By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

THOMAS F. SIKORA
Brigadier General, United States Army
The Adjutant General

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Smoke   Operations

Preface

Field Manual 3-50 provides US Army units with doctrine, tactics, techniques, and procedures to use smoke and obscurants to attack and defeat specific enemy targets, sensors, target acquisition systems, weapon guidance systems, and other enemy electro-optical devices. Also, it describes techniques to reduce friendly degradation in smoke.

The scope of this manual is smoke operations at the operational and tactical levels of war. The target audience is maneuver unit commanders and staff officers, particularly the G2/S2, G3/S3, FSO, and chemical officer at corps level and below. Most of the examples depict smoke support for brigade-level operations.

The focus is on synchronized smoke planning — smoke integrated into the commander's tactical plan, sustained as necessary to defeat the enemy's electro-optical systems and create a "one-way mirror" — one which our forces can both see and shoot through to set the terms of battle.

Smoke is a double-edged sword. Smoke conceals troop movements, slows attacking forces, disrupts command and control, and reduces the vulnerability of critical assets for both friendly and Threat forces. Combat operations in World War II and the Korean War demonstrated that the proper use of smoke enhances mission success and force survivability. In recent times, US forces have reinforced the positive benefits of large-area smoke use at the combat training centers at Fort Irwin, California; Fort Chaffee, Arkansas; and Hohenfels, Federal Republic of Germany.

In battle, the side that employs smoke correctly and is experienced in limited visibility operations will be more agile and respond faster to changing situations.

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Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men.

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Introduction

Common sense tells us what can be seen can be hit and killed on the battlefield. The US Army uses smoke and obscurants to attack Threat reconnaissance, surveillance, and target acquisition (RSTA) efforts. It also uses smoke to protect the force and to support tactical deception operations. By combining obscuration with maneuver you can protect your force and deny the Threat the ability to acquire and engage it.

Historical Perspective

Armies have used smoke to confuse and deceive their enemies throughout history. We can find indications of smoke operations from as early as 2000 B.C. when the burning of damp straw was a common way to smoke enemy positions.

The War Department proposed the use of smoke to President Lincoln during the War Between the States. The idea was not taken seriously at the time and smoke was used sparingly. Documentation of the period reflected in the Cavalry Journal historical archives suggests that "...a little smoke, judiciously laid down, could have changed the entire course of history. Had the South used smoke, Federal forces may not have been able to stop Pickett's charge at Gettysburg even though the Federal force was greatly superior...."

The use of large-area smoke increased drastically during World War II. The British used smoke to effectively screen harbors, factories, and large cities in the United Kingdom from the Luftwaffe's relentless bombing. In 1943, US forces used smoke to protect the supply facilities and invasion fleet at Bizerte Harbor in North Africa from attacking German aircraft. The smoke blanket placed over this area by smoke generator units resulted in over 3,000 bombs falling harmlessly in and around the area.

The use of smoke and other man-made obscurants can give a commander an edge if applied properly. Natural obscurants can also be used to friendly advantage. The actions of Combat Command A (CCA), 4th Armored Division, during the Lorraine Campaign, in September 1944, demonstrated the use of fog as a combat multiplier.

On 13 September 1944, CCA forced a crossing of the Moselle River north of the heavily defended city of Nancy. On 14 September, CCA was ordered to bypass Chateau-Salins and exploit the weakness to the south. By 1900 hours, CCA began to draw into a perimeter defense around the town of Arracourt. This allowed the Germans to strengthen their position around Chateau-Salins and assemble forces for a major counterattack against the XII Corps right flank. The Fifth Panzer Army moved north, striking at CCA's exposed position around Arracourt. The ensuing battle was one of the largest armored engagements fought on the Western Front.

On the morning of 19 September, a heavy fog concealed the German movement, giving them tactical surprise and protection from Allied aircraft. Elements of the 133rd Panzer Brigade penetrated CCA's defenses. Two tank destroyer platoons and a medium tank company engaged the 133rd Panzer Brigade. The fog worked to the defender's (Allied forces) advantage, as the limited visibility negated the superior range of the German tank guns. As the fighting surged back and forth through the fog, CCA's tanks and tank destroyers used their mobility to out-maneuver and ambush the larger Panzers.

From 20 to 25 September, the Fifth Panzer Army directed the lllth Panzer Brigade and the llth Panzer Division into a series of attacks against the Arracourt position. Each assault followed the pattern set on 19 September. The Panzers attacked under the cover of morning fog, only to be thwarted by CCA's mobile defense and driven off by armored counterattacks of company or battalion strength.

The defensive actions fought around Arracourt stalled the German offensive. The 4th Armored Division claimed 281 German tanks destroyed, 3,000 Germans killed, and another 3,000 taken prisoner in the fighting. For the German offensive, the ground fog represented a double-edged sword. It provided

them concealment but ultimately led to their demise. For US forces, it proved to be a significant combat multiplier.

Description of Smoke and Obscurants

Obscurants are man-made or naturally occurring particles suspended in the air that block or weaken (attenuate) the transmission of a particular part or parts of the electromagnetic spectrum, such as visible light, infrared (IR), or microwaves. Fog, mist, dust, smoke, and chaff are examples of obscurants.

Smoke is an artificially created obscurant normally produced by burning or vaporizing some product. An example is the vaporization of fog oil to produce smoke from a mechanical smoke generator. We classify US and Threat smoke and obscurants, both currently fielded and developmental, as visual, bispectral, multispectral, or special-purpose obscurants. Visual obscurants defeat the visible through near IR portion of the spectrum; bispectral obscurants defeat the visible through far IR; multispectral obscurants defeat the visible through millimeter wave; and special purpose obscurants defeat specifically targeted portions of the electromagnetic spectrum.

Appendix G describes the characteristics of smokes and obscurants, how they work, and what obscurants are in the US inventory.

