow. The Joint Chiefs of Staff estimate that an average of 65 short tons per day flowed into Laos during the three months prior to the bombing halt. The Seventh Air Force estimated that the flow decreased from 340 tons per day in mid-July to 35 tons per day immediately prior to the bombing halt. The CIA and DIA estimate that an average of 165 short tons per day flowed into Laos during 1968. Some of this variation can be explained by the seasonal variation in truck traffic as indicated by the following table of truck sightings in Route Packages 1, 2, and 3 in NVN.

<table>
<thead>
<tr>
<th>Month</th>
<th>1967</th>
<th>1968</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>383</td>
<td>2866</td>
</tr>
<tr>
<td>Feb</td>
<td>654</td>
<td>1037</td>
</tr>
<tr>
<td>Mar</td>
<td>770</td>
<td>2142</td>
</tr>
<tr>
<td>Apr</td>
<td>1731</td>
<td>3346</td>
</tr>
<tr>
<td>May</td>
<td>2919</td>
<td>5140</td>
</tr>
<tr>
<td>Jun</td>
<td>3358</td>
<td>3723</td>
</tr>
<tr>
<td>Jul</td>
<td>4254</td>
<td>4668</td>
</tr>
<tr>
<td>Aug</td>
<td>5717</td>
<td>3337</td>
</tr>
<tr>
<td>Sep</td>
<td>2510</td>
<td>1958</td>
</tr>
<tr>
<td>Oct</td>
<td>1037</td>
<td>1488</td>
</tr>
<tr>
<td>Nov</td>
<td>1090</td>
<td>-</td>
</tr>
<tr>
<td>Dec</td>
<td>1754</td>
<td>-</td>
</tr>
</tbody>
</table>

SOURCE: DIA

In 1967, truck sightings dropped by a factor of 5.5 from the peak in August to the low in October as bad weather set in over NVN. The supply flow followed this trend. Thus, one cannot attribute the entire decrease in supply flow that occurred in the months before the bombing halt to bombing effectiveness.

Whether the "Summer-1968 Interdiction Campaign" had a special effect is difficult to assess. The following table compares truck attrition in Route Packages 1, 2, and 3 in NVN for June-October in 1967 and 1968.
SECRET

TRUCK ATTRITION IN NVN
(Evaluated Destroyed in Route Packages 1, 2, and 3)

<table>
<thead>
<tr>
<th>Month</th>
<th>1967</th>
<th>1968</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jun</td>
<td>402</td>
<td>565</td>
</tr>
<tr>
<td>Jul</td>
<td>577</td>
<td>775</td>
</tr>
<tr>
<td>Aug</td>
<td>784</td>
<td>622</td>
</tr>
<tr>
<td>Sep</td>
<td>239</td>
<td>295</td>
</tr>
<tr>
<td>Oct</td>
<td>77</td>
<td>242</td>
</tr>
<tr>
<td></td>
<td>2079</td>
<td>2499</td>
</tr>
</tbody>
</table>

SOURCE: DIA

These results show a 20 percent increase in truck attrition in the period June-October 1968 over the same period in 1967.

Rather than look at monthly estimates of truck sightings and attrition and supply flows, a better perspective on the overall effect of the bombing in NVN on the supply flow into Laos is obtained by comparing estimates averaged over a whole year. The table below suggests that, despite our intensive 1968 bombing campaign, NVN was able to infiltrate more supplies and equipment into Laos than it required to support military operations in SVN. The excess material was probably stockpiled in Laos and SVN to support future operations.

<table>
<thead>
<tr>
<th></th>
<th>Delivered to Laos</th>
<th>Consumed &amp; Destroyed</th>
<th>Available for SVN</th>
<th>Required in SVN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1967</td>
<td>93</td>
<td>57</td>
<td>36</td>
<td>15-20</td>
</tr>
<tr>
<td>1968</td>
<td>165</td>
<td>99</td>
<td>66</td>
<td>30-50</td>
</tr>
</tbody>
</table>

While the exact magnitude of these supplies flows and requirements is still subject to uncertainty, the basic conclusion seems clear. The bombing failed to reduce support below required levels, even at the increased activity rates of 1968. The external needs of the VC/NVA forces were so small relative to enemy capacity that it is doubtful any interdiction campaign could have constrained their combat operations. Estimates of the VC/NVA daily requirements for ammunition and weapons range from 30 to 50 short tons, the equivalent of about 10 to 15 trucks per day.

