CHAPTER 4
ROW MINING

CONSIDERATIONS

Row mining is the process of laying mines in rows as opposed to laying them in a standard or random pattern. The typical row minefield is several rows of regularly spaced mines.

Use of Row Mining

Row mining is not a new idea. It has been used since the beginning of modern mine warfare and has proved to be very effective. It is especially effective in support of maneuver-oriented doctrine such as AirLand Battle. Row mining is faster than standard pattern mining. It improves the maneuver commander's flexibility by providing him an obstacle effort that requires smaller manpower effort than standard pattern mining.

Mines may be surface-laid or buried, and they are often laid directly from a slow-moving vehicle. This reduces time and personnel required to emplace a minefield. Soldiers can emplace row minefields from an armored vehicle. Row minefields can be used as tactical obstacles or as situational obstacles. They are usually emplaced at or near the FLOT, along flank AAs to support security operations. The speed and efficiency of row mining make it a desirable option, and row mining supports AirLand Battle doctrine.

Rules for Row Mining

Rules governing authority, reporting, recording, and marking are generally the same for row minefields as they are for other minefields. Row mining is simply a method for laying mines.

The most important factor in row mining is the requirement for strict command and control. Row mining is potentially the most hazardous form of mine laying. It entails movement of vehicles and personnel in and around mines without the safety of a centerline strip. Leaders must place extreme emphasis on safety because the laying procedure is very rapid.

Only a few rules govern row mining. Most of these rules are in STANAG 2036, but the following rules also apply:

- Minimum distance between rows of AT mines is 8 meters.
- Minimum distance between any row and a row with AP mines is 15 meters.
- Clusters are placed on the row centerline, directed toward the enemy side. A cluster in row mining is usually one AT mine, but a cluster may also consist of AP mines.
  - Cluster composition must remain the same throughout the row.
  - Different types of AP mines may be used in a cluster.
  - Total number of mines in one cluster will not exceed five; no more than one will be an AT mine.
  - AT mine type may vary from one cluster to another.
  - A cluster of AP mines can be laid in a 2-meter semicircle on the enemy side of the base mine.

★ - When a cluster contains a mine equipped with an AHD, the mine is armed before the AHD is armed. The cluster is not armed until all personnel are at least 25 meters away.

- Spacing between mines or clusters can vary from 4 to 10 meters, but it will remain constant within the row.
- Mines or clusters will not be closer than 15 meters from the perimeter fence.
- The distance between a start row marker and the first mine in a row is the mine spacing for that row.
- If the distance between a mine or cluster and any turning point is less than the mine spacing for that row, omit that mine or cluster. The mine immediately following a turning point is always located at the mine spacing for that row.
- Record all minefields on DA Form 1355 (see Chapter 5). Figure 4-1, pages 4-3 and 4-4, shows a completed DA Form 1355 for a row minefield.
- Minefield marking and reporting are the same as for other minefield.

Row Mining Logistical Calculations

The following method is used to determine the number of AT mines required for a row minefield when not using the standard row minefields discussed at the end of this chapter. Resulting numbers are rounded up to the nearest whole number.

Step 1. Determine the number of mines required. Multiply the desired density by the minefield frontage.

Density X Frontage = Number of Mines

Step 2. Determine the number of mines per row. Divide the minefield frontage by the desired spacing interval between mines.

Frontage/Mine Spacing = Number of Mines per Row

Step 3. Determine the number of rows. Divide the number of mines by the number of mines per row.

Number of Mines/Number of Mines per Row = Number of Rows

Step 4. Determine the actual number of mines. Multiply the number of mines per row by the number of rows.

Number of Mines per Row X Number of Rows = Actual Number of Mines

Step 5. Determine the number of mines to request. Multiply the actual number of mines by 1.1 (includes 10 percent resource factor).

Actual Number of Mines X 1.1 = Number of Mines to Request

Step 6. Determine the number of vehicle loads by using Table 2-3, page 2-37.

Step 7. Determine the fencing and marking material required. Use the same procedure used for a standard pattern minefield.

Sample Problem

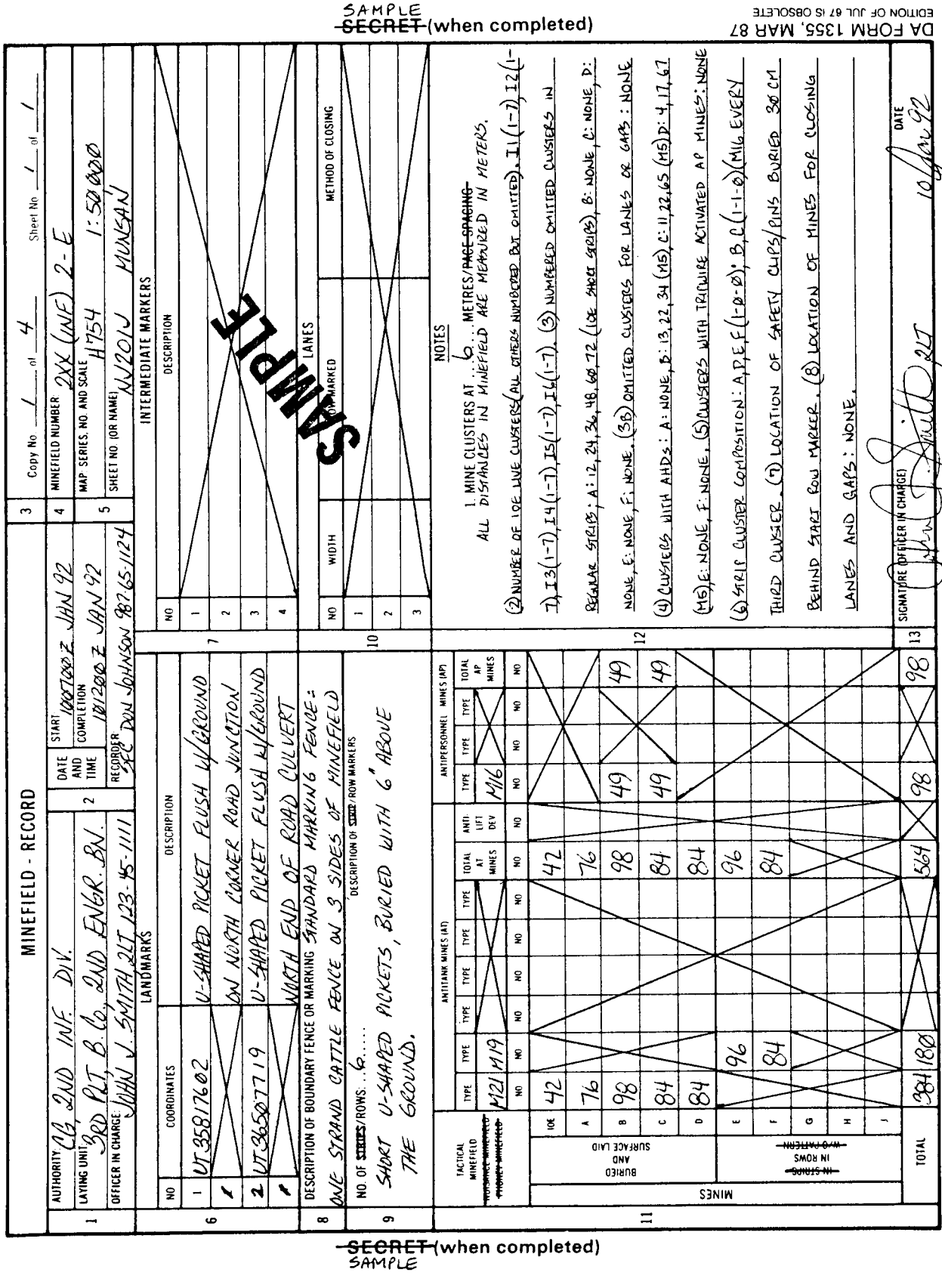
Your platoon has been tasked to emplace a 400-meter row minefield with a density of 0.5-0-0. You have decided to space the mines 6 meters apart. Determine the number of M15 mines to order and the number of 5-ton dump trucks required to deliver the crated or uncrated mines.