Uses of Smoke and Obscurants

We can render some electro-optical (EO) target acquisition and sighting devices ineffective; others we can degrade significantly; some we cannot affect at all. As a result of the development of IR and radar devices during World War II and subsequent technological advances, EO devices have supplemented conventional visual methods of target acquisition and aiming weapons. Precision-guided munitions and sophisticated sensors provide the ultimate in lethality on the battlefield:

What can be seen can be hit and killed.

We use visual obscurants to defeat the enemy's battlefield viewers, such as binoculars, weapon sights, night observation sights, and laser range finders. We use bispectral obscurants to defeat the enemy's battlefield viewers and weapon guidance systems such as command line-of-sight or terminal homing systems on antitank and air defense missiles. When developed, we will use multispectral obscurants to defeat the enemy's battlefield viewers; weapon guidance systems; radar systems; and high-energy, microwave-directed energy weapons.

Table 1, on the next page, is a tactical decision aid for selecting the type of smoke to defeat a particular EO system. Detailed information concerning the types of smokes and obscurants and their effects on EO systems are in Appendixes G and B, respectively.

How and Where To Use Smoke

Smoke aids in deceiving the enemy, conceals maneuver, and increases your potential force-on-force ratio when your target acquisition systems can see through the smoke and the Threat's cannot (see Chapter 2). For smoke to do this, you must develop a plan to use smoke synchronized with your tactical plan.

Use the military decision model from FM 101-5 as general guidance for planning and executing smoke operations. Commanders must routinely give planning guidance to the staff that answers the following questions:

- What do I want smoke and obscurants to accomplish? (Degrade target acquisition? Conceal the movement of my main attack? Aid in deception?)
- Where and for how long am I willing to sustain this smoke cloud? (Over my own position? Between my unit and the enemy? On the enemy?)
- How much restriction in my own mobility can I accept? (Visibility 50 meters or less? More?)
- How much restriction in my own target acquisition and engagement capabilities can I accept? (If I deny another's laser designators, I also deny mine, but my thermal sights are unaffected).
- When might on-call hasty or deliberate smoke benefit me? (Where does my decision support tree indicate I may be exposed and need immediate smoke to obscure the enemy?)
- How will countersmoke help me? (If the enemy uses smoke, where and how should I retaliate with smoke to interfere with their synchronization?)

Categories of Smoke Operations

There are two general categories of smoke operations: hasty and deliberate.

Hasty Smoke Operations

Hasty smoke operations are smoke operations conducted with minimal prior planning. They are normally executed by the projected, on-board, and smoke generator units (company- and smaller-size elements) on hand at the time of the engagement. This does not mean that hasty smoke operations are not planned; rather, plan hasty operations as on-call smoke in your deliberate smoke plan. Use hasty smoke operations to support a combined arms force to counter an enemy action or anticipated enemy action of immediate concern to the commander. Hasty smoke operations generally cover a small area for a short duration.

Deliberate Smoke Operations

Deliberate smoke operations are conducted with detailed planning and are executed by either on-hand smoke assets or with those on hand augmented by corps and theater assets. Deliberate smoke operations normally are synchronized with specific times, events, or locations on the battlefield (for example, when we are within 1,500 meters of the objective, fire six battery volleys of 50-percent high-explosive and 50-percent smoke munitions onto the objective to obscure enemy observa-

Table 1. Electro-optical systems defeated by smoke.

Spectral Region	Electro-Optical System	Type of Smoke
Visible 0.40–0.75 mm	Viewers: —Daylight Sights —Naked Eye —Camera Lens —Binoculars/Standard Optics —Battlefield TV —CLOS Missiles (for example AT-3) —Night Sights	All
Near IR 0.75–4.00 mm	Viewers: —SACLOS Missiles (for example, AT-4 and AT-5) —Night Sights	All
	Sensors: —Laser Designators —Laser Range finders	All
Mid-IR 4–14 mm	Viewers: —Passive Thermal Sights	WP, PWP, RP, Type III IR Obscurant, Dust
Far-IR 14–100 mm	Sensors: —Thermal Imagers —Terminal Homing Missiles (AT-6)	WP, PWP, RP, Type III IR Obscurant, Dust
MM Wave and Lower Frequency 1.10 mm	Radar Radio Microwaves	WP and PWP (Instantaneous Interruption Only), Developmental Obscurants
X Ray and Higher Frequency	Directed EMP Nuclear Weapons	Oil Smoke (Attenuation Only), Developmental Obscurants

tion). Deliberate smoke operations normally include multiple pre-planned smoke operations. They cover large areas over long periods to support the operations of brigades, divisions, and corps.

Smoke Planning

Each echelon of command plans for smoke employment to support both current and future operations. Integrate smoke into the overall tactical plan, synchronized with key events or decision points. Base smoke planning on the same factors as the tactical plan: mission, enemy situation, terrain, weather, troops available, time, and distance. Mission considerations include unit capabilities, detailed planning and preparation, employment techniques, communications, intelligence, and whether the unit has successfully operated in smoke previously.

The G3/S3 has primary staff responsibility for planning smoke operations in coordination with the fire support officer (FSO), G2/S2,

G4/S4, smoke unit commander, chemical staff officer, and staff weather personnel. When planning smoke operations, the primary focus must be to attack enemy EO systems and degrade enemy combat effectiveness without significantly degrading friendly command, control, or target acquisition capabilities.

Staff officers must constantly plan to integrate smoke into the tactical plans for both current and future operations. Planning ranges from deliberate plans to provide smoke support for future operations in a 48- to 72-hour window to hasty planning for current operations.

Staffs must develop estimates that define enemy capabilities and our own courses of action, analyze smoke targets, and prioritize smoke resources. They must finally recommend courses of action for the commander's approval. When the commander approves the staff estimates, the staff prepares orders that combine smoke with combat power. Appendix A shows a smoke estimate format and a smoke annex to plans and orders.

Situation and Target Development

Targeting begins with the commander's guidance and continues through the development of a prioritized list specifying what targets to attack and when to attack these targets (DECIDE) and acquiring high-payoff targets (DETECT) and what will defeat these targets (DELIVER). This process concludes with the commander's decision on which course of action he will select to engage the various targets: maneuver, fire support, and smoke unit support, or a combination thereof. There are two basic processes in the targeting process: situation development and target development.

Situation development and target development are the processes that provide commanders the intelligence and targeting data they need to plan and fight the close and deep operation. Both processes, conducted simultaneously, incorporate intelligence preparation of the battlefield (IPB) and the intelligence cycle functions. Situation development enables commanders to see and understand the battlefield in sufficient time and detail to employ their forces and weapons effectively. In situation development, the G2/S2 uses IPB to produce a description of enemy force disposition on the battlefield in terms of location, size, type, direction, rate of movement, and activity. For smoke planners, situation development provides information about weather, terrain, enemy disposition, and composition in the area of interest. FM 34-1 provides a more detailed description of situation development procedures.

IPB provides a basis for accomplishing situation and target development. IPB orients the mission planning, collecting, processing, and disseminating efforts of situation and target development. The IPB process includes—
- Threat evaluation. This is a detailed study of enemy forces and their composition, organization, tactical doctrine, weapons, equipment, and supporting battlefield functional systems. For smoke planning, we focus on enemy EO and smoke capabilities as listed in Chapter 2 and Appendix B.
- Evaluation of areas of interest and operation. This is a study of enemy order of battle (OB) for a specific area of the battlefield. For smoke planning, we focus on numbers and probable locations of EO systems.
- Terrain analysis. This is an analysis of the military aspects of the terrain in a specific area. For smoke planning, we focus on the terrain effects on smoke.
- Weather analysis. This is an analysis of the impact of weather on both terrain and friendly and enemy capabilities. For smoke planning, we focus on the weather effects on smoke.

- Threat integration. This is the development of situation, event, and decision support templates. For smoke planning we input the priority intelligence requirement (PIR) and extract actual findings from the decision support template.

Smoke Estimate Preparation

When the G2/S2 performs the IPB, the chemical officer, in coordination with the G3/S3, FSO, and smoke unit commander, will prepare the smoke estimate. This estimate will go to the G2/S2 and targeting officer for inclusion into the target value analysis (TVA) for fire support planning and to the G3/S3 and chemical staff for smoke target planning.

The chemical staff officer prepares a smoke estimate to recommend courses of action for attacking enemy targets with smoke and obscurants. Besides supporting the commander's estimate, the smoke estimate assists the chemical staff, FSO, and G3/S3 in determining the detailed plan for smoke employment. FM 101-5 contains detailed guidance on the military decision-making process and estimates.

Smoke Support Plan Development

Simultaneous with preparing the smoke estimate, the staff chemical officer develops a draft smoke support plan. The procedures for preparing a smoke support plan are—
- Coordinate with the commander and staff prior to smoke support planning. Obtain the restated mission.
- Obtain required fire and smoke planning information such as task organization, smoke delivery systems, objectives, axis of advance or sector, and commander's intent.
- Recommend smoke support coordinating measures such as key time, place, and event and no smoke

areas and target allocations (smoke unit targets, artillery targets, and mortar targets) based on available information such as restrictive fire line (RFL), coordinated fire line (CFL), no fire line (NFL), munition availability, and priority of fire.
● Update status displays.
– Plot locations of maneuver elements and objectives.
– Plot locations of agreed targets.
● Develop a smoke support plan.
– Get target lists from the FSO.
– Modify target lists as necessary. Use the smoke target analysis procedures in Appendix A as guidance.
– Develop a list of smoke delivery assets.
– Decide the type of support required (for example, smoke versus EO system effectiveness).
– Decide the time support is required.
– Decide the best delivery system to engage.
– Decide the best delivery unit to engage (for example, smoke generator unit, direct support (DS), 155-battery).
– Prepare and consolidate target lists.
– Assign smoke target numbers. Appendix A outlines the procedure for numbering smoke targets.
● Coordinate the smoke support plan with the FSO.
– Inform or brief requirements for fire support engagement with smoke.
– Obtain target numbers for targets requiring fire support asset engagement.

– Modify the plan as agreed.
– Ensure the plan is logistically supportable and sustainable.
● Brief smoke support plan to obtain concurrence from the commander (or G3/S3 as required by local policy).
–Brief requirements for fire support engagement with smoke.
–Modify the plan as agreed.
–Decide the support.
–Decide the time.
–Decide which smoke delivery unit (s) will engage.
–Finalize the target list.
● Coordinate the fire support plan changes with the commander or G3/S3 and the FSO.
– Inform or brief them concerning changes made in coordination.
– Modify the plan as agreed.
● Coordinate the smoke support plan with adjacent units.
– Inform or brief them concerning the plan.
– Modify the plan if required.
● Confirm coordination with the commander or G3/S3 and with the FSO.
● Brief the smoke unit leader(s) on the smoke annex to the OPORD.

Smoke Support Plan Execution

The extreme impact of smoke on tactical operations mandates close coordination, control, and planning for contingencies. Command supervision and staff supervision are essential to ensure the use of smoke enhances rather than degrades mission success.

Commanders must control smoke in their area of operations. Use decision points based on IPB and human feedback to control when you start and stop smoke. Smoke unit leaders monitor the communications nets for the supported unit as well as internal nets. This ensures the commander has an immediate response to start or stop smoke at a particular point or time.

Plan to minimize friendly force degradation from our own use of smoke. Rehearse those contingencies. An antitank position with clear fields of fire may be valueless in dense smoke unless the gunner or section leader has rehearsed movement to previously prepared alternate positions (limited visibility positions).

The preceding paragraphs established the "Why" and "How" of smoke support. The remainder of Chapter 1 answers the "When and Where" and "What" and explains with what delivery systems and delivery units we make smoke. The remaining chapters outline Threat (Chapter 2) and provide doctrine, tactics, and techniques for smoke employment in the offense (Chapter 3), defense (Chapter 4), and other operations (Chapter 5). The manual concludes with smoke support sustainment planning considerations (Chapter 6).

Operational Concept for Smoke and Obscurants

Smoke and obscurants themselves are not lethal. However, when synchronized throughout the depth of the battlefield they enhance the maneuver commander's ability to maneuver. They concentrate combat power against enemy vulnerabilities at the critical time and place. They also reduce his own vulnerability to enemy intelligence and target acquisition. Smoke and obscurants provide the commander with another means to meet the imperatives of the AirLand battle by–
● Degrading the enemy's ability to see.
● Disrupting the enemy's ability to communicate.
● Concealing friendly forces.
● Deceiving the enemy.
● Providing a means to identify and signal.
● Degrading or defeating directed-energy weapons.

● Enhancing friendly weapon system effectiveness.

The Comprehensive Smoke Study analyzed what happened when US forces used smoke and the adversary used smoke, and the net effect on combat effectiveness when both sides used smoke and obscurants, The lessons learned indicate –
● Smoke favors the attacker. Our force exchange ratio improves 25 to 80 percent.

- Projected smoke is important to success, but resource intensive. Firing units require 400 percent above normal basic loads.
- Large-area smoke is beneficial. There is up to a 30-percent increase in our force exchange ratio. Combined with artillery-delivered WP smoke gives a 75-percent increase in our force exchange ratio.
- You should avoid smoke on friendly antitank guided missile lines of sight.

Operational Level of War

Operational objectives within a theater of war include the marshalling and sustaining of forces and materiel to conduct successful campaigns. Commanders and staffs at this level of war will plan and conduct smoke operations to—
- Deceive the enemy as to friendly force location, status, and movement.
- Defeat enemy air and satellite reconnaissance efforts.
- Reduce the effectiveness of enemy fire and air attacks.
- Defeat enemy precision-guided weapons.
- Increase force survivability.

Tactical Level of War

Obscurants can support the movement and positioning of forces on the battlefield and the provision of fire support. They can also conceal the logistical support of forces before, during, and after engagements with the enemy. The objec-

tive of smoke employment is to increase the effectiveness of US operations while reducing the vulnerability of US forces.

Obscurant use supports battlefield deception and enhances friendly combat operations by—
- Increasing friendly force survivability by—
  - Concealing friendly mass and maneuver.
  - Degrading Threat weapon system effectiveness.
  - Attenuating energy weapons.
  - Increasing friendly-to-enemy force ratio.
  - Increasing Threat force vulnerability by —
  - Decreasing Threat rate of advance.
  - Disrupting Threat command and control.
  - Deceiving Threat intelligence collection.

In the offense, the commanders can achieve surprise and protect their force by combining obscurants with maneuver and firepower. Obscurants allow us to reduce our vulnerability through concealment as we mass forces to attack. Obscurants will conceal friendly movements and screen breaching of obstacles and river crossings. They will also negate the stand-off capabilities of enemy long-range antiarmor weapons and interfere with enemy guidance and acquisition systems. Smoke supports tactical objectives by deceiving the enemy as to the exact location, timing, and size of the main attack. It also isolates units for piecemeal destruction.

In the defense, obscurants support disruption of enemy activities and enhancement of friendly operations throughout the battlefield. Smoke will isolate attacking echelons and conceal friendly unit locations. It will screen friendly maneuvers, support deception, and interfere with enemy movement and communications. Obscurants help to preserve forces essential to the mission. Smoke supports tactical objectives by selectively denying air and ground routes and by forcing the enemy into tightened tactical formations, which are easier targets.

In a nuclear environment, temporary massing of friendly forces may create a particularly lucrative target. Dense smoke provides both concealment and some measure of protection against thermal radiation.

Commander and Staff Considerations

Commanders must be prepared to use smoke to their advantage regardless of whether it is employed by friendly or Threat forces. Commanders and staffs at all levels—
- Consider the use of smoke to enhance friendly scheme of maneuver.
- Avoid developing a predictable pattern of smoke use.
- Anticipate and plan to counter enemy smoke and countersmoke measures (see Chapter 2).
- Train for limited visibility operations to minimize friendly force degradation.

Operational Continuum

Smoke and obscurants disrupt the enemy's ability to locate, acquire, and defeat our forces across the operational continuum. Use smoke in peacetime, conflict, and war.

Peacetime

Use smoke in peacetime in support of security assistance operations, show of force, and

peacekeeping operations. Smoke systems may be particularly useful in segregating or isolating violent elements. This creates a sense of isolation among the people. In counternarcotics operations, use smoke to restrict use of airfields and to conceal the movement of law enforcement personnel.

Conflict

Use smoke in conflict to support all types of military operations. Smoke is useful in insurgency/counterinsurgency and peacetime contingency operations in support of tactical objectives. Smoke systems may be particularly useful in concealing initial insertion of forces.

This would provide surprise and security for our forces.

War

Use smoke in war to support all operational and tactical operations. Smoke is useful from the onset of hostilities to protect the force, alter force ratios, conceal maneuvering forces, and give leaders an added dimension of flexibility.

Spectrum of Conflict

The Army recognizes that under low-intensity conflict (LIC) conditions indirect, rather than direct, applications of military power are the most appropriate and cost-effective ways to achieve national goals. If US involvement requires military action, force protection and identification of Threat RSTA means are critical. In LIC, use projected, generated, and self-defense smoke to –

● Support counterinsurgency operations. Smoke use can protect the force in all phases of counterinsurgency operations. In addition, when identified we use smoke to attack Threat RSTA means. Smoke creates a psychological feeling of isolation. This may reduce the insurgent's will to resist.

● Support terrorism counteraction. Smoke use can restrict use of airfields or facilities and conceal the movements of counterterrorist forces. Use smoke to conceal objectives prior to assault or occupation

by law enforcement or counterterrorist forces.

● Support peacekeeping operations. Smoke use can protect our forces by screening our forces from Threat observation. It can also restrict the effectiveness of combatant target acquisition or weapon guidance systems. Marking smokes are effective for signaling and early warning. In addition, we can use smoke and obscurants to segregate or isolate forces in conflict.

● Support peacetime contingency operations. Smoke use can protect our forces, particularly in a show of force or demonstration. In strikes, raids, and unconventional warfare, use smoke to attack known Threat RSTA means. For example, in a raid on a suspected Threat communications center, friendly forces would—

–Use projected smoke (for example, mortars, rifle grenades, or aviation-delivered smoke rockets) to obscure guard posts and observa-

tion points. This is particularly important when special operating forces are being inserted.

– Use emplaced smoke such as smoke hand grenades to conceal entry into the facility once their presence is known.

– Use projected or emplaced smoke to conceal their exfiltration route and allow them to break contact.

In high-intensity and mid-intensity conflicts, US forces face large, rapidly maneuvering formations on battlefields characterized by sophisticated weapons, high-consumption rates, and extended time and distance. Smoke supports all types of military operations in mid- and high-intensity conflict.

Using smoke and obscurants across the spectrum of conflict will positively influence the outcome of any operation. Chapters 3 through 5 outline tactics for smoke employment to meet the challenges of the spectrum of conflict.

The Battlefield

Smoke and obscurants disrupt enemy combat operations throughout the depth of the battlefield. One of the key concepts in AirLand battle is the entire battlefield consists of one single battle fought by one commander with one plan. Obscurant operations must support all levels of command in fighting a unified battle of deep, close, and rear operations.

Deep Operations

Deep operations disrupt the enemy's movement in-depth, destroy high-value targets behind the enemy's lines, and interrupt enemy

command and control at key decision points. Deep attacks are conducted to create "windows of opportunity" by disrupting or destroying follow-on echelons. Smoke systems that support the deep battle include aviation, artillery, smoke generator, and armored vehicle smoke systems.

Army aviation assets deliver smoke rockets from attack helicopters to obscure enemy observation, degrade target acquisition, and mark targets for close air support aircraft. Medium-lift helicopters supporting airmobile operations can move chemical units with smoke generators behind enemy lines. In

addition, we can air transport the chemical company of an airborne division to support airborne operations in the deep battle.

Current artillery-delivered obscurants will seldom have a direct impact on deep strike capability. In the far term, millimeter wave obscurants delivered by rockets onto radar sites will be effective to suppress enemy air defense and counterbattery abilities. Similarly, special purpose obscurants that block certain regions of the electromagnetic radiation will be more effective in disrupting hardened command and control centers than high-explosive munitions.

Deep attacks with armored columns may require the use of smoke self-protection systems. Combat vehicle defensive obscurant systems include vehicular launched grenades and vehicle engine exhaust systems. The prime constraints will be logistical support (fuel and armament).

Close Operations

In the defense a covering or screening force occupies a sector far enough forward of the forward edge of the battle area (FEBA) to prevent surprise, to force the enemy to deploy their forces, and to gain sufficient time to respond to the Threat. Extensive use of concealing and deception smoke helps to develop the situation by forcing the enemy to deploy. It also denies information about disposition and composition of friendly forces, degrading enemy target acquisition.

Defending forces fill valleys and terrain defiles with visual obscurants to force enemy helicopters above the obscurant cloud, while ground fire is adjusted, using thermal viewers. Use visual and infrared defeating smokes to support countersurveillance and counterreconnaissance.

Smoke provides concealment for maneuver and counterattack and reduces the effectiveness of enemy target acquisition. It also deceives the enemy about the true intentions of our forces and creates conditions necessary to surprise them. Smoke enables the covering force to delay the Threat advance more effectively.

When advanced positions can no longer be retained, the security force must quickly and efficiently conduct a passage of lines. It must hand the battle off to the main battle area (MBA) units. Smoke pots, smoke generator units, and projected smoke conceal friendly forces and routes during battle handoff.

Obscurants support the decisive battle in the MBA by concealing battle preparations, denying enemy intelligence information, and concealing maneuver and counterattack. Units conceal areas for real and decoy battle positions during initial preparation and camouflage. Before the battle, mobile units provide smoke in multiple areas until the battlefield is fully prepared.

Use smoke and obscurants aggressively to assist the unit in regaining the initiative. Obscurants isolate enemy echelons, conceal movement of counterattacking forces, and deceive the enemy about friendly intentions. Smoke from smoke units, smoke pots, and enemy smoke lines conceal movement of friendly forces. Artillery- and mortar-delivered smoke blinds enemy armored and antitank elements while friendly forces attack targets from the flanks using thermal viewers. Obscurants separate enemy echelons to preclude supporting and overmatching fire and to facilitate their piecemeal defeat.

Obscurants in the defense of the MBA require careful preparation to preclude an ill-conceived deception; disruption of friendly activities; or poorly-timed, low-visibility retrograde operations. Obscuration will slow friendly activities. Commanders and planners should plan additional time for movement under smoke and obscurants.

Rear Operations

Because support units normally remain fixed over a period of hours or more, smoke units will normally maintain a large-area haze over brigade and division support activities throughout the early part of the battle. Based on command priorities and resources, brigade and division support areas may be concealed by obscurants from the beginning to the end of the battle. Obscurants used in rear operations include deception and screening of vital targets. Such targets include communications centers, ammunition supply points, motor pools, tank parks, assembly and staging areas, and critical portions of main supply routes.

At the operational level, the protection of key transportation and logistics activities is critical to sustaining the force. Echelons above corps must plan for obscurants in the defense to conceal static operations. Ports and terminals; fixed rail facilities such as bridges, tunnels, and rail yards; logistics-over-the-shore sites; dams; locks; trailer transfer points; and critical points along main supply routes must be covered. Obscurants may also provide limited protection for nonstatic operations such as water transport, railroad operations, inland waterways movement, and convoys. Commanders and staffs must carefully plan operations to ensure that the use of friendly obscurants at one logistics facility does not impede activities at another.

Smoke can assist in defeating or delaying enemy airborne and airmobile operations. Place smoke over potential drop zones and landing zones in rear areas to conceal them and force the enemy aircraft to remain exposed to our air defense assets longer. This is particularly useful when you have significant intelligence indicators that airborne or airmobile operations are imminent, as smoke may deny the enemy the ability to insert those forces at all.

In the event of enemy breakthrough, freed sites and some rear area forces will not be able to maneuver away from an attacking Threat force. They will have to defend in place. Placing smoke on rear operations will conceal them from observation. However, this will degrade their operations. Smoke may be placed on the Threat forces, in coordination with electronic warfare and deception assets, to isolate the Threat units and prevent resupply, relief, or reinforcement prior to their destruction.

Battlefield Applications of Smoke

Smoke has four battlefield applications that support combat operations: obscuring, screening, protecting, and marking.

Obscuring Smoke

Obscuring smoke is smoke delivered directly on or immediately in front of enemy positions to blind or degrade their vision both within and beyond their location. Use obscuring smoke to attack and defeat enemy target acquisition and guidance systems at their source. Projected means, such as artillery, mortars, rockets, and rifle grenades, generally deliver obscuring smoke.

For example, smoke delivered on an enemy antitank guided missile (ATGM) position may prevent the system from acquiring or subsequently tracking targets, thereby reducing its effectiveness. Employment of obscuration smoke on an attacking armored force may cause it to vary its speed, inadvertently change its axis of advance, deploy prematurely, and rely on nonvisual means of command and control.

Screening Smoke

Screening smoke is smoke delivered in areas between friendly and enemy forces or in friendly operational areas to degrade enemy ground or aerial observation or both. It also defeats or degrades enemy EO systems. In general, use screening smoke to attack enemy target acquisition and guidance systems by placing smoke between the friendly unit and the sensors. Generated means, such as smoke generators, smoke pots, and smoke hand grenades, deliver screening smoke.

For example, employ screening smoke to conceal ground maneuver, breaching and recovery operations,

key assembly areas, and supply routes. There are three visibility categories for screening smoke that the supported unit commander uses to establish the visibility requirement for a smoke mission. These are —

- **Smoke haze.** A smoke haze is a light concentration of smoke placed over friendly areas to restrict accurate enemy observation and fire. It is not dense enough to disrupt friendly operations within the screen. A smoke haze is defined as a concentration of smoke that would allow an individual to identify a small tactical vehicle between 50 and 150 meters away, but no farther than 150 meters.
- **Smoke blanket.** A smoke blanket is a dense, horizontal development of smoke used over friendly areas to conceal them from enemy ground and aerial observation. A smoke blanket may hamper operations of friendly troops by restricting movement and activity within the screen. It provides maximum concealment. It is a concentration of smoke that would allow the identification of a small tactical vehicle from 0 to 50 meters but no farther.
- **Smoke curtain.** A smoke curtain is a dense, vertical development of smoke. It is placed between friendly and enemy positions to prevent or degrade enemy ground observation of friendly positions. Since the smoke curtain is not placed directly on friendly troops, it will not hamper friendly operations. Commanders should use smoke curtains when friendly forces have air superiority or air parity. It does not prevent aerial observation; however, it may force aircraft to fly higher in order to see behind the curtain, thus increasing vulnerability to air defense weapons. In general, smoke curtains will defeat sensors in the

visual through mid-infrared portions of the spectrum depending on the concentration of the smoke.

Protecting Smoke

Protecting smoke is smoke used to defeat enemy guidance systems or to attenuate energy weapons on the battlefield. Smoke and obscurants have the ability to reflect, refract, or absorb energy. When enemy gunners have already fired ATGMs or have used laser designators, use protecting smoke to immediately screen vehicle movements and defeat enemy guidance links. In an active nuclear environment or when threat of nuclear weapon use is high, use protecting smoke to attenuate the thermal energy from nuclear detonations.

When the enemy possesses directed-energy weapons, use smoke or obscurants to degrade the effects of those weapons. Directed-energy weapons include lasers; high-power microwaves; particle beams; and non-nuclear, directed electromagnetic pulse. A detailed description of the effects of smoke and obscurants on directed-energy weapons is in Appendix B.

Marking Smoke

Marking smoke includes smoke used to mark targets, identify friendly positions, and provide for prearranged battlefield communications. The smoke means used for identification or signaling smoke are normally projected means and smoke hand grenades. For example, use helicopter-delivered smoke rockets to mark a target for destruction by close air support aircraft, artillery, or mortars. Use smoke hand grenades to signal aircraft.

Smoke Delivery Means

The primary factors that affect delivery of smoke onto a target are the smoke weapon system (delivery means and smoke agents) and terrain and weather conditions (steering winds and temperature gradients). Appendixes C and G detail smoke delivery means and smoke agents, respectively.

Smoke Delivery Systems

In general, there are three means for producing smoke: projected, self-defense, and generated smoke devices and systems.

Projected Smoke

Projected smoke is smoke produced by artillery or mortar munitions, naval gunfire, helicopter-delivered rockets, and bombs and generator smoke from fixed-wing aircraft. The advantage of using projected smoke munitions is you can place smoke directly on a deep, close, or rear target.

The disadvantage of projected smoke is that most projected smoke devices and munitions are lethal; they cannot be used on or near friendly forces. Most unit basic loads for munitions are insufficient for sustaining smoke on a target. The exception to this is generator smoke from fixed- and rotary-wing aircraft, which is considered a projected smoke system because of its ability to obscure deep targets.

Projected smoke can support both short- and long-duration missions based on the availability of ammunition. Combine use of projected smoke munitions with other smoke employment means throughout the battlefield.

The ideal battlefield applications for projected smoke systems are producing obscuring smoke, initiating screening smoke, and marking targets. For example, use projected smoke systems to place smoke on enemy intelligence gathering assets, ATGM positions, and artillery for-

ward observers. Also, use them for initiating screening smoke forward of an attacking force that smoke generators will sustain.

Self-Defense Smoke

Self-defense smoke is smoke produced by smoke grenade launchers and the vehicle engine exhaust smoke system (VEESS), which we mount on most armored vehicles. An advantage of this system is rapid smoke production and responsiveness to the small unit leader. Disadvantages include danger to dismounted troops with the grenade launchers, interrupting your own target acquisition while taking evasive maneuvers, and additional fuel consumption for VEESS.

The ideal battlefield application for self-defense smoke devices is to conceal armored vehicle movements and to reduce vulnerability to attack by enemy antiarmor weapons. The devices function as follows:
● Armored vehicle smoke grenade launchers. Mounted on M88, M113, M60, Ml, M2, and M3 families of armored vehicles, smoke grenade launchers provide rapid obscurant production to assist the vehicle in self-defense. The launchers deliver the obscurant in front and/or to the flanks of a vehicle by smoke grenades electrically fired from the vehicle.
● Vehicle engine exhaust smoke system. The VEESS injects diesel fuel into the engine exhaust system. The fuel then vaporizes and is released into the air, where it condenses and produces smoke Vehicles that currently have the VEESS include the AVLB. LEV, M88A11, M60, Ml, M2, and M3 families of combat vehicles.

Generated Smoke

Generated smoke is smoke produced by smoke pots, smoke grenades, and smoke generators. Steering winds deliver generated smoke to a target. Combine generated smoke with projected

smoke to provide depth of coverage throughout the battlefield. Generated smoke can cover small and large areas for up to an indefinite period of time based on the availability of logistical support, particularly fuel.
● Smoke pots and smoke grenades. You can pre-position these. They do not require an operator. You can ignite them manually or electrically. Use these smoke devices in hasty smoke operations because of their relatively short burn time and ease of access. The ideal battlefield applications for smoke pots are initiating screening smoke, marking smoke, and providing smoke unit self-protection. Smoke hand grenades are best for small-area screening smoke (squad-size maneuver) and marking smoke.
● Smoke generators. Smoke generator units produce large volumes of smoke to support hasty or deliberate smoke operations. Smoke generator units require a stand-off distance from the target based on wind speed and direction. Smoke generators are ideal for large-area smoke missions of long duration. They require detailed planning for logistical support. The ideal battlefield applications for smoke generators include screening, protecting, and sustaining obscuring smoke.

There are two concepts for employing smoke generators: mobile and stationary.

Mobile smoke is smoke produced while the system is on the move. Mobile smoke units normally are positioned well forward on the battlefield. They have the advantage of maneuver, but are exposed to more enemy weapon systems. They have a self-concealment ability that enhances their survival, and they can make smoke from a freed position or while moving. Mobile smoke systems rely heavily on passive operations security (OPSEC) measures to enhance their survivability.

Mobile smoke is supplied by units equipped with M1059 mechanized smoke carriers or motorized M157 smoke generators.

The M1059 is an M113 armored personnel carrier (APC) equipped with the M157 smoke generator set. This system can support armored and mechanized forces well forward. It is less vulnerable to small arms and indirect fire than wheeled systems due to its armored plating. Its tracked chassis provides it with the ability to move with its supported unit both on and off the road.

The motorized M157 smoke generator is an M1037 HMMWV equipped with an M157 smoke generator set. This system can provide mobile smoke to light infantry and specialized units. This system is vulnerable to small arms and indirect fire.

Stationary smoke is smoke produced from a fixed location, normally by units equipped with M3A4 mechanical pulse jet smoke generators mounted on M998 HMMWVs or M151 1/4-ton vehicles with trailers. Units move their vehicles and smoke generators into positions on a smoke line and then produce smoke. These units are limited by their mobility and require more time to set up and depart an area. They are well-suited for large-area smoke missions conducted in rear areas.

Weather and Terrain Effects

Steering winds actually carry the smoke and determine its direction, speed, and downwind travel distance. Temperature gradients are normally based on the time of day. Temperature gradients affect the height, density, duration, and travel distance of smoke. There are three types of temperature gradients: lapse, neutral, and inversion.

Since steering winds carry smoke, smoke usually follows the contours of the earth's surface. On flat, unbroken terrain and over water (open terrain), smoke streamers take longer to spread out and mix with other streamers. Obstructions, such as trees and buildings, tend to break up smoke streamers. The streamers may then re-form, cover a larger area, and create a more uniform cloud than over open terrain. Large hill masses and very rugged terrain cause strong cross currents of wind and tend to create holes and uneven dispersal of the smoke cloud.

Appendix F details the effects of weather and terrain on obscurants. It also gives a summary of the best and worst employment conditions.

Smoke Units

Smoke generator units are assigned to chemical battalions under chemical brigades at corps, to chemical battalions at TAACOMs, and to divisions. Detailed information concerning the modified or living tables of organization and equipment (MTOEs/LTOEs) and capabilities of these units is in Appendix D.

The platoon is the lowest echelon of command for smoke units that is self-sufficient. Table 2, below, outlines the smoke coverage capabilities of smoke platoons.

Tactics, Techniques, Procedures, and Unit Guidelines

Smoke tends to draw enemy attention and fire especially when used over friendly areas. The effect of enemy fire can be minimized by detailed planning, synchronizing all smoke assets with firepower, and limiting exposure of smoke assets to that fire.

Tactics, Techniques, and Procedures

The commander that "owns" the terrain is responsible for controlling the smoke. Place smoke before the enemy can pinpoint targets. Employ smoke during hours of darkness and limited visibility periods (rain, fog, ice fog, snow, sleet) to enhance its effectiveness. Synchronize all smoke assets for maximum impact

Table 2. Smoke platoon coverage capabilities.

	No. of Generators	No. of Point Sources	Average Cloud Parameters			
			Crosswind Width		Downwind Depth	
			Haze	Blanket	Haze	Blanket
Stationary Smoke	24	24	1.00–3.40 km	0.50–1.70 km	0.65–10.00 km	0.65–10.00 km
	24	12	0.50–1.70 km	0.30–0.90 km	0.65–10.00 km	0.65–10.00 km
	12	6	0.30–0.90 km	0.15–0.50 km	0.65–10.00 km	0.65–10.00 km
Mobile Smoke	12	6	0.55–1.40 km	0.50–1.20 km	0.15–3.60 km	0.05–1.40 km
	14	7	0.60–1.50 km	0.55–1.30 km	0.15–3.60 km	0.05–1.45 km

against the enemy. Coordinate smoke employment with adjacent units and all units in the operational area to minimize friendly unit degradation.

Understand that smoke compresses the battlefield by limiting visibility. Training soldiers to operate in smoke reduces the degradation caused by smoke. It also reduces psychological impact such as confusion, fear, and isolation on troops.

Smoke cloud size should be large enough to prevent the enemy from saturating the entire smoked area with fire. The target should be offset from center within the smoke. A rule of thumb is for the screen to be five times the size of the target. Avoid patterns for smoke employment. Avoid placing smoke over the center of your target every time. Maneuver using the flanks and edges of the smoke alternatively with the center.

To support tactical deception, employ smoke over other likely areas to dilute the volume of fire and draw attention to the areas of little or no importance. The smoke should approximate the principal smoke cloud in size. Establish and enforce mobile smoke control measures. The smoke control officer controls the smoke operation from a vantage point allowing target observation, ensuring it is completely concealed by smoke. When using self-defense smoke, ensure the entire squad, section, or platoon uses the smoke simultaneously to preclude drawing attention to a lone vehicle.

Start the smoke mission prior to operation start time and continue well beyond the end of the operation. For example, a river crossing is scheduled for the time from 0500 to 0700. Start smoke at 0400 and stop smoke at 0800 to confuse the enemy as to the exact crossing time and size of the force.

Limited visibility positions, preplanned and previously prepared, will minimize degradation caused by friendly or Threat use of

smoke. Rehearsal of displacement under smoke will help you avoid confusion and disorientation and rapidly restore engagement capability.

Unit Guidelines

Smoke units are vulnerable to enemy direct fire weapons. Use the following guidelines when employing smoke generator units. Smoke units should, whenever possible, avoid prominent terrain features and locations that would permit accurate map firings or fire through adjustment from a known point.

Do not use mobile smoke vehicles to lead the attack. Use them to screen the flanks or main body maneuvering forces. Do not employ smoke units less than a platoon-size element. Use stationary smoke units to conceal rear area facilities and light infantry forces.

Command and Support

Smoke units operate under two types of relationships: command and support. A command relationship reflects the chain of command and degree of authority. A support relationship represents the manner in which the maneuver unit is to be supported.

In the tactical planning process the staff recommends the appropriate command or support relationship between the chemical unit and the supported unit. This relationship defines the specific responsibilities between supporting and supported units. Generally, smoke units at corps and division levels establish support rather than command relationships. Direct support (DS) is the preferred support relationship for company-size and larger chemical units. Attachment is the preferred command relationship for chemical platoons.

Organization and Principles

Smoke units work most efficiently under the control of a parent chemi-

cal unit. This organization permits close control and the most productive use of all assets. The commander continuously monitors the progress of assigned tasks. He shifts elements where the need is greatest throughout his area of operations. On the other hand the supported unit commander at the lowest level gets greater responsiveness when the chemical unit is under his direct control. He determines the task organization and gives missions directly to the units under him.

Providing smoke units in a command or a support relationship is a balance between the needs of the higher commander for flexibility and the needs of the subordinate commander for responsiveness. The corps may provide each committed heavy division with one motorized and one mechanized smoke company. Light infantry divisions are normally provided a dual-purpose smoke/decontamination company. Units are provided in either a command or support relationship.

For brigades already in contact or when contact is imminent, it is also appropriate for the division to allocate chemical units in an OPCON or attached status. Brigades, in turn, can provide chemical assets directly to their battalion task forces only when they receive the chemical assets from the division in a command relationship. Otherwise, the chemical unit commander deploys his subordinate elements based on his estimate.

At each echelon, commanders use organizational principles, derived from the AirLand battle imperatives, to guide the employment of chemical units. These principles include the following:

Task organize to meet requirements. Mission requirements drive size and composition of task forces. A mix of chemical units is often necessary to achieve the proper balance of capabilities.
● Task organize by platoons.
● Give priority to the main effort. There are not enough chemical assets on the battlefield to handle all

tasks. Chemical units are not spread evenly across the battlefield but are concentrated with the main effort to ensure its success.

• Integrate chemical support with maneuver and fire. The scheme of maneuver governs the use of smoke and reconnaissance assets.

• Do not hold smoke units in reserve. Smoke assets are too scarce and valuable to be held out of the fight. They must refit quickly and return to their primary mission.

• Make logistically sustainable plans. Resources are always limited. The availability of fuel and fog oil restricts chemical unit ability to execute smoke missions. Conduct detailed planning for chemical unit sustainment and supporting logistics.

• Maintain effective command and control. Effective plans use all available controlling headquarters and hand off operations smoothly between them.

Responsibilities

When supported by a smoke generator unit, both the maneuver unit commander and the smoke unit commander have specific sets of responsibilities for planning and coordinating the smoke mission. Smoke missions involve close coordination between the supported unit commander and staff and the smoke unit commander. Commanders must use the same troop-leading procedures for smoke assets as they will for their maneuver units, ensuring smoke unit commanders have adequate time and resources to plan and prepare for smoke support.

Maneuver Unit Commander's Responsibilities

The maneuver unit commander is responsible for the overall tactical operation. This commander must execute coordination with all units participating in or influenced by the smoke operation. He defines smoke support requirements to include—

• His intent.
• Visibility criteria within the smoke.
• Location and size of the smoke target.
• Time for effective smoke to be on the target.
• Duration of effective smoke on the target.
• Security of smoke assets.
• Immediate support available for the mission.
• Preparation of a smoke annex for the operation.

Smoke Unit Commander's Responsibilities

When the smoke plan calls for support from a smoke generator unit, the commander of the smoke unit is responsible for all activities concerning establishing and maintaining smoke on the designated target. Based upon information from the maneuver commander, the smoke unit commander performs the following tasks:

• Plans for map, air, or ground reconnaissance.
• Coordinