Appendix C

Obstacle Resourcing and Supply Operations

This appendix describes obstacle resourcing and supply from corps to emplacing unit level. First, it concentrates on how units plan to resource obstacles in terms of Class IV and Class V obstacle materials, manpower, and equipment. Second, it describes the flow of obstacle materials and offers some techniques for ensuring efficient supply operations.

OBSTACLE RESOURCING

At company team level, the emplacing unit and company team commander can easily identify the resources required for individual obstacles. However, at TF level, the exact requirements are less clear. The exact requirements become increasingly unclear at each higher level. The staff at each level needs a method for estimating obstacle resource requirements to make the necessary allocations to subordinate units. The two techniques for estimating obstacle resource requirements are—

- Requirement-based resourcing.
- Capability-based resourcing.

These techniques provide guidelines for requisitioning and moving resources.

REQUIREMENT-BASED RESOURCING

One technique is to resource subordinate units with obstacle materials and manpower based on anticipated requirements. These requirements are based on the tentative control measures the staff used while developing the obstacle plan (see *Chapter 4).* The staff arrays obstacle-control measures based on the array of friendly forces two levels down. For example, the division staff draws tentative obstacle belts to support the tentative array of TFs in the scheme of maneuver. The staff combines the obstacle belts into obstacle zones and allocates resources for the obstacle zones based on the tentative obstacle belts.

The staff multiplies the width of the AA for the tentative obstacle-control measure at the lower level by the obstacle-effect resource factor (see *Table C-1, page C-2).* The resource factor used depends on the obstacle effect. The staff assumes an obstacle effect for the tentative obstacle-control measures based on how it thinks the subordinate unit will fight the battle.

This provides the linear obstacle effort required for the obstacle-control measure. *Figure C-1, page C-2,* shows the relationship

Table C-1. Obstacle-effect resource factor.

Obstacle Effect	Resource Planning Factor
Disrupt	0.5
Turn	1.2
Fix	1.0
Block	2.4

between the resource factor for each obstacle effect, the AA width, the total linear obstacle effort required, and a possible array of individual obstacles. The staff translates the linear effort required for all the tentative obstacle-control measures into resources required using standard planning factors and obstacle packages. It sums the total resources required for the tentative obstacle-control measures within each subordinate unit's area of operations. It then allocates resources to the subordinate units based on the resources required for the obstacles in its areas of operations.

Figure C-2 shows the obstacle plan from the division scenario in *Chapter 4* (to include the tentative obstacle belts used to develop the plan). *Table C-2, page C-4,* shows an example of the requirement-based resourcing technique based on that scenario.

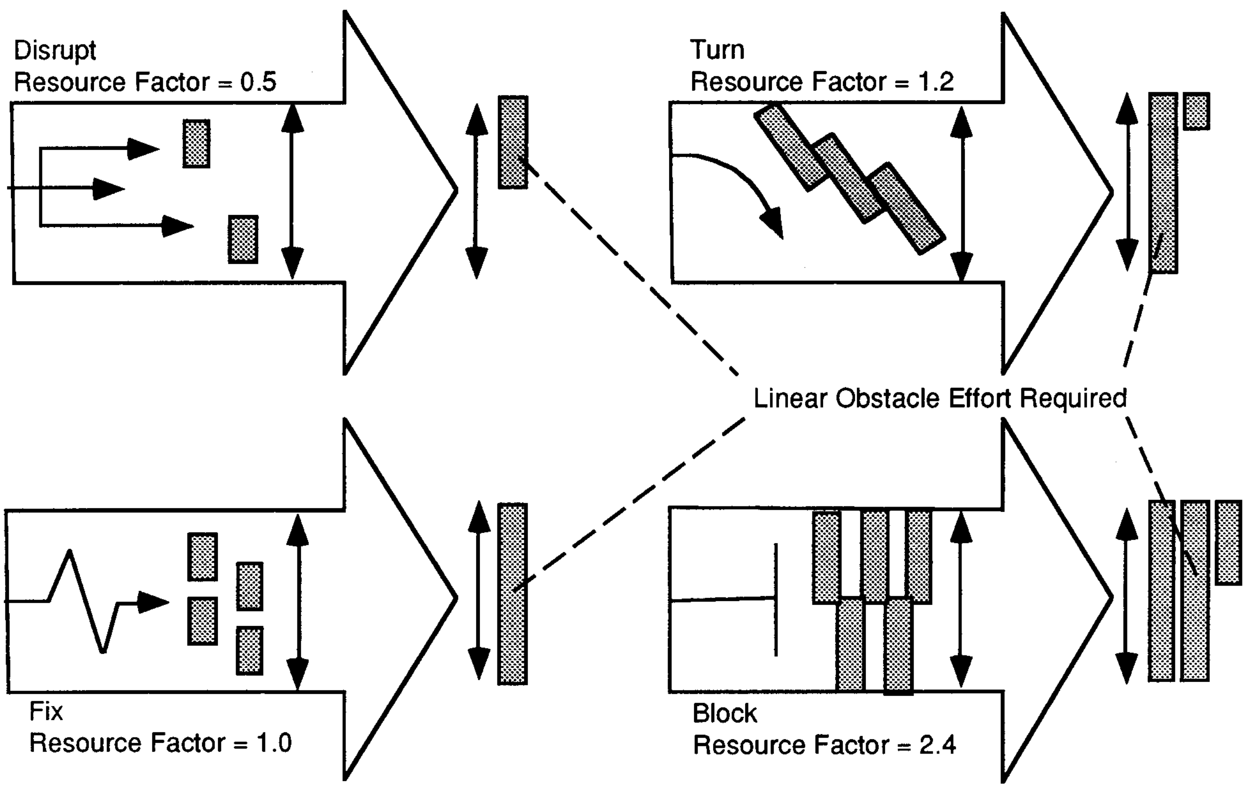

Figure C-1. Obstacle resource factor.

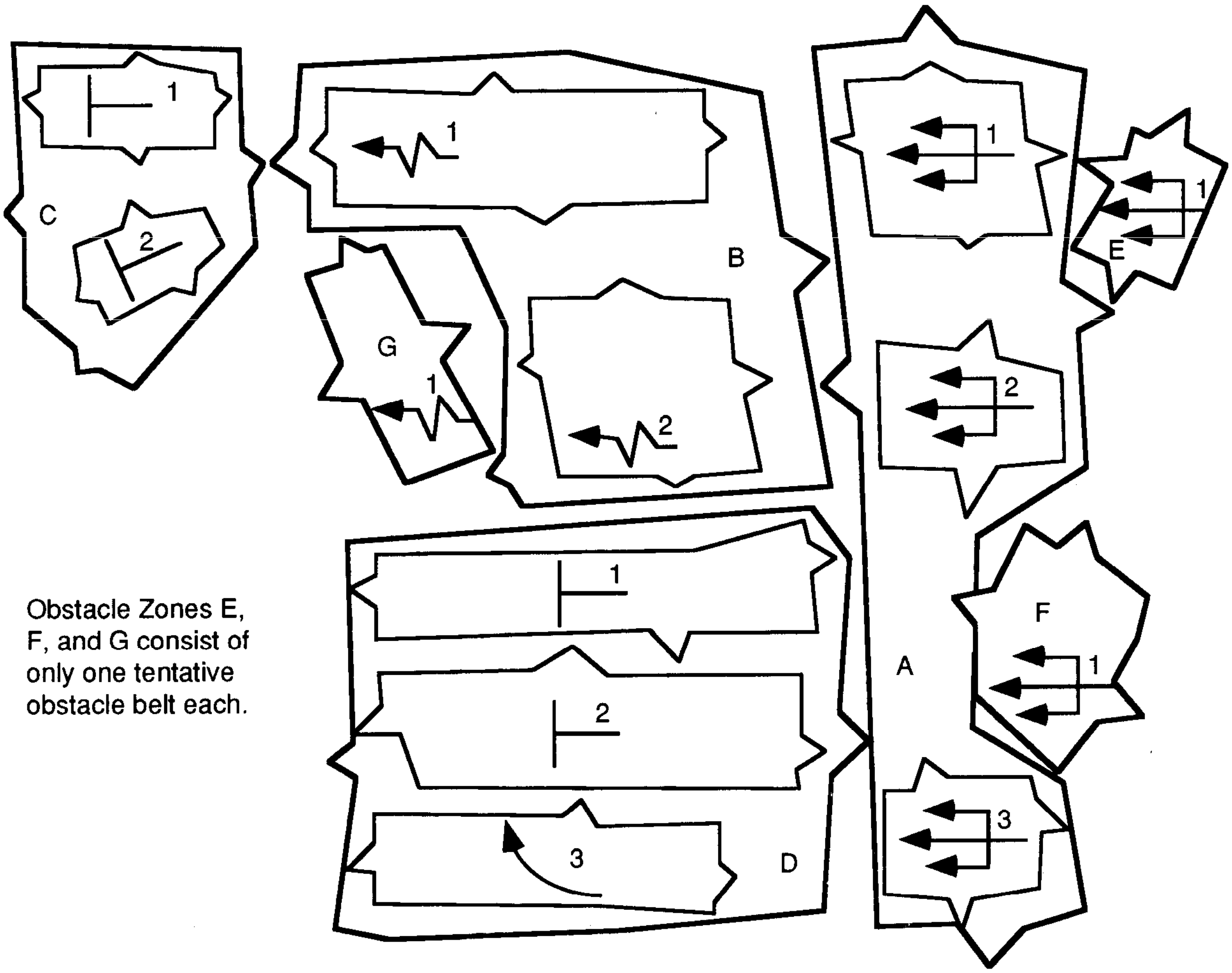

Figure C-2. Division obstacle plan.

The division staff developed seven obstacle zones, A through G (column 1). It used tentative obstacle belts (column 2) to develop the obstacle zones. The staff assumed an obstacle effect (column 3) for each tentative obstacle belt based on how it thought the brigade commanders would fight the battle. It determined the resource factor (column 4) based on the assumed obstacle effect. It multiplied the AA widths (column 5) by the resource factor to determine the total linear obstacle effort required (column 6) for each tentative obstacle belt.

The division used the standard row minefield from FM 20-32 to determine resource requirements (it could just as easily have used other standard obstacles dependent on METT-T). The staff divided the linear obstacle effort required by the frontage of the appropriate standard row minefield (column 7) to determine the number of minefield required (column 8). The staff then multiplies the number of minefield required by the number of mines and platoon hours required for each minefield (columns 9 and 10 respectively). The staff totals the requirements for mines (column 11) and platoon hours (column 12) for each obstacle zone.

Using the zone totals (columns 13 and 14), the staff can now allocate platoons and

Table C-2. Requirement-based resourcing.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	Conversion of PHs Into Engineer Units
Zone	Belt	Effect	Resource Factor	AA Width	Linear kms	MF Frontage	# MFs	Mines/ MF	PHs/ MF	Mines Req	PHs Req	Mines/ Zone	PHs/ Zones	
A	1	Disrupt	0.5	5	2.5	250	10	126	1.5	1,260	15	3,276	39	2 platoons = 1 engineer company for 2 days
	2	Disrupt	0.5	4	2.0	250	8	126	1.5	1,008	12			
	3	Disrupt	0.5	4	2.0	250	8	126	1.5	1,008	12			
B	1	Fix	1.0	4	4.0	250	16	147	1.5	2,352	24	5,860	60	3 platoons = 1 engineer company(+) for 2 days
	2	Fix	1.0	6	6.0	250	24	147	1.5	3,508	36			
C	1	Block	2.4	3	7.2	500	15	630	5.0	9,450	75	18,900	150	8 platoons = 4 engineer companies for 2 days
	2	Block	2.4	3	7.2	500	15	630	5.0	9,450	75			
D	1	Block	2.4	3	7.2	500	15	630	5.0	9,450	75	26,082	203	10 platoons = 5 engineer companies for 2 days
	2	Block	2.4	4	9.6	500	20	630	5.0	12,600	100			
	3	Turn	1.2	3	3.6	500	8	504	3.5	4,032	28			
E	1	Disrupt	0.5	4	2.0	200	10	FSO determines exact requirements for artillery-delivered RAAMS/ADAM to support either Obstacle Zone E or F.						
F	1	Disrupt	0.5	4	2.0	200	10							
G	1	Fix	1.0	4	4.0	278	16	80 canisters	NA	640 canisters	Air Volcano; division controls assets. Mine quantities are in canisters.			

mines to the brigades to meet the requirements for each obstacle zone. The staff converts the platoon hours required into platoons required based on the actual time available. It then task organizes engineer units to the brigades to provide the necessary manpower. The staff may consider other sources of manpower (units other than engineers) when allocating engineer units.

CAPABILITY-BASED RESOURCING

The second technique for obstacle resourcing is to allocate obstacle materials based on the capability of units to emplace obstacles. Units have the capability to emplace only a certain amount of obstacle material in a given amount of time. For example, an engineer company can emplace a quantifiable number of conventional mines in one day.

Capability-based resourcing is a good technique to use when time is short. Early in the plan development, the staff identifies the main effort based on the concept of the operation. Based on the main effort, the staff develops a preliminary task organization. This task organization drives obstacle material resourcing. Although the staff concerns itself primarily with the engineer task organization, it does not ignore other units with obstacle emplacement capability.

The advantage of this technique is the early identification of obstacle material requirements. Obstacles require a large amount of material and transportation assets to haul the material. Engineer units have a limited capability for hauling obstacle material. The earlier the staff identifies the haul requirement, the easier coordination for haul assets becomes. This helps logistic planners who do not require great precision but certainly welcome early identification of requirements.

Figure C-3 illustrates the capability-based resourcing technique. The scenario used is

Based on the commander's intent and the concept of the operation, the priority of effort is to 2d Brigade, 1st Brigade, Cavalry Squadron, 3d Brigade, and Aviation Brigade (in that order). Based on troops available, the task organization is as follows:

Using 10 platoon hours/day x 150 $\frac{\text{mines}}{1.5}$ platoon hours = 1,000 mines/day

1st Brigade
- **Engineer Battalion** → **8 platoons x 1,000 mines/day = 8,000 mines/day**
- **Engineer Company**

2d Brigade
- **Engineer Battalion** → **8 platoons x 1,000 mines/day = 8,000 mines/day**
- **Engineer Company**

3d Brigade
- **Engineer Battalion(-)**

Cavalry Squadron
- **Engineer Company** → **2 platoons x 1,000 mines/day = 2,000 mines/day**

Figure C-3. Capability-based resourcing.

the division defensive scenario from *Chapter 4.* The staff developed a task organization for engineer units with one engineer battalion each in support of 2d Brigade and 1st Brigade. Both engineer battalions have an attached engineer company (from the third engineer battalion) for a total of eight engineer platoons each. In addition, the cavalry squadron has an attached engineer company (also from the third engineer battalion) for a total of two engineer platoons. (Note that the third engineer battalion HQ is conducting planning and coordination with 3d Brigade for the division CATK).

To determine the obstacle resources required by each brigade, the division staff determined the obstacle emplacement capability of the engineers in support of the brigades. The staff made several assumptions concerning obstacle emplacement capability. Based on the standard row minefield in *FM 20-32* and minefield planning data in *FM 5-34*, the staff assumed that an engineer platoon can emplace 100 mines per hour. The staff also assumed that the platoons can only do ten hours of effective work per day (subtracting time for travel, maintenance, resupply, rest, and so forth).

The staff multiplied the effective hours per day by the number of mines per hour and determined that the platoons can use 1,000 mines per day. The staff multiplied the number of engineer platoons in support of each brigade by the number of mines per day. This figure was the number of mines per day that each brigade can reasonably emplace given the engineer task organization.

In the examples above, the staff only considered the use of standard row minefield from *FM 20-32*. The staff could have used a different type of individual obstacle or a combination of different types. If it used the requirement-based method, for example, the staff could have substituted AD for part of the total linear obstacle effort required. For Obstacle Belt B1, the staff could have used 1,000 meters of AD and 3,000 meters of minefield instead of 4,000 meters of minefield. This would have reduced the total Class V and platoon hour requirement for Obstacle Belt B1 but would have added a requirement for digging assets.

Both of the resourcing techniques discussed above can be used at any level for planning resources. At the TF level, the staff uses the actual groups that it has planned rather than tentative obstacle-control measures. As with any other process, the staff abbreviates obstacle resourcing when time is short or adds detail if time allows. Whatever the technique used, staffs must make some reasonable assumptions when necessary. They also must use information and planning factors relevant to their organization.

OBSTACLE SUPPLY OPERATIONS

Obstacle material is Class IV or Class V material, which is requested and delivered through the maneuver unit's supply channels. Obstacle material is a maneuver unit responsibility. *Figure C-4 and Figure C-5, page C-8,* show the request flow and the supply flow for Class IV and Class V, respectively, from corps to TF level.

Class IV obstacle material requests originating at or below TF level go to the TF S4. The TF S4 sends supply requests to the forward support battalion (FSB). Class IV supply requests at brigade level also go to the FSB. The FSB sends the requests to the division materiel management center (DMMC). Supply requests originating at division level also go to the DMMC. The DMMC sends the request to the corps material management center (CMMC). Corps-level requests also go to the CMMC.

Issuing Class IV obstacle material usually involves large quantities of material. Corps

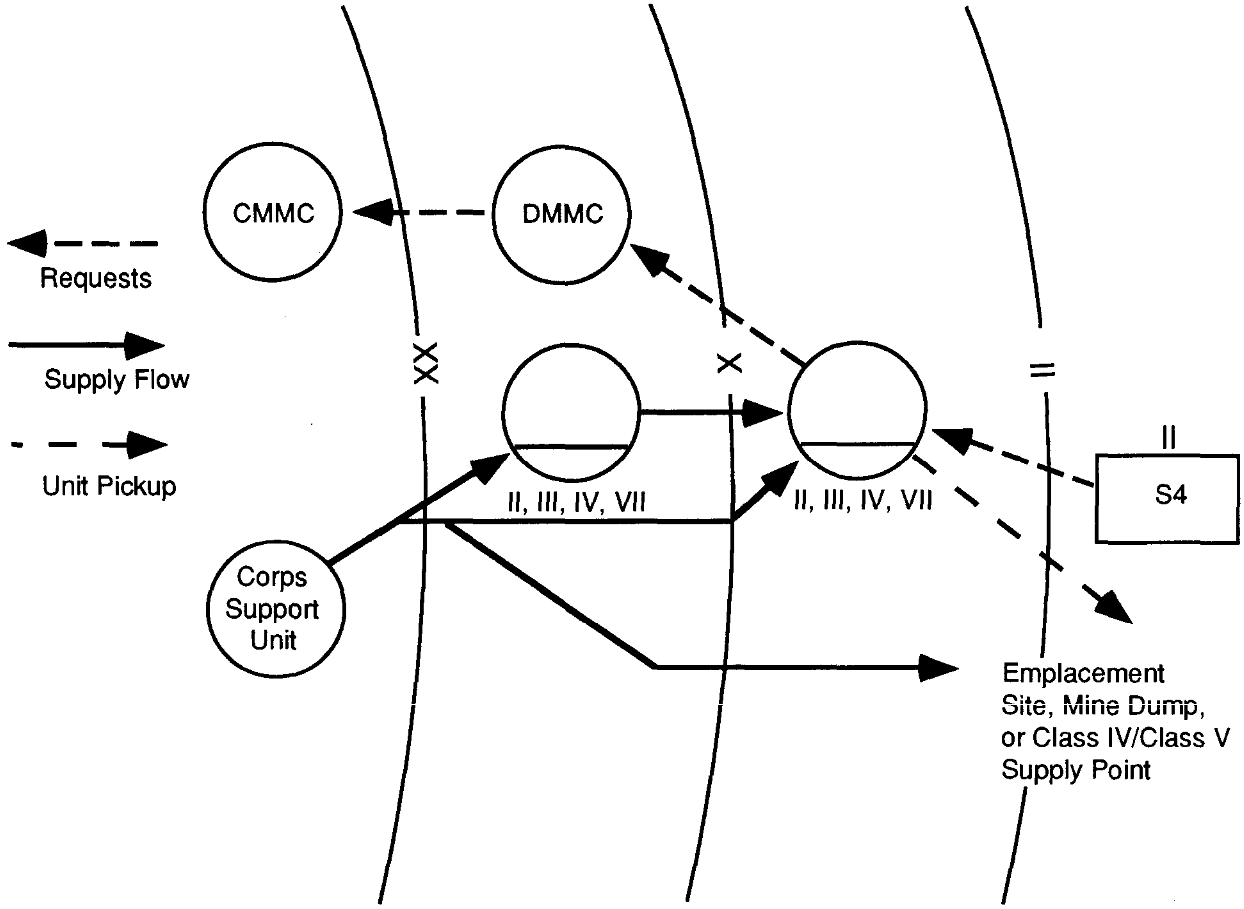

Figure C-4. Class IV obstacle material.

support elements deliver Class IV material directly to the emplacement sites using corps transportation assets.

Units request Class V obstacle materials somewhat differently. The TF S4 notifies the brigade S4 of Class V requirements. The brigade S4 notifies the division ammunition officer (DAO) in the DMMC who authorizes Class V issue by the ammunition transfer point (ATP). The DAO sends requests for Class V to the CMMC.

Class V obstacle material flows from the corps storage area (CSA) to the ammunition storage points (ASP) to the ammunition transfer points (ATP) or, more likely, straight to the ATP. Class V obstacle material, unlike most ammunition, is delivered to the user at the obstacle emplacement site.

A supply request includes the quantity, the required delivery time, the transportation responsibilities, and a desired location. The quantity includes the required quantity for each type of obstacle. There may be several Department of Defense identification codes (DODICs) and national stock numbers (NSNs) involved, depending on the types of obstacles required. The required delivery time is very important to ensure an early start on the preparation of the battlefield. Lack of material could adversely affect the mission. The transportation responsibilities must be clearly understood. MHE is required to ensure a rapid turnaround of haul assets.

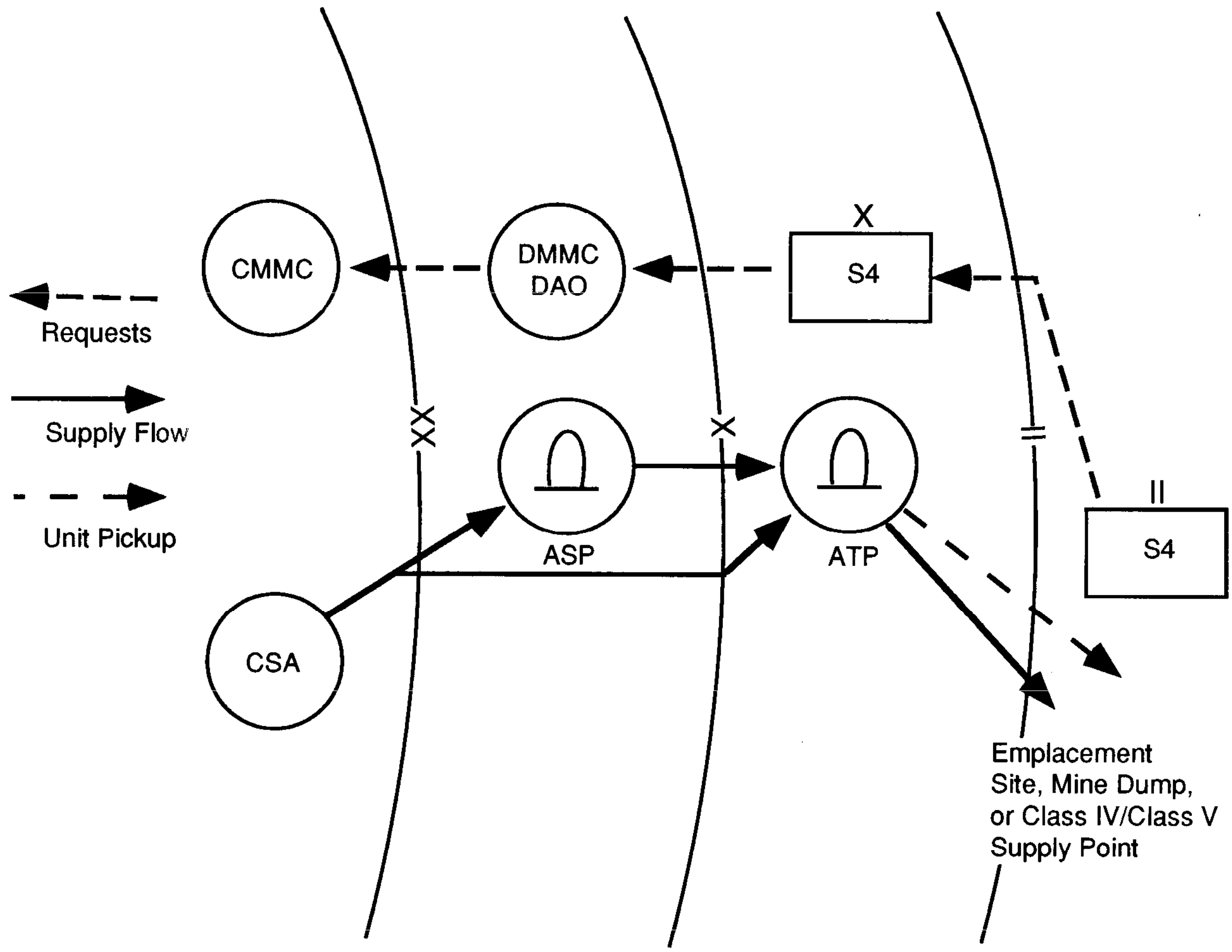

Figure C-5. Class V obstacle material.

In addition, the brigade staff identifies the location of Class IV/Class V points in the TF sectors in coordination with the TF staff. Prompt identification of the TF Class IV/ Class V point is required if the obstacle material is forwarded from the corps into the TF sector. If the material is not forwarded into the TF sector, it becomes a brigade responsibility to deliver the material to the TF.

At the TF level, sustaining obstacle operations is an extremely difficult task. Centralized throughput operations by the corps or the division stops at the TF level. Mass quantities of obstacle material, especially mines, are centrally received, broken down into usable packages, and then distributed throughout the sector based on the obstacle plan. At some point in the distribution plan, the TF turns over control of the obstacle material to engineers who then emplace them. Obstacle logistics, especially for mine warfare, at the TF level can be complex, require prudent use of scarce haul and MHE, and demand positive C2.

In the case of obstacle groups developed at corps, division, or brigade level, obstacle material supply may vary slightly. The staff that is at the level where the obstacle group is planned in detail determines the resources required for the obstacle. It also plans how the emplacing unit will get the materials. For example, if the corps staff plans a reserve obstacle group, but the detailed planning is done at TF level, the TF plans the resources for the obstacle group as it would any other obstacle group. However, if the corps staff plans the obstacle group in detail, it determines the resources required. In this case, the corps staff would also plan for delivery of the obstacle materials to the emplacing unit. Alternately, the corps staff could direct the emplacing unit to pick up the obstacle materials from a location such as the CSA.

OBSTACLE RESUPPLY NODES

There are two critical obstacle resupply nodes within the TF sector. Each of them has a different function in the obstacle resupply process if the material is not delivered directly to the emplacement site. They are the—

- Class IV/Class V supply point.
- Mine dump.

The relative location of the Class IV/Class V supply point and mine dumps are shown in *Figure C-6.*

Class IV/Class V Supply Point

The Class IV/Class V supply point is the central receiving point of obstacle material in the TF sector. It is the point at which the TF receives and transfers control of obstacle material pushed forward by higher levels. The supply point is established and operated by the TF and is centrally located to support all planned obstacles within the TF sector. Where the tactical obstacle plan allows, the supply point should be located near the TF combat trains to better facilitate C2 and the availability of equipment.

The main purpose of the Class IV/Class V supply-point operation is to receive obstacle materials and then reconfigure them based on the requirements for each obstacle group.

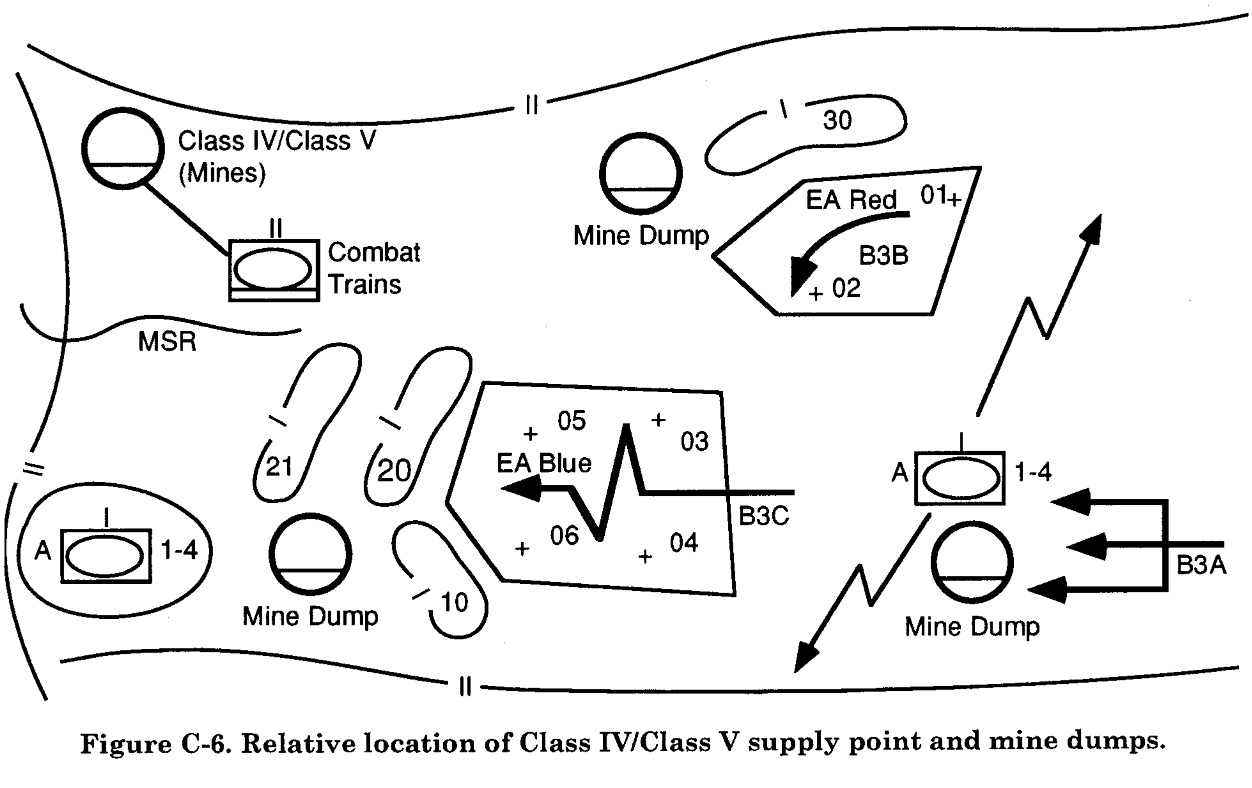

Figure C-6. Relative location of Class IV/Class V supply point and mine dumps.

This requires that the supply point must have a dedicated S4 representative to track the flow of obstacle material in and out of the supply point. The supply point should have dedicated MHE to off-load the bulk quantities of obstacle material and reconfigure them into obstacle packages, if required. Obstacle materials are normally broken down into obstacle packages if the materials are not already delivered in combat configured loads. This may require a dedicated engineer representative to ensure that the obstacle materials are configured properly.

The most labor-intensive task at the Class IV/Class V supply point is uncrating the mines. This requires dedicated manpower equipped with tools to break shipping bands and uncrate the mines from their containers. Another important aspect of uncrating mines is tracking fuzes and booster charges. As the mines are uncrated, fuzes and booster charges are separated; however, the same number and type of fuzes and boosters must be task organized with minefield packages. This requires strict supervision because mistakes can quickly lead to confusion and a waste of emplacement time.

Because of the assets involved in the Class IV/Class V supply point, a TF is normally capable of operating only one supply point at any given time. If the TF sector is extremely wide or deep, several supply points may be planned; however, only one can be operated at a time, based on the commander's priorities for obstacle emplacement.

Mine Dump

The mine dump is the most forward mine resupply node. It is the point at which mines are task organized into mine strip packages and inspected, prepared, and loaded onto the emplacing vehicle. It is not a permanent supply point. A mine dump is not always used; it depends on the method of minefield resupply. These techniques are discussed in more detail below. When used, one mine dump supports a single obstacle group. It is activated or deactivated upon initiation and completion of emplacing the obstacle group. Mine dump operations are primarily an engineer company or platoon responsibility. However, it is a good technique to augment mine dump operations with personnel from the company team overmatching the obstacle group being emplaced. The mine dump may be located either in the vicinity of the company team position or nearer to the obstacle group.

There are three critical tasks that must be accomplished at the mine dump.

- As minefield packages are transported to the mine dump, they are further task organized into strip packages, complete with the right number, type, and mix of fuzes and boosters. For example, if the platoon is emplacing a standard disrupt row minefield, mines are task organized into three packages. As the engineer platoon moves to the mine dump to resupply, each emplacing vehicle loads a designated package.
- The mines are prepared for emplacement. They are not fuzed at the mine dump. Preparation includes loosening and greasing fuze and booster wells and checking to ensure proper functioning.
- The mines are loaded onto the emplacing vehicles or delivery system.

Transportation of mines from the Class IV/Class V supply point to the mine dump is a supported TF responsibility; however, it is usually shared between the engineer company and the TF since neither one has the haul capability to simultaneously service all active mine dumps.

OBSTACLE RESUPPLY RULES

The following rules govern obstacle material resupply:

- Uncrate mines at the Class IV/Class V supply point to preserve transportation assets going forward.
- Task organize obstacle material into type packages at the Class IV/Class V supply points.
- Transport materials from the Class IV/Class V supply point to the mine dump (a shared engineer and maneuver unit responsibility) when a mine dump is used.
- Inspect and prepare mines at the last supply node (Class IV/Class V supply point or mine dump) before loading them onto the emplacing vehicle or dispensing system.
- Set up Class IV/Class V supply points using authorized ammunition procedures and distance requirements.

OBSTACLE SUPPLY LOCATIONS

Considerations for selecting a location for the Class IV/Class V supply point and/or mine dump are—

- Carrying capacity.
- Traffic circuit.
- Camouflage and cover.
- Defense.
- Time.
- Operators.

Carrying Capacity

The location of key supply nodes depends in part on the type, amount, and availability of haul assets. The carrying capacity plays a large role. In short, the more material a vehicle can carry, the more turn-around time you can afford. *Table C-3,* page *C-12,* provides the Class IV and Class V haul capacity for various types of vehicles.

Traffic Circuit

Vehicles must be able to enter, load, unload, and exit without interfering with the loading and unloading of other vehicles.

Camouflage and Cover

Protection from observation and thermal imaging is desired. Protection from artillery and air attack should be considered. Residue must be removed.

Defense

The site must be organized for defense against enemy patrols and saboteurs.

Time

Time factors to handle the obstacle material—to include all unloading, uncrating, inspecting, and loading—must be considered. Use of soldiers other than engineers to perform these functions can have a significant impact on obstacle capability.

Operators

Leaders and soldiers must be specifically allocated to operate mine dumps. They will probably remain there until the task is complete. The supply node may have to be collocated with or be near a source of manpower. *Table C-4, page C-12,* provides general guidance on how much manpower is required to sustain mine resupply operations.

OBSTACLE MATERIAL RESUPPLY METHODS

The methods for obstacle material resupply are—

- Supply point.
- Service station.
- Tailgate.

In each method, corps or division transport delivers Class IV/Class V supplies forward

Table C-3. Class IV and Class V haul capacity.

Vehicle	Concertina Wire	M15 AT Mine	M19 AT Mine	M21 AT Mine	M16 AP Mine	MOPMS Mine	Flipper Mine	Volcano Mine
HMMWV, M998 2,500 lb 215 cu ft	2	51	34	27	55	15	11	1
21/2-Ton Truck 5,000 lb 443 cu ft	4	102	69	55	111	30	23	2
5-Ton Truck 10,000 lb 488 cu ft	7	204	138	109	222	61	46	5
5-Ton Dump Truck 10,000 lb *135/291 cu ft	2/4	112/204	64/138	32/70	168/222	23/51	39/46	3/5
20-Ton Dump Truck 40,000 lb 754 cu ft	11	628	443	179	888	132	184	20
HEMTT Truck 20,000 lb 540 cu ft	8	408	277	128	444	94	92	10
12-Ton S&P 24,000 lb 875 cu ft	13	489	333	208	533	148	110	12
40-Ton Lowboy 80,000 lb 1,760 cu ft	27	1,466	1,035	419	1,777	308	368	43
M548 12,000 lb 529 cu ft	8	244	166	125	266	74	55	6
#/Wt/lb; Cube cu ft	40/ 1,180; 64	1/ 49; 1.2	2/ 72; 1.6	4/ 91; 4.1	4/ 45; 0.8	21/ 162; 5.7	40/ 217; 3.4	240/ 1,850; 37.6

For concertina = bundles; 1 bundle = 40 rolls * Without/with sideboards

Table C-4. Mine dump planning factors.

Number of Personnel	Quantity of Mines
2-man team (2 minutes per mine)	25 mines/hour
Squad (8 soldiers)	100 mines/hour
Platoon	300 mines/hour; 3,600 mines/day
Company	10,800 mines/day

NOTE: Soldiers work 50 minutes per hour, 12 hours a day.

to a designated Class IV/Class V point in each TF sector. The primary differences in each method are how the material is delivered from the Class IV/Class V point to the obstacle location and whether or not a mine dump is activated in the resupply chain.

Supply Point

The supply-point technique requires that the emplacing engineer platoon return to the Class IV/Class V supply point each time it must resupply. *Figure C- 7, page C-14,* illustrates the supply point method of resupply. The supply-point technique does not activate a separate mine dump. In effect, it moves the normal tasks associated with a mine dump to the supply point. Mines are prepared and inspected at the supply point as they are loaded onto the emplacing vehicle or dispenser.

Several considerations may affect the use of supply point resupply. First, if there are no additional haul assets to transport obstacle material forward from the Class IV/Class V supply point, the supply-point method may be the only viable technique. Second, the obstacle may be close enough to the supply point that any other method is less efficient.

Advantages. The advantages to a supply point are that it—

- Minimizes unloading and loading of material.
- Requires minimal augmentation of haul assets.
- Allows manpower and equipment to be massed at a single supply point.
- Streamlines C2 of material.

Disadvantages. The disadvantages to a supply point are that it—

- Requires more movement of the platoon, which may take away from emplacement time.
- Requires that the platoon move in and out of the area.
- May disrupt the emplacement of individual obstacles when emplacing vehicles cannot carry enough material to start and complete the obstacle. This causes emplacing vehicles to stop work, reload, and pick up where they left off.
- Requires a larger Class IV/Class V supply point capable of receiving mass quantities of obstacle material and loading platoons simultaneously.
- Does not afford an opportunity to task organize obstacle packages.

Service Station

The service-station technique centers on the activation of a mine/obstacle dump forward of the Class IV/Class V supply point (see *Figure C-8, page C-15).* In the service-station method, mines/material are transported to a mine/obstacle dump using a combination of engineer and TF haul assets that are normally under the control of the emplacing engineer. At the mine/obstacle dump, material is stockpiled and prepared by the mine/obstacle dump party. Obstacle material is further task organized into packages. The emplacing platoon moves to the mine/obstacle dump to resupply emplacing vehicles or dispensers. Once the obstacle group is emplaced, the mine/obstacle dump is deactivated or moved to support another obstacle group.

There are several considerations for using the service-station resupply method:

- It is used when the obstacle group is located too far from the Class IV/Class V supply point to allow efficient turnaround.
- It is used when available haul assets have a relatively small capacity. This requires frequent short-duration resupply trips and stocking mines to keep pace with emplacement.
- It streamlines emplacement since there is an opportunity to task organize

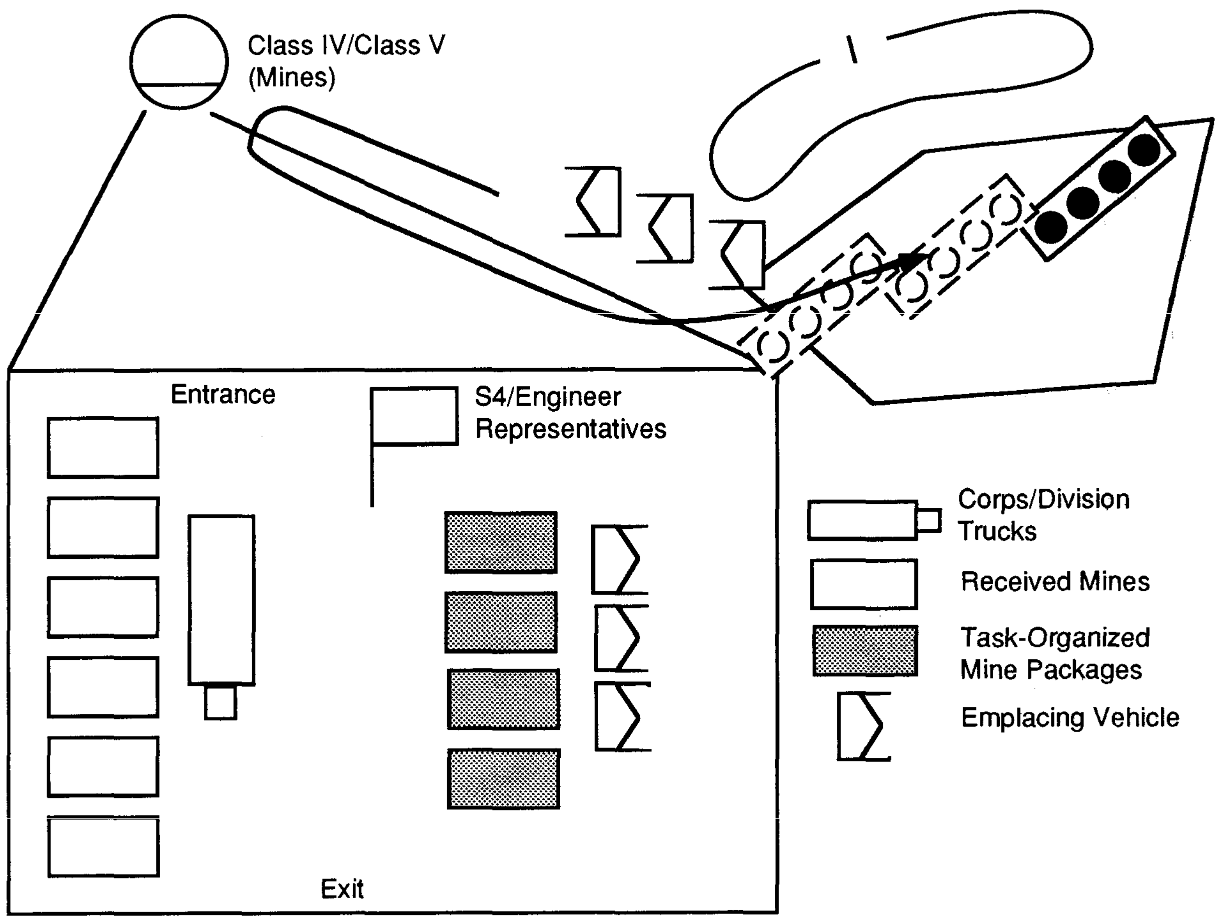

Figure C-7. Supply point distribution.

the mines into strip packages based on the emplacement method and type of minefield.

- While it still requires the emplacing platoon to stop laying and resupply, it minimizes the distance and time the platoon must travel to reload. This requires that a small party be left at the minefield to assist in picking up where emplacement stopped.

Advantages. The advantages to the service-station resupply method are that it—

- Allows for prestockage of obstacle material to keep pace with emplacement.
- Minimizes the distance and time the emplacing platoon must travel to reload.
- Allows for obstacle packages.
- May provide additional manpower and security if it is located near a company team.

Disadvantages. The disadvantages to the service-station resupply method are that it—

- Requires additional loading and unloading of obstacle material.
- May require augmentation with haul assets.
- Disrupts emplacement by requiring the emplacing platoon to stop obstacle

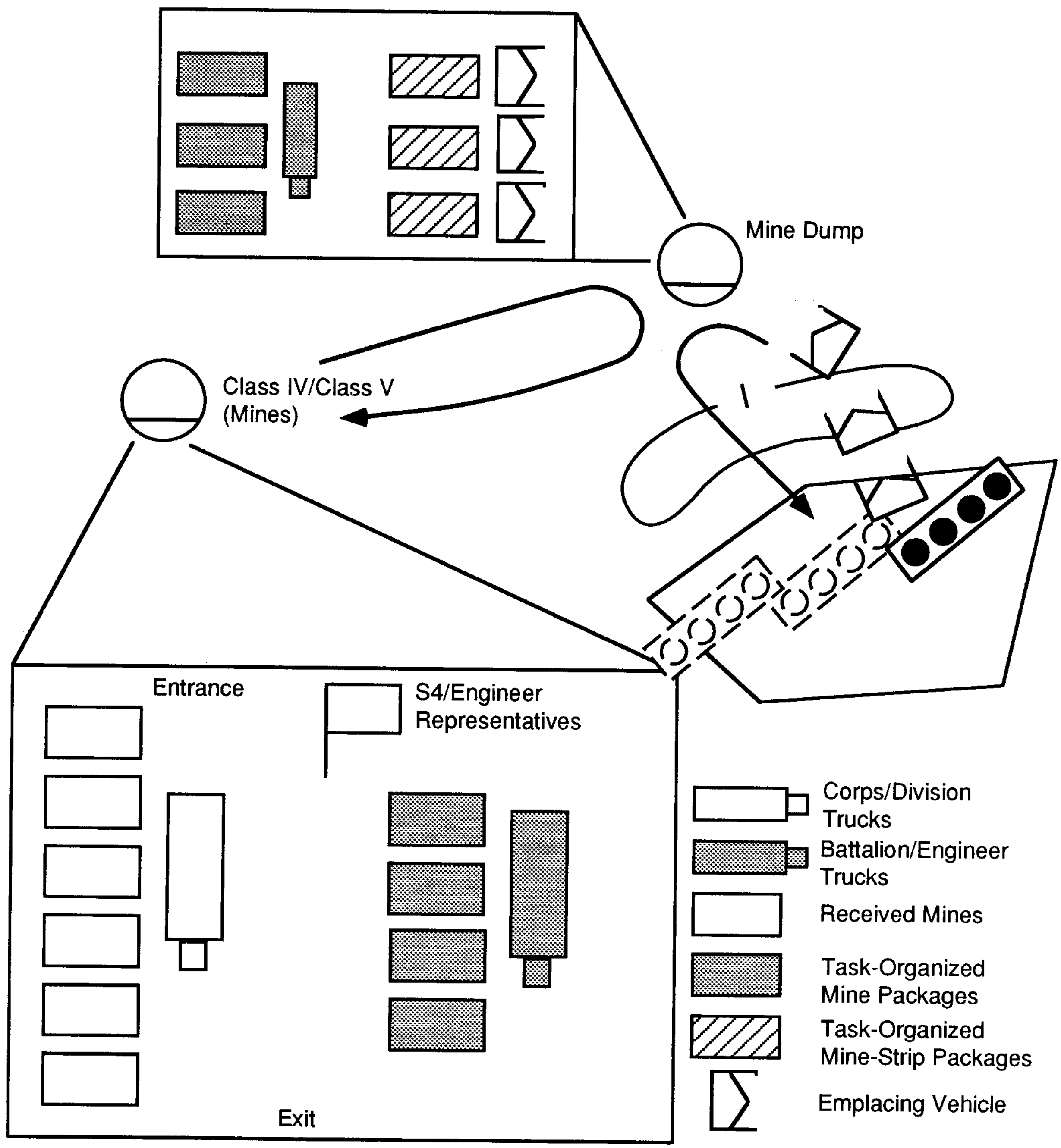

Figure C-8. Service-station distribution.

emplacement, move to the supply point, reload, and return to the minefield.

Tailgate

The tailgate resupply method transports obstacle material directly from the Class IV / Class V supply point to the emplacing platoon on the site (see *Figure C-9).* Obstacle material is transported to the emplacing platoon using both TF and engineer haul assets. At the obstacle site, obstacle material is loaded onto emplacing vehicles or dispensers. This action is performed by emplacing engineers rather than a separate party.

Two overriding considerations drive the decision to use the tailgate resupply method:

- If obstacle emplacement is being conducted during limited visibility, the tailgate method minimizes disruption of emplacement and chance of fratricide as engineers move back into a work area after reloading.
- The tailgate method is used when establishing a hasty defense or when the situation is unclear and an attack can happen at any time. Since obstacle material remains loaded until transferred to the emplacing vehicle, the tailgate method enables engineers to

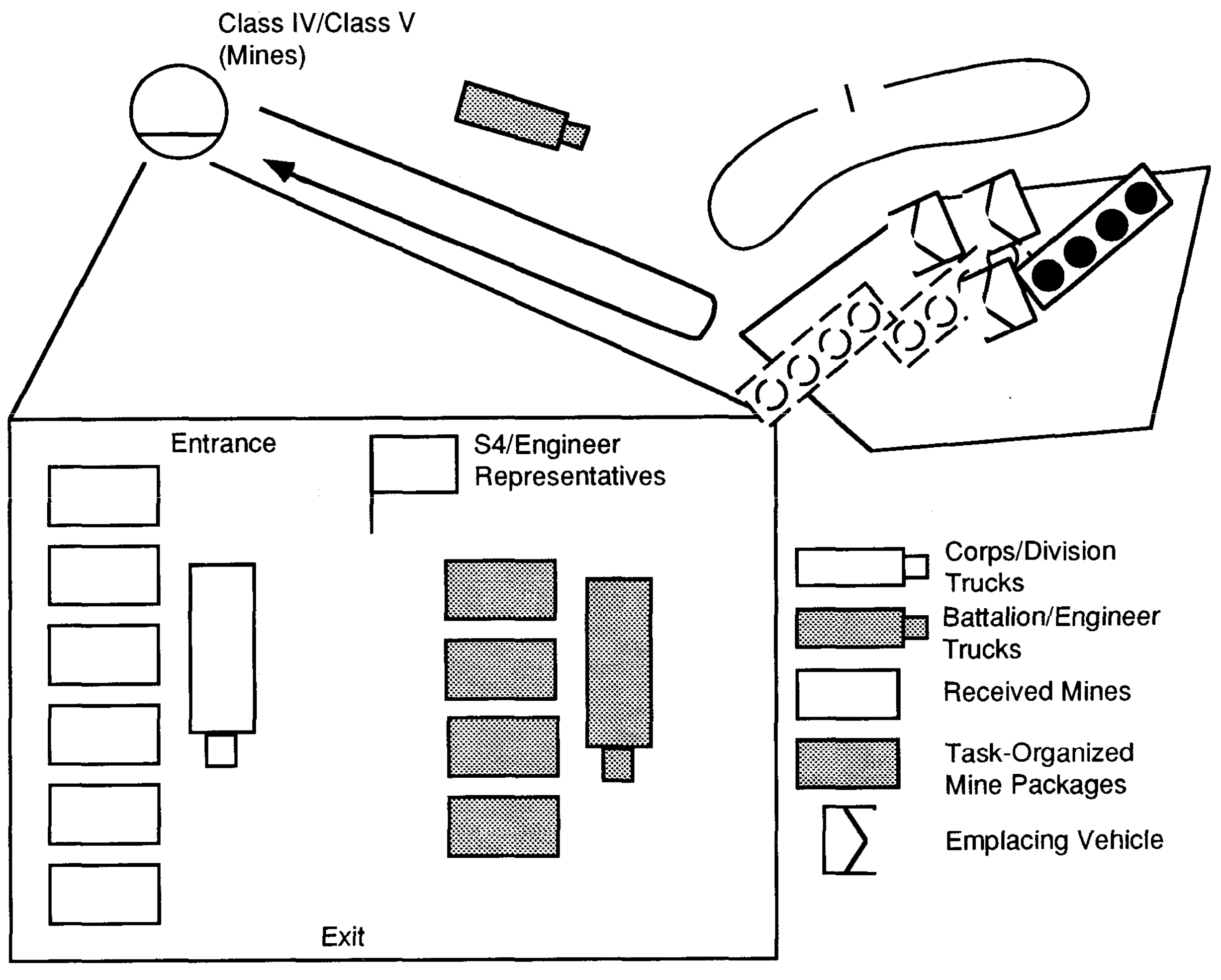

Figure C-9. Tailgate distribution.

quickly break contact without risking a loss of obstacle material to the enemy. The tailgate resupply method is the preferred method for light forces.

Advantages. The advantages to the tailgate resupply method are that it—

- Minimizes loading and unloading of obstacle material.
- Allows engineers to rapidly break contact, in the event of enemy attack, without losing obstacle material to the enemy.
- Minimizes the movement of platoons in and out of the obstacle (suitable for limited visibility).

Disadvantages. The disadvantages to the tailgate resupply method are that it—

- Requires augmentation by high capacity transportation assets capable of offsetting the loss in turn-around time if the vehicle has to wait on-station at the obstacle site.
- May result in inefficient use of haul assets.
- Complicates C2 in linking up obstacle transport assets with emplacing engineers as the engineers continue emplacement.
- Requires that task organizing of obstacle packages and loading occur concurrently.