Step 1. Density X Frontage = Number of Mines

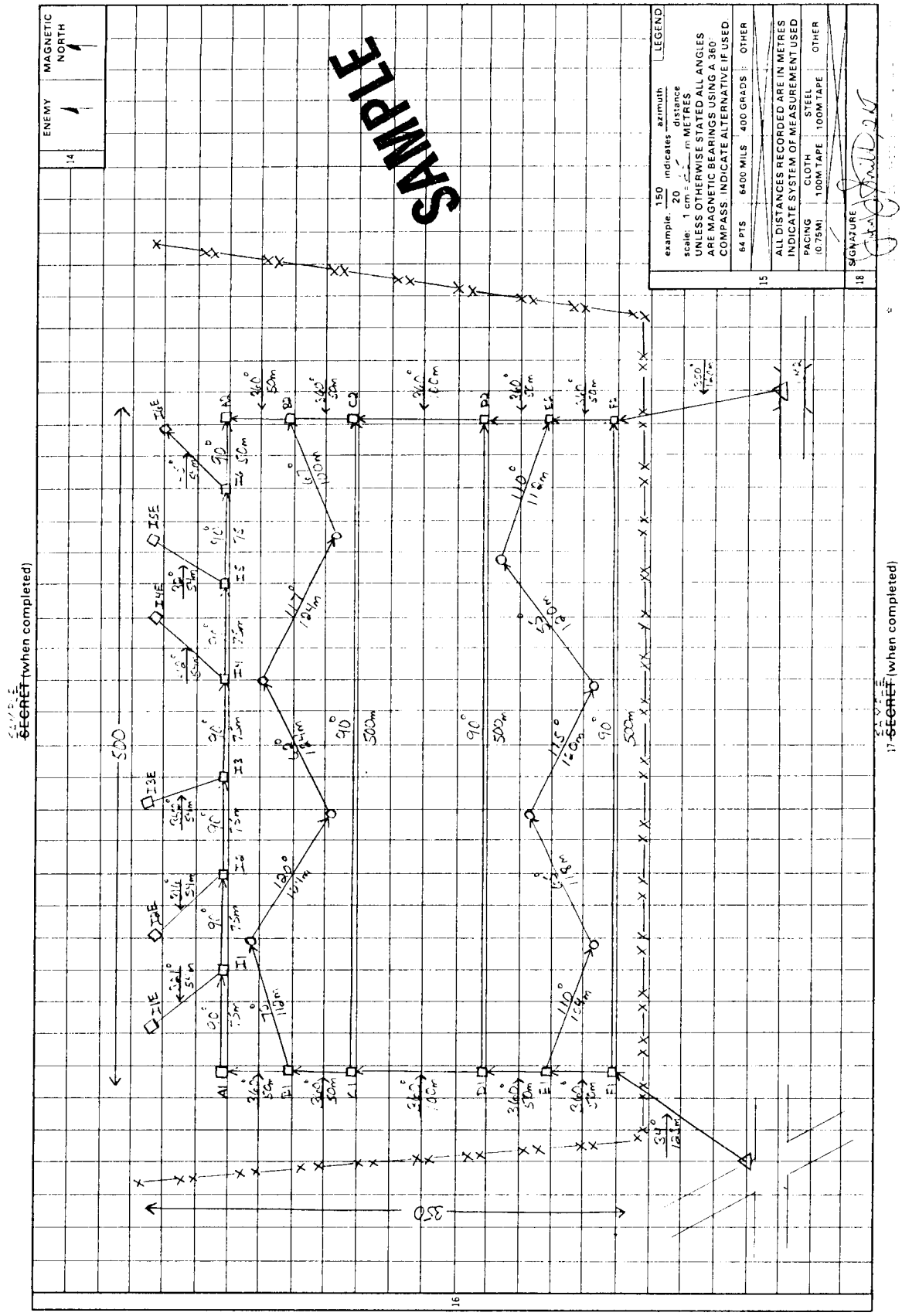
0.5 mines / meter X 400 meters = 200 mines

Step 2. Frontage / Mine Spacing = Number of Mines per Row

400 meters / 6 meters = 66.6 = 67 mines per row



★ *Figure 4-1. Sample DA Form 1355 for row minefield*



★ *Figure 4-1. Sample DA Form 1355 for row minefield (continued)*

Step 3. Number of Mines / Number of Mines per Row = Number of Rows

200 mines / 67 mines per row = 2.98 = 3 rows

Step 4. Number of Mines per Row X Number of Rows = Actual Number of Mines

67 mines per row X 3 rows = 201 mines

Step 5. Actual Number of Mines X 1.1 = Number of Mines to Request

201 mines X 1.1 = 221.1 = 222 mines

★ Step 6. Mines Requested / Crated Mines per 5-Ton Dump Truck (see Table 2-3, page 2-37) = Number of Trucks

222 mines / 204 mines per truck = 1.08 = 2 trucks

Task Organization

To maximize the efficiency of the row mining process, the platoon leader must task-organize his platoon. The organization of the task, as a whole, is intricate and places great demands on the leader. Because each situation is different, leave nothing to chance when planning and executing a row minefield. Make allowances for transporting, handling, and controlling the mines. The officer and squad leaders must be able to exercise control throughout the task under all conditions and during darkness. Always observe safety.

Organize the platoon into the following parties: *siting and recording, marking, mine dump,* and *laying.*

Siting and recording party. The platoon leader directs this party and is responsible for siting, recording, and reporting the minefield. This party consists of one or two soldiers and a vehicle to carry material. (If a vehicle is not available, increase the party to three soldiers.) Because siting is usually done in daylight, take appropriate physical security measures. Start well ahead of the actual laying and set out all control markers. Avoid using sharp turns. The distance between intermediate markers in a row depends on terrain, but it should not exceed 100 meters. Mark vehicle traffic routes to and from the rows. When siting is complete, task the soldiers to perform other tasks. The platoon leader supervises minefield laying.

Marking party. This party is composed of an NCOIC and personnel not working as members of other teams. After the minefield is sited, the marking party emplaces fence posts, wire, and marking signs.

★ **Mine dump party.** This party is controlled by an NCOIC and is composed of personnel not working as members of other teams. It is responsible for setting up vehicle mine sets at the mine dump and hauling more mines as required. If mines are delivered by the tailgate method, personnel will reload vehicles. They may uncrate mines if necessary. They will create vehicle sets by setting aside the number of mines and separated fuzes required by each vehicle, loosening then hand- tightening arming or shipping plugs, helping load mines onto laying vehicles, and disposing of residue. They may also assist the marking party or provide local security. For initial vehicle loads, the mine dump party may be assisted by laying squads to speed up the process.

Laying party. This party consists of an NCOIC (laying leader), four soldiers, and a vehicle to carry mines. The laying leader controls the movement of each laying vehicle. He directs each vehicle to start and stop laying and controls immediate action drills.

NOTE: Using tilt-rod fuzes requires more soldiers to stake mines, insert fuzes, and arm mines.

When laying three rows at once, each laying party consists of three armored personnel carriers (APCs) (labeled 1, 2, and 3) and the following teams:

Carrier team. This team is composed of the APC driver and the track commander (TC). They keep the APC on the proper course and speed.

Sapper team. This team is composed of the squad leader and remaining squad members. It provides personnel to lay and arm mines. Each soldier carries wrenches and fuzes. If laying AP mines, the arming party positions and arms them. The squad leader supervises laying. Task personnel not needed for laying to other parties.

Digging team. This party consists of an NCOIC and several soldiers equipped with suitable digging tools. If mines are surface-laid, there is no digging party. Increase the arming party by two to speed up the laying process or task personnel not needed to other parties.

Site Layout

General. Once the platoon leader has coordinated the location of the minefield(s) with the maneuver commander, siting can begin. Siting is the first step in the actual laying process. Siting is done for safety and control. Although the minefield may be emplaced at night or during limited visibility, the siting party should site the minefield under favorable conditions, preferably during daylight. Siting consists of identifying landmarks; establishing routes; and emplacing start, end, and intermediate row markers. Actual control measures (stake or picket) should not stand out to such an extent that they give away the minefield orientation but must be easily discernible to the laying party.

Considerations. Certain features, like thick woods and deep, wide streams, are natural obstacles. Mine rows should be laid to reinforce terrain and increase effectiveness of the minefield.

Mine rows. Mine rows are labeled with a letter. Row A is nearest to the enemy, followed by rows B, C, D, E, and so forth. Rows should be laid in this order. When laying tactical minefields, each row has a start and end row marker. Intermediate markers may be required depending on row length and terrain. Platoon leaders consider the number of laying vehicles to be employed. The preferred technique is to use three vehicles so three rows can be laid simultaneously. Using more than three vehicles is beyond the command and control capabilities of a platoon and is not considered. The distance between rows is determined by the following factors:

- Depth and density of the minefield.
- Terrain.
- Suitability of the ground for use of laying vehicles.
- Desired obstacle intent.

NOTE: Standard row minefields discussed later in this chapter use a distance of 50 meters between rows.

Mine spacing. The minefield OIC decides mine spacing. Desired density, availability of laying vehicles, number of rows, and possibility of sympathetic detonation (see Table 2-1, page 2-33) affect the distance between mines.

NOTE: Standard row minefields discussed later in this chapter use a mine spacing of 6 meters.

Control measures. Laying vehicles are guided by row mining control measures. All personnel must be familiar with control measures. Control measures should be constructed of different markers from the start and end row markers and from intermediate markers. (For example, use VS17 panels on poles for start and end row markers and use an M133 hand-emplaced minefield marking set (HEMMS) poles with flags for intermediate markers.) Use intermediate markers to make the following control measures:

NOTE: All control measures are not required for each row minefield.

- Start row marker.
- Start laying (first intermediate marker after start row marker).

- Intermediate markers should be used between last marker and next visible point more than 100 meters away.
- Change of direction or turning point (three markers— first is warning, second is turning point, and third is new direction marker).
- Stop laying marker.
- End row marker.

Materials used to construct control measures include—

- U-shaped pickets.
- HEMMS poles.
- Wooden posts.
- Steel rods.
- Engineer tape.
- VS17 panels.

Control measures for laying mines at night require lights or infrared equipment as follows:

- Chem-lights placed in U-shaped pickets or hand-held.
- Directional flashlights taped in U-shaped pickets or hand-held.
- HEMMS lights used with U-shaped pickets or poles.
- Lights from minefield marking set #2.
- Infrared reflectors.

Procedures for site layout. The minefield OIC arrives on site with the siting and recording party. He selects landmark 1 and then sites the left (or right) boundary fence and start row markers. The siting and recording party takes distances and azimuths to be used in preparing the recording form. If the tactical situation permits and the marking party is ready, the siting and recording party emplaces the fence.

If the minefield is to have a separate IOE strip, the siting and recording party proceeds across the IOE and establishes I1, I1E, I2, I2E, and so on until he reaches the end. Personnel proceed down the right (or left) boundary and emplace start row marker A1. Proceeding from Al toward A2, they place intermediate markers as required. When they reach A2, they emplace the end row marker and repeat the procedure from B1 to B2, Cl to C2, and so on until they emplace all required control measures (Figure 4-2, page 4-8). They establish landmark 2 and the left (or right) rear fence location. They site in mine dumps near the minefield. It is also permissible to lay the IOE off row A if both the IOE and row A are buried. The party laying row A sites and records the IOE during laying as described in Drill 2 below.

Mine-Laying Vehicles

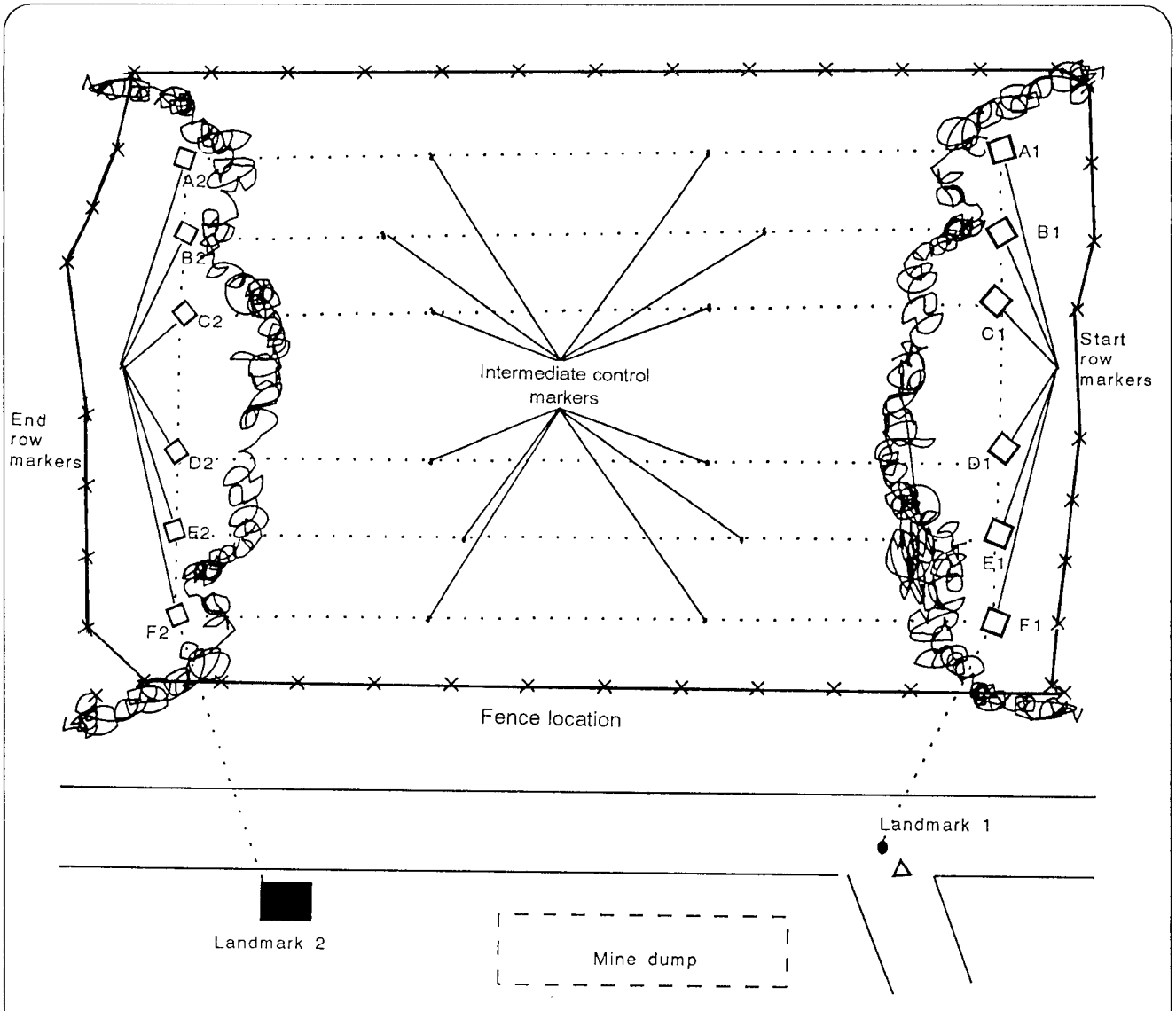
Soldiers normally lay row minefields from a vehicle to speed up emplacement. Use any tactical or wheeled vehicle for mine laying. Consider vulnerability, capacity, and trafficability when selecting a vehicle. Before preparing vehicles for mine laying, drive them in random patterns across the minefield before it is emplaced. The random pattern deceives the enemy by masking the actual laying vehicle pattern. Preparation includes loading mines. Load enough mines so each vehicle can complete an entire row or rows before reloading, but do not stack fuzed mines more than two high.

Laying a Row Minefield

A platoon usually emplaces a row minefield using three vehicles. The following two drills demonstrate how to lay the minefield as a platoon and as a squad in the laying platoon.

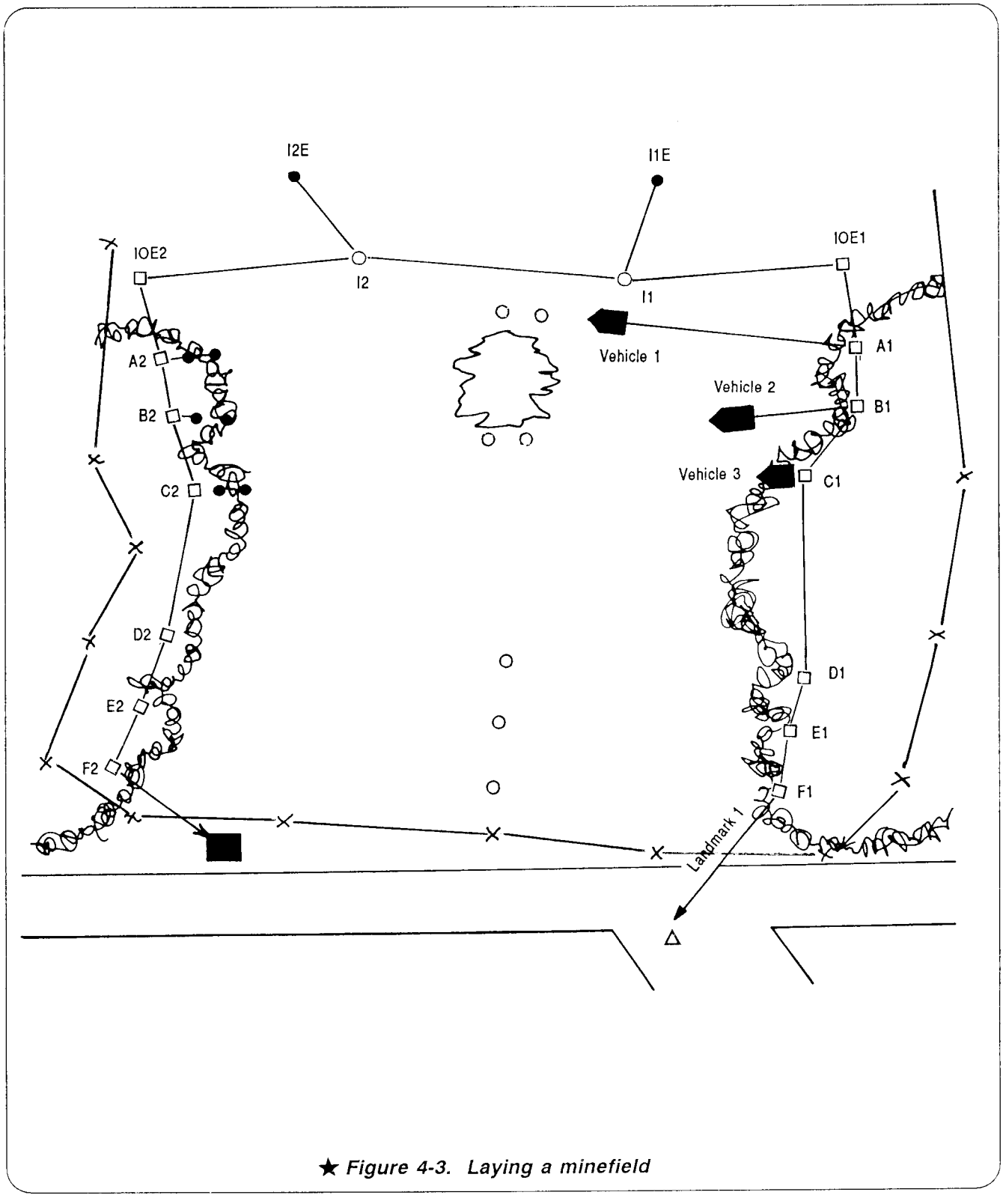
Drill 1.

Squad vehicles arrive on site and proceed down the right (or left) boundary of the minefield to their assigned row. (A separate party must be detailed to install the IOE.) At the start row marker, the squad vehicle moves into position and prepares to lay mines. The squad leader for row A tells vehicle 1 to move out. Mines are laid on the ground at the required spacing along the line of control markers positioned by the siting and recording party. As mines are laid, the arming party moves behind the vehicle and arms the mines. They remove temporary control measures installed by the siting and recording party. When vehicle 1 moves a

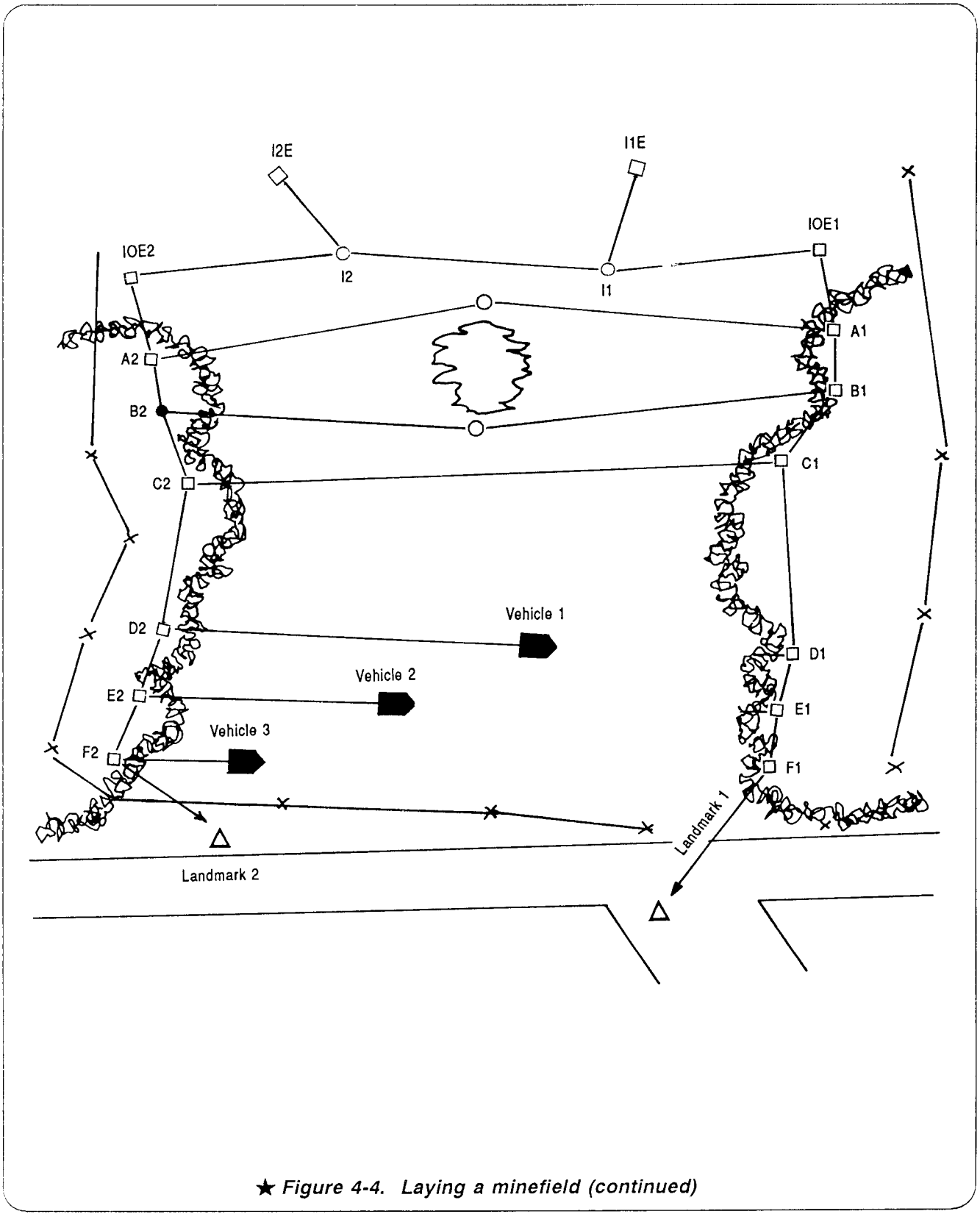


★ *Figure 4-2. Row mining—site layout*

★ safe distance (approximately 25 meters) down row A, vehicle 2 begins to lay mines on row B. When vehicle 2 moves a safe distance down row B, vehicle 3 begins to lay mines on row C. The marking party continues to emplace the left and right boundary fence (see Figure 4-3). The OIC completes the recording form. The IOE party exits the minefield outside the left or right boundary after it completes the IOE. As vehicles 1 and 2 finish their assigned rows, they move past the end row marker and execute a left (or right) turn and wait for vehicle 3 to complete its row. All vehicles move in column down the left (or right) boundary to their next assigned row. The process of laying and arming mines is repeated, this time in the opposite direction (see Figure 4-4, page 4- 10). After vehicles 1 and 2 have completed their second row, they execute a right (or left) turn and wait for vehicle 3 to finish its row. All vehicles then exit the minefield down the right (or left) boundary and out the rear. The marking party completes the rear fence, and the OIC completes DA Form 1355 (see Figure 4-4).



★ *Figure 4-3. Laying a minefield*



★ *Figure 4-4. Laying a minefield (continued)*

Drill 2.

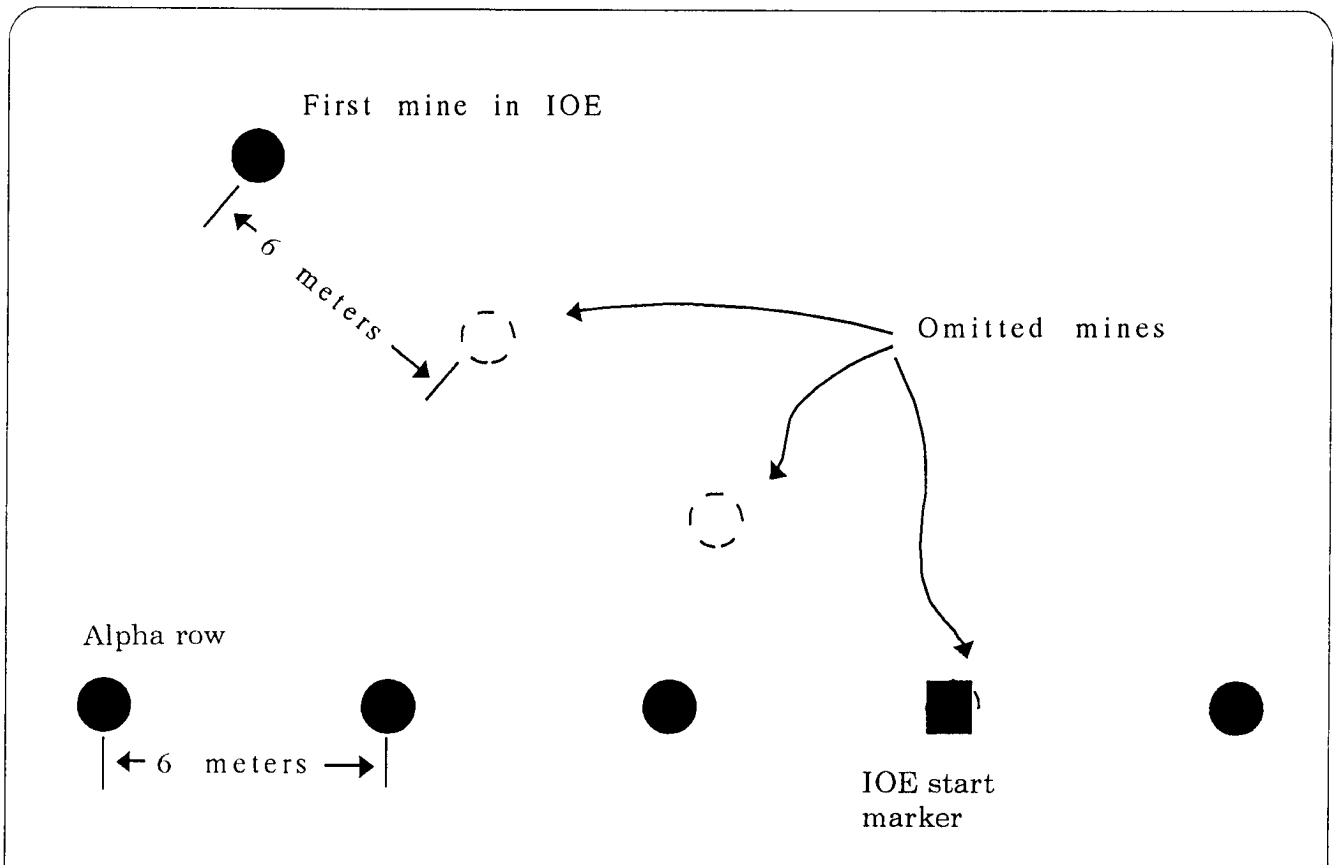
This drill may be used to speed up mine laying. However, to ensure security and safety, strict command and control is vital. This method is difficult to use when the terrain is rugged or when weather and visibility is subject to change.

This drill is conducted by three squad vehicles, each laying one row. Row B has turning points and rows A and C have none. If the minefield has six rows, row E has turning points and rows D and F have none. The squad leader (laying leader) in row B (and row E, if required) is in charge of the overall laying.

Squad vehicles arrive on site and proceed down the right (or left) boundary of the minefield to their assigned row. At the start row marker, squad vehicles move into position and prepare to lay mines.

The laying leader tells vehicle 1 to move out on row A. The sapper team lays mines on the ground at the required spacing. If an IOE is required, the row A team emplaces the IOE concurrently with row A and at the same mine spacing. Each IOE strip is laid after laying a predetermined number of mines in row A. For example, the platoon leader (or laying leader, if delegated) may require an IOE to be emplaced off every eighth mine. In that case, the squad laying row A would omit the eighth mine and place an IOE end marker instead. The laying party starts at the IOE end marker along an azimuth designated by the laying leader or squad leader, omits the first two mines in the IOE, and begins laying at the position of the third mine (Figure 4-5).

After mines are laid, the arming party moves behind the vehicle and arms the mines. They remove temporary control measures installed by the siting and recording party. The arming



★ *Figure 4-5. Laying IOE strip*

party must be distinguishable from everyone else. The last member of the arming party should wear a colored vest or carry a specific colored chem-light. No one will be allowed behind the last member of the arming party.

★ The NCOIC completes a strip feeder report on laid mines and gives the information to the recording party. The strip feeder report includes how many mines of what type were laid, what mines were omitted, azimuths of IOE strips and turning points, AHDs emplaced, and anything else the platoon leader requires.

Vehicle 1 moves down row A until the laying leader tells vehicle 1 to stop. The laying leader chooses vehicle stops to coincide with the location of turning points. Then the laying leader tells vehicle 3 to begin laying mines along row C. Vehicle 3 begins to lay mines on row C until the laying leader says stop (somewhere well past vehicle 1).Again, the laying leader chooses the vehicle stop at another turning point.

★ Vehicle 2 begins to lay mines on row B by heading toward vehicle 1. (At night or during low risibility, the squad leader in vehicle 1 has a soldier direct two red flashlights, held side by side, at vehicle 2. The driver of vehicle 2 drives toward the lights until he can distinguish the two lights or until the light holder turns them off.) When vehicle 2 is within 15 meters of vehicle 1 and is just about to place a mine, he stops and turns toward vehicle 3. Vehicle 2 then lays mines on row B by heading toward vehicle 3 in the same fashion as it headed toward vehicle 1. (At night or during low visibility, the light holder in vehicle 3 will have green lights.)

When vehicle 2 is about to lay its first mine, within 15 meters of vehicle 3, it stops and turns toward vehicle 1. The process continues as before until each vehicle reaches the end of its row (Figure 4-6).

NOTE: If the platoon leader feels that low visibility or other reasons preclude the use of vehicle positions as turning points, he may have the siting party emplace turning point markers (three intermediate markers) for vehicle 2 to guide on. In that event, the three vehicles will emplace mines simultaneously, and the laying leader will still control vehicle movement.

As vehicles 1 and 2 finish their assigned rows, they move past the end row marker and execute a left (or right) turn and wait for vehicle 3 to complete its row. All vehicles move in column down the left (or right) boundary to their next assigned row, if there is one. The process of laying and arming mines is repeated, this time in the opposite direction.

After vehicles 1 and 2 have completed their second row, they execute a right (or left) turn and wait for vehicle 3 to finish its row. All vehicles then exit the minefield down the right (or left) boundary and out the rear. The marking party completes the rear fence, and the OIC completes DA Form 1355. (See Figure 4-1, pages 4-3 and 4-4).

Immediate Action Drill

If the enemy attacks the platoon during minefield emplacement, the laying teams should execute the following drill. Sapper teams enter vehicles and recover the spacing sandbag. Vehicle 1 exits the minefield first by making a wide turn around the front of the other two vehicles. Vehicle 2 follows by making a wide turn around the front of vehicle 3. Then, vehicle 3 exits the minefield. The three squads conduct whatever immediate action drill the platoon leader has ordered.

Squad Drill

During row mining, the platoon usually uses three vehicles. Whether the platoon uses one or three vehicles, each squad in a laying vehicle conducts the following drill:

The carrier team—

- Moves the APC to the row start point.
- Lowers the APC ramp until it is horizontal or opens the rear door. (If using the APC ramp to distribute mines, chain the ramp open to support the weight.)

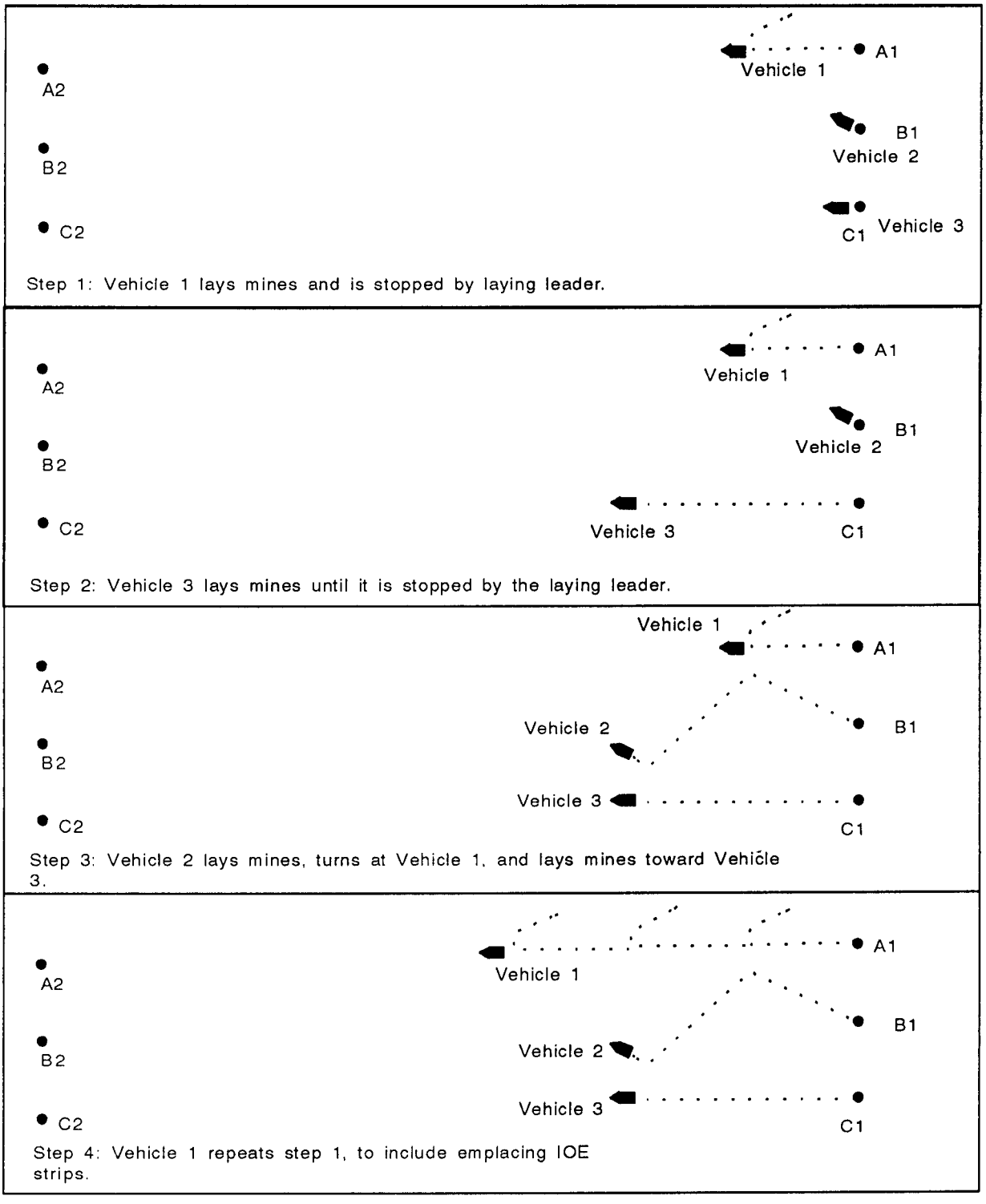


Figure 4-6. Vehicle position during row minefield laying

The sapper team—

- Soldier 1 ties the rope to the end of the lowered ramp or tow pintle.
- Soldier 2 ties the partially filled sandbag on the other end of the rope, (The rope length, from the end of the ramp or door to the sandbag, is the correct spacing between mines.) (See Figure 4-7.)
- The squad leader (soldier 3) positions team members. Soldier 1 is at the rear of the compartment. Soldier 2 sits on the edge of . the APC ramp or open door. Soldier 4 walks behind the APC.

The squad leader—

- Tells the squad to start laying mines.
- Supervises mine arming and placing.

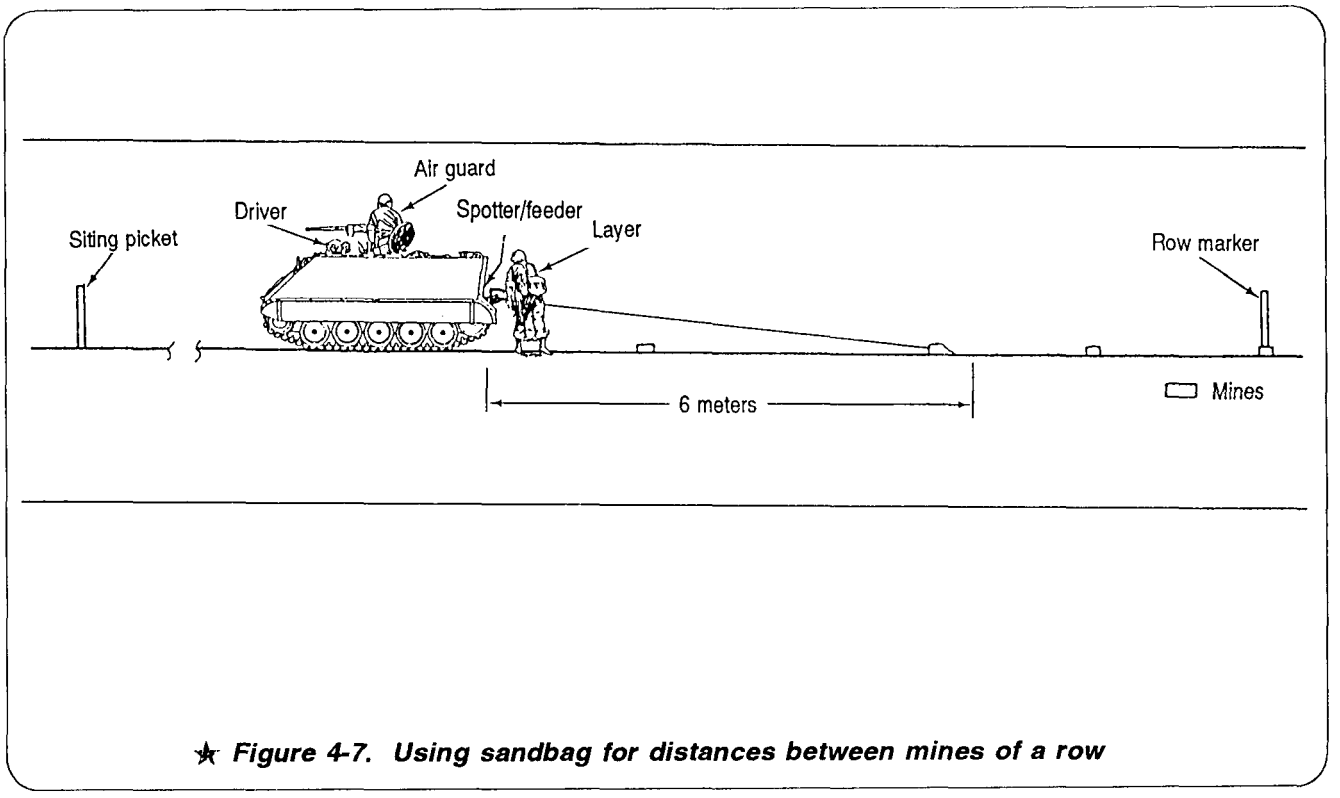
The carrier team moves the APC, at a low speed (2 to 3 miles per hour (mph)). in a straight line toward the row end point.

The sapper team—

- Soldier 1 fuzes and passes a mine to soldier 2. Soldier 2 records all mines issued. If AP mines are also laid, they are given out simultaneously. (Soldiers may carry Ml4 mines in a satchel to speed up laying.)
- Soldier 2 places the fuzed mine on the ground when the sandbag tied to the rope is even with the previously placed mine.
- Soldier 3 (squad leader) walks behind the vehicle and supervises mine laying.
- Soldier 4 walks behind the vehicle and arms mines.
- After the mine row is armed and camouflaged, Soldier 4 buries pins, clips, and shipping plugs 30 centimeters to the rear of each end row marker.

The above steps are repeated until the end of the row is reached.

If the platoon is burying mines, the digging party follows the laying party along the friendly side of the row and proceeds as follows:



★ *Figure 4-7. Using sandbag for distances between mines of a row*

- The NCOIC selects the mine to be buried by each soldier and supervises the operation.
- ★ Mines are dug in but left exposed until arming is complete. Use a posthole digger to dig a hole to fit M16 mines. Use a small sledgehammer to make a hole to fit M14 mines.
- Once a soldier completes digging in a mine, he moves along the friendly side of the row to the next unburied mine and repeats the process.
- ★ Arm AP mines in a cluster before arming AT mines.
- If possible, allocate a vehicle to help remove spoil from the site.

Marking, Recording, and Reporting Row Minefields

Marking procedures for row minefields are the same as those for other minefields. Row minefields are recorded on a DA Form 1355 (Figure 4-1, pages 4-3 and 4-4). Reporting procedures for row minefields are the same as those for other minefields—intent, initiation, status, and completion.

★ STANDARDIZED ROW MINEFIELDS

★ The specific composition of row minefields depends on METT-T and available resources. To aid in standardization and platoon techniques, four row minefield compositions have been developed to match obstacle intent/effect. Using standard minefields eases planning obstacle type, size, and logistical requirements (see page 2-8). It is imperative that the designs and effect of these minefields are well understood. They are an integral part of combined arms obstacle doctrine and form the cornerstone of engineer obstacle operations. The platoon leader is given the obstacle intent—disrupt, turn, block, or fix. He has the resources to emplace a standardized row minefield. Use the following standardized row minefields as building blocks to create the appropriate obstacle based on intent.

Disrupt and Fix Minefields

Disrupt and fix minefields are similarly constructed, except the fix minefield has an IOE and does not have AHDs. The standard minefield is 250 meters wide. The disrupt minefield is 100 meters deep and has a mine density of 0.5 mine per linear meter; the fix minefield is 120 meters deep and has a density of 0.6. Both minefields require 1.5 platoon hours and 84 track-width mines. The disrupt minefield requires 42 full-width mines, and the fix minefield requires 63 full-width mines. (See Figure 4-8, page 4-16.)

Emplacement: The emplacement of disrupt and fix minefields is the same, except fix minefields have an IOE.

★ **NOTE: Stake surface-laid, M21 tilt-fuzed mines to keep them from tipping over.**

Row A.

- Use 42 full-width AT mines (tilt rod), placed 6 meters apart.
- ★ May have no turning points.
- May be surface-laid or buried.

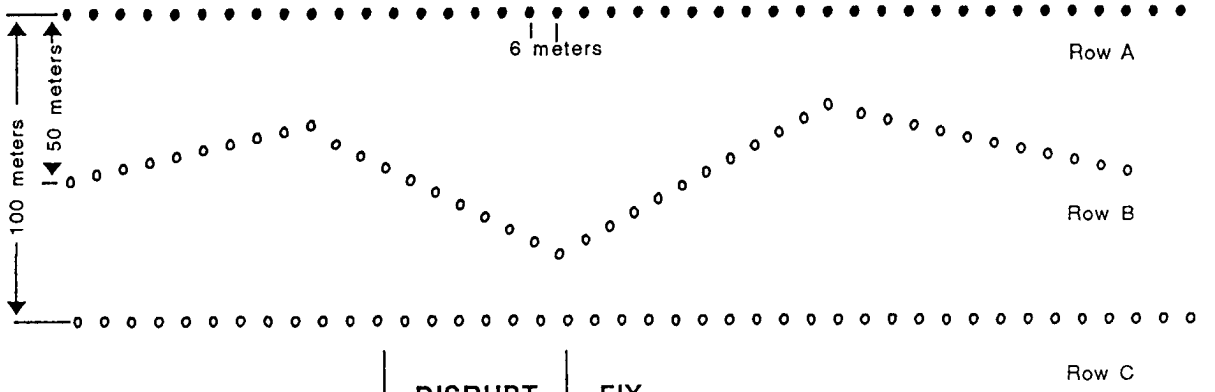
Row B.

- Emplace start and end row markers 50 meters behind row A.
- Use 42 track-width AT mines, placed 6 meters apart.
- ★ Preferably has no more than three turning points.
- May be surface-laid or buried.

Row C.

- Emplace 100 meters behind row A.
- Use 42 track-width AT mines, placed 6 meters apart.

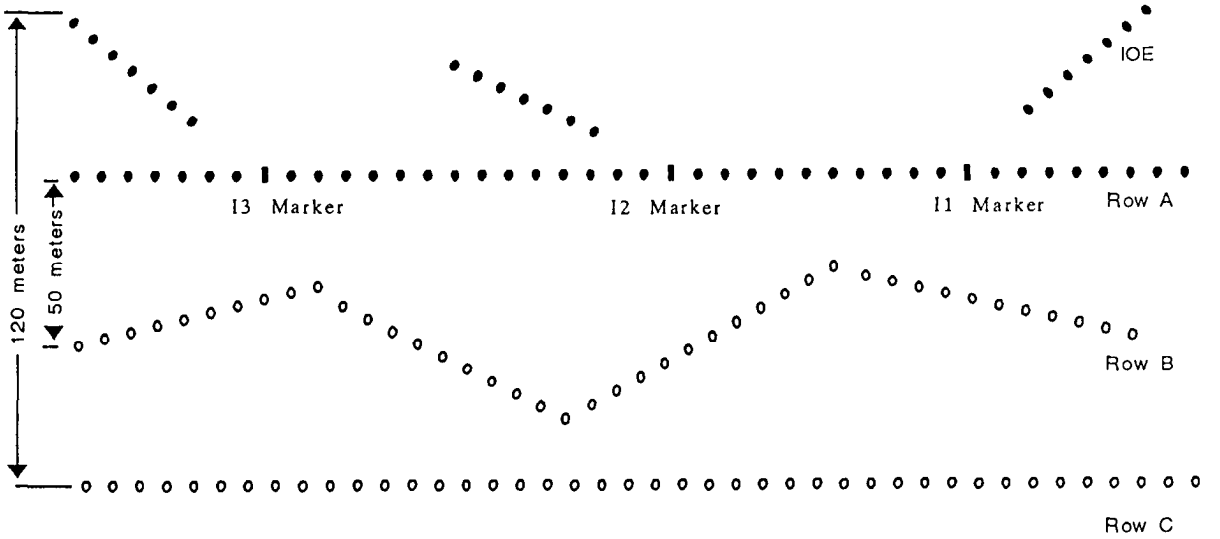
STANDARD DISRUPT ROW MINEFIELD



	DISRUPT	FIX
FRONTAGE(m)	250	250
DEPTH(m)	100	120
AT FULL(# ROWS)	1	1
AT TRACK(# ROWS)	2	2
IOE(YES OR NO)	NO	YES
AHD(YES OR NO)	NO	NO
PLT HOURS REQ'D	1.5	1.5
FULL-WIDTH MINES	42	63
TRACK-WIDTH MINES	84	84
DENSITY	0.5	0.6

● FULL-WIDTH AT MINE

○ TRACK-WIDTH AT MINE



STANDARD FIX ROW MINEFIELD

★ *Figure 4-8. Standard disrupt and fix row minefield patterns and characteristics*

- May have no turning points.
- May be surface-laid or buried.

IOE (fix minefield only).

- Has three IOE strips.
- Row A may be used as a baseline or estab - lish a separate IOE baseline.
- Use seven track-width AT mines, placed 6 meters apart for each IOE strip (total of 21 mines).
- May be surface-laid or buried.
- Place the first IOE strip off the IOE end marker, in place of the omitted eighth mine in row A. After 12 more mines are laid, omit the thirteenth mine for the second and third IOE end markers and strips, leaving eight mines until the end row marker. If a separate IOE baseline is established, follow standard layout procedures discussed on page 3-6.

Turn Minefields

Turn minefields are constructed similar to disrupt and fix minefields. Turn minefields consist of four rows of full-width mines and two rows of track-width mines. The width of a turn minefield is 500 meters. It is 300 meters deep and has a density of 1 mine per linear meter. It requires 3.5 platoon hours, 336 full-width mines, and 168 track-width mines. (See Figure 4-9, page 4-18.)

Emplacement. The emplacement of rows D, E, and F is the same as in a disrupt minefield.

Row A.

- Use 84 full-width AT mines (tilt rod), placed 6 meters apart.
- May have no turning points.
- May be surface-laid or buried.

Row B.

- Emplace start and end row markers 50 meters behind row A.
- Use 84 full-width AT mines (tilt rod), placed 6 meters apart.
- Preferably has no more than five turning points.
- May be surface-laid or buried.

Row C.

- Emplace 100 meters behind row A.
- Use 84 full-width AT mines (tilt rod), placed 6 meters apart.
- May have no turning points.
- May be surface-laid or buried.

Row D.

- Emplace 100 meters behind row C.
- Use 84 full-width AT mines (tilt rod), placed 6 meters apart.
- May have no turning points.
- May be surface-laid or buried.

Row E.

- Emplace start and end row markers 50 meters behind row D.
- Use 84 track-width AT mines, placed 6 meters apart.
- Preferably has no more than five turning points.
- May be surface-laid or buried.

Row F.

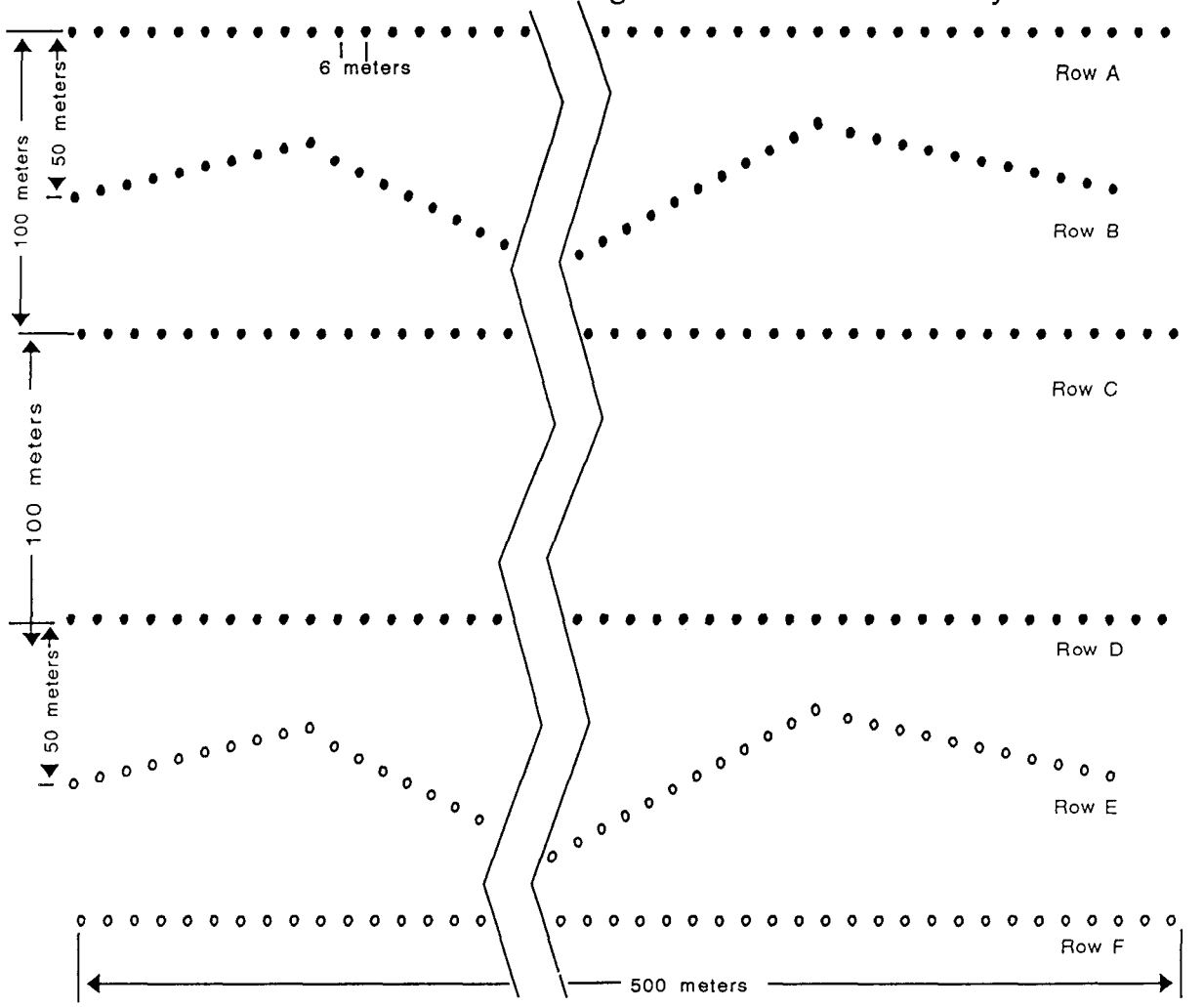
- Emplace 100 meters behind row D.
- Use 84 track-width AT mines, placed 6 meters apart.
- May have no turning points.
- May be surface-laid or buried.

Block Minefields

Block minefields are constructed similar to turn minefields, except block minefields have an IOE, AHDs, and AP mines in two of its rows

STANDARD TURN ROW MINEFIELD

NOTE: Center of minefield figure is omitted for clarity.



	TURN
FRONTAGE(m)	500
DEPTH(m)	300
AT FULL(# ROWS)	4
AT TRACK(# ROWS)	2
IOE(YES OR NO)	NO
AHD(YES OR NO)	NO
PLT HOURS REQ'D	3.5
FULL-WIDTH MINES	336
TRACK-WIDTH MINES	168
DENSITY	1.0

● FULL-WIDTH AT MINE

○ TRACK-WIDTH AT MINE

Figure 4-9. Standard turn row minefield pattern and characteristics

of full-width mines. The width of a block minefield is 500 meters. It is 320 meters deep and has a density of 1.1 AT mines per linear meter. It has a minefield density of 0.17 M16 AP mine per linear meter or 1 M14 AP mine per linear meter. It requires 5 platoon hours, 378 full-width mines, and 168 track-width mines. It also requires 84 M16 mines or 500 M14 mines. (See Figure 4-10, page 4-20.)

Emplacement. The emplacement of the block minefield is the same as the emplacement of the turn obstacle, except the block minefield has an IOE and AP mines.

Row A.

- Use 84 full-width AT mines (tilt rod), placed 6 meters apart.
- ★ May have no turning points.
- May be surface-laid or buried.

Row B.

- Emplace start and end row markers 50 meters behind row A.
- Use 84 full-width AT mines (tilt rod), placed 6 meters apart.
- ★ Preferably has no more than five turning points.
- May be surface-laid or buried.

Row C.

- Emplace 100 meters behind row A.
- Use 84 full-width AT mines (tilt rod), placed 6 meters apart.
- ★ May have no turning points.
- May be surface-laid or buried.

Row D.

- Emplace 100 meters behind row C.
- Use 84 full-width AT mines (tilt rod), placed 6 meters apart.
- ★ May have no turning points.
- May be surface-laid or buried.

Row E.

- Emplace start and end row markers 50 meters behind row D.
- Use 84 track-width AT mines, placed 6 meters apart.
- ★ Preferably has no more than five turning points.
- May be surface-laid or buried.

Row F.

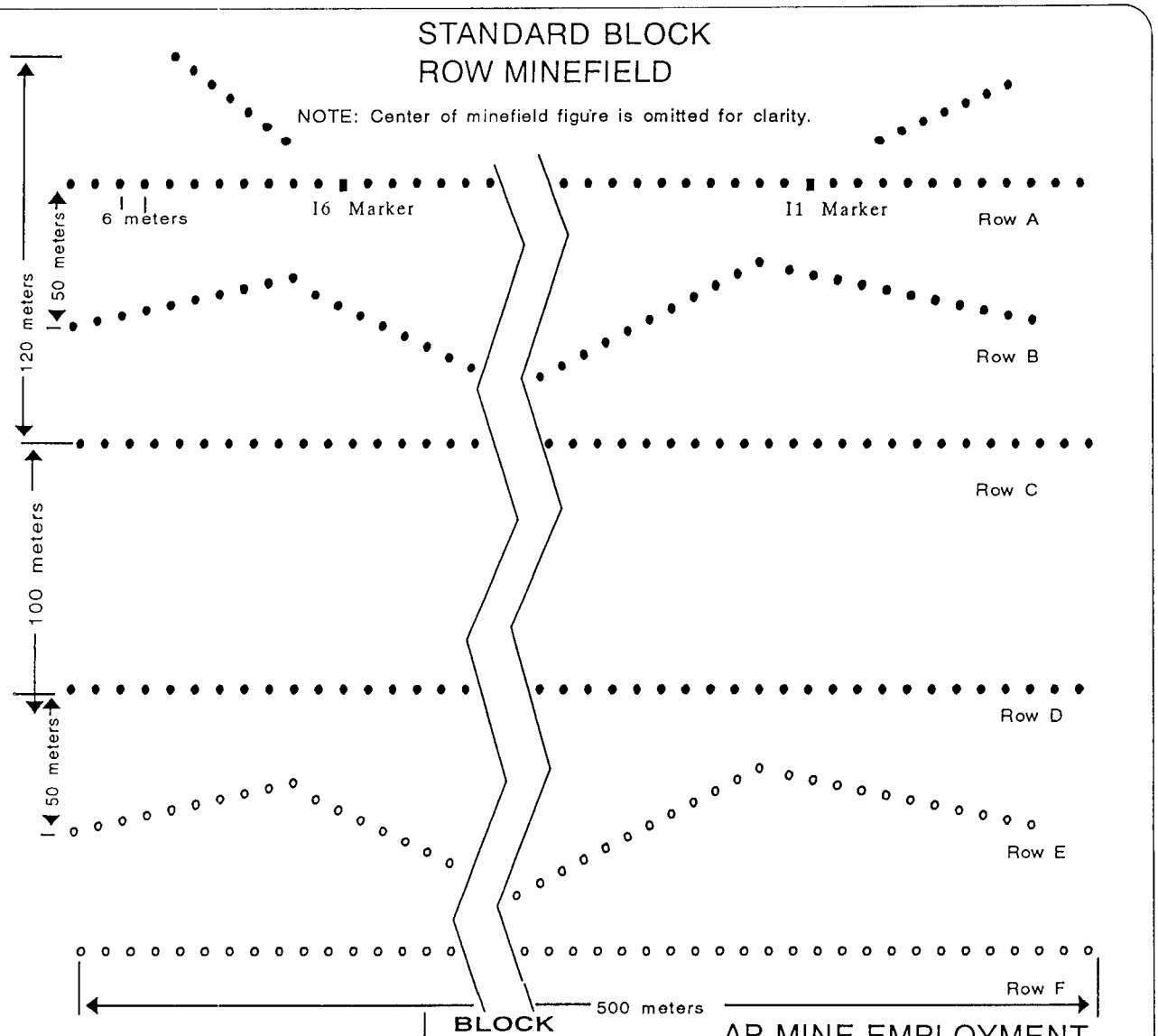
- Emplace 100 meters behind row D.
- Use 84 track-width AT mines, placed 6 meters apart.
- Has no turning points.
- May be surface-laid or buried.

IOE.

- Has six IOE strips.
- ★ Use row A as a baseline or establish a separate IOE baseline.
- Use seven track-width AT mines, placed 6 meters apart for each IOE strip (total of 42 mines).
- May be surface-laid or buried.
- ★ Place first IOE strip off the IOE end marker, in place of the omitted twelfth mine in row A. After 11 more mines are laid, omit the twelfth mine for the second through sixth IOE end markers and strips. If a separate IOE is established, follow standard layout procedures discussed on page 3-6.

AP mines.

- Use AP mines on any two rows of full-width AT mines.
- Place AP mines in a cluster around AT mines.
- Place one AP mine in front of every other AT mine in each of two rows when using M16 (bounding frag) mines.
- Place one AP mine on the enemy side (12 o'clock), one on the left (9 o'clock), and one on the right (3 o'clock) sides of each AT mine, in each of the two rows when using M14 (blast) mines.



	BLOCK
FRONTAGE(m)	500
DEPTH(m)	320
AT FULL(# ROWS)	4
AT TRACK(# ROWS)	2
IOE(YES OR NO)	YES
AHD(YES OR NO)	YES
PLT HOURS REQ'D	5.0
FULL-WIDTH AT MINES	378
TRACK-WIDTH AT MINES	168
DENSITY AT	1.1
M16 OR	84 OR
M14	500
DENSITY AP	.17/1.0

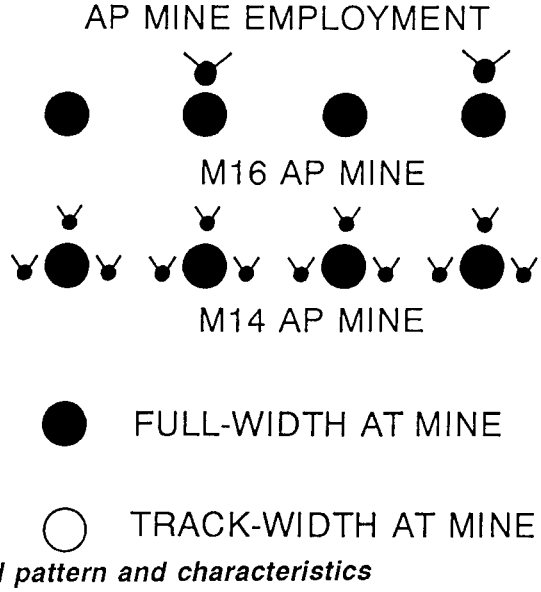


Figure 4-10. Standard block row minefield pattern and characteristics