In addition to the destruction of supplies and lines of communication, the bombing campaign in NVN forced the enemy to provide additional materiel to compensate for the interdiction losses, this in order to maintain support of his forces in SVN at acceptable levels. Moreover, NVN was denied use
of the more efficient means of transportation (i.e., rail and coastal shipping). Use of these modes since the halt has enabled the enemy to move large amounts of materiel into the southern Panhandle. Movement south to Vinh by rail is estimated at 400 short tons per day; by coastal watercraft, nearly 1,500 short tons per day. Truck activity now occurs throughout the day, whereas it was confined to the hours of darkness prior to the bombing halt. Further repairs and improvements to land lines of communication, coupled with continued southward extension of north-south petroleum, oils, and lubricants pipeline (1,100 metric tons daily capacity) will further increase the enemy's logistic capability.
To what extent did Chinese and Soviet aid relieve pressure on Hanoi?

Soviet and Chinese aid to NVN has provided nearly all of the materiel required to carry on the war against SVN; NVN's contribution has been chiefly the over-all direction of the war and the input of troops to do the fighting. The bulk of this military and economic aid comes from the Soviet Union. Its assistance generally has consisted of a sophisticated air defense system and training for associated personnel, artillery, petroleum products, transportation equipment, and food. Chinese aid has consisted primarily of small arms and ammunition. Without such aid, NVN long since would have been forced to reduce the scope of fighting in SVN to the guerrilla-warfare level.

One consequence of aid from outside countries was a lessening of economic pressures on Hanoi in the conduct of its war effort. On the other hand, dependence on outside countries for economic support may have resulted in an increase in the political leverage which could be exerted on Hanoi's war policies by other Communist states.

Another consequence of foreign aid directly affected the bombing campaign. The provision of a complete air defense system--including MIG aircraft, surface-to-air missile systems, and antiaircraft guns--enabled NVN to mount a vigorous defense against US air attacks. This air defense environment had significant affects on our bombing performance and tactics.

Seaborne imports to North Vietnam during 1968 increased by almost 40 percent over 1967. The increase was caused mostly by a 40 percent rise in food and a 56 percent rise in petroleum shipments over the previous year from both the USSR and China. Large amounts of flour and rice were delivered last year to supplement the below-average harvests in North Vietnam. The delivery of such items permitted the movement of men and supplies to SVN and the maintenance of a subsistence-level diet in NVN.
What are current views on the proportion of war-essential imports that could come into North Vietnam over the rail or road lines from China, even if all imports by sea were denied and a strong effort even made to interdict ground transport? What is the evidence?

Land Import Capacity

In 1968, NVN imported an average of 6,800 STPD (short tons per day); 6,000 STPD by sea, and 800 STPD by land. Imports by land were higher in 1967, amounting to about 1,100 STPD. However, the land lines of communication from China were not used to capacity. It is estimated that the two rail lines from China have a theoretical uninterdicted capacity of about 8,000 STPD and the road network could provide an additional 7,000 STPD during the dry season (normally June-September) and about 2,000 STPD during the poor weather months. The combined capacity of the land routes (9,000–15,000 STPD) is more than enough to transport North Vietnam's total import requirements of about 7,000 STPD. If all seaborne imports were to come through China, considerable logistic problems would have to be solved by the Chinese regime.

Interdiction of Imports from China

If seaborne imports can be denied to NVN, her ability to successfully pursue the war in SVN would be dependent on land imports from China.

A strong effort to interdict road and rail transport from Communist China through North Vietnam would require a concerted and coordinated air interdiction campaign against all transportation: military support; petroleum oil, and lubricants power; industrial; air defense; and communications target systems. The interrelationship of the effects of destruction of targets in one category to the effectiveness of others is such that a cumulative impact is achieved. The air campaign would be conducted in such a manner as to be free of the militarily confining constraints which have characterized the conduct of the war in the north in the past. The concept would preclude attacks on population as a target but would accept high risks of civilian casualties in order to achieve destruction of war-supporting targets.

An interdiction campaign as described above, when employed in conjunction with denial of sea imports, would, in large part, isolate Hanoi and Haiphong from each other and from the rest of the country. Isolation of Hanoi, the focal point of the road and rail system, would be highly effective in reducing North Vietnam's capability to reinforce aggression in South Vietnam. Importation of war-supporting material would be seriously reduced. Road capacities would be reduced by a factor well in excess of
the estimated 50 percent believed to have been accomplished during the
summer months of 1966 and 1967. Over time, North Vietnam's capability
to cope with the cumulative effects of such an air campaign would be
significantly curtailed.

The Joint Chiefs of Staff believe that resumption of an interdiction
campaign similar to that carried out in Route Package I between July
and 1 November 1968 would assure almost total interdiction of truck and
waterborne movement of supplies into the demilitarized zone and Laos.
Naval blockade offshore and interdiction of Regional Package II to Thanh
Hao would further enhance this effort.

Commitment of B-52 forces following heavy and unrestricted suppress­
on of defenses by fighters, could reduce the amount of time to accomplish
the above. Although the North Vietnamese have established a significant
by-pass capability, the transportation nets remain vulnerable at many key
points. The locomotive population could be attrited quickly if all buffer
restrictions were removed near the Chinese border.

There is not sufficient data available at this time on either the cost
or the effectiveness of an air campaign against these land lines to reach
a firm conclusion as to the chances of isolating NVN from her neighbors.
Past attempts to cut rail, road, and water networks in NVN have met with
considerable difficulties. It has been estimated that a minimum of 6,000
attack sorties per month would be required against the two rail lines
from China. Even at this level of effort, the North Vietnamese could
continue to use the rail lines to shuttle supplies if they were willing
to devote sufficient manpower to repair and transhipment operations.
Interdiction of the road system would be still more difficult. Since
the bombing halt north of 19° in April 1968, North Vietnam has repaired
all major road and railway bridges, constructed additional bypasses and
alternative routes and expanded the railroad capacity by converting large
segments from meter to dual gauge track. These improvements would make
even more difficult prolonged interdiction of the overland lines of com­
munication.

We currently fly approximately 7,000 sorties per month against
two primary roads in Laos without preventing throughput truck traffic;
the road network from China has 7-10 principal arteries and numerous
bypasses. Finally, the monsoonal weather in NVN would make it diffi­
cult to sustain interdiction on the land lines of communication. Poor
visibility would prevent air strikes during 25-30% of the time during
good weather months and 50-65% of the time during poor weather months.
Thus, it is not possible to give a definitive amount to the question
of how much war-essential imports could come into NVN if sea imports
are denied and a strong air campaign is initiated.
Attention would also have to be given to interdiction of supplies coming into SVN from Cambodia. Over the past 2 years, the enemy's use of Cambodia as a supply base and a place of refuge has become more pronounced. During the period October 1967 to September 1968, 10,000 tons of munitions transited Sihanoukville and are suspected of having been delivered to enemy forces in the Cambodia-Republic of Vietnam border regions. This amount represents more than enough ordnance to satisfy the arms and ammunition requirements for all enemy forces in South Vietnam during the same period. Thus, the act of sealing off the enemy's Cambodian supply lines must be considered as an integral part of any plan to prevent supplies from reaching enemy forces in the Republic of Vietnam.
SECRET
QUESTION 29e

What action has the Democratic Republic of Vietnam taken to reduce the vulnerability and importance of Hanoi as a population and economic center (e.g., through population evacuation and economic dispersal)?

North Vietnam has attempted to reduce the vulnerability of Hanoi and Haiphong to US air strikes. A large segment of the civilian population (estimates range from 40-70% of the total) was evacuated from those two populated areas while US bombing operations were being conducted in the north. Some evacuees have drifted back into the city since the bombing halt, and a few schools reportedly have been reopened; however, the evacuated order has not been rescinded. In addition to personnel evacuation, the North Vietnamese dispersed most small industry, schools, hospitals, and government administration in Hanoi and Haiphong. There is no indication that these facilities have returned. Finally, North Vietnam has constructed an effective and extensive system of air raid shelters for Hanoi residents, and blast walls are under construction around important facilities such as the thermal power plant. Hanoi and its environs are also protected by a well-integrated air-defense system.

Although the North Vietnamese have attempted to reduce the importance and vulnerability of Hanoi and Haiphong, these two cities still remain essential to their war effort. Approximately 80% of the North Vietnamese imports enter through the port of Haiphong, and Hanoi is the logistic center for all rail, road, and water lines of communication from China. Both cities are important storage areas for war-supporting supplies and materiel. It has been reported that some fuel and industrial equipment are being sent directly to new regional sites and rural areas away from Hanoi where new factories will be set up.

The buildup of a major logistics support/trans-shipment complex in the Than Hoa and Vinh area since April 1968 has shifted this important war-support function from the Hanoi area. The buildup of Quang Khe and Dong Hoi since the bombing halt has further reduced dependence on Hanoi. However, the success of this dispersal is dependent in large measures upon unrestricted ship movements south from Haiphong. Hanoi continues to be a bottleneck for all land traffic from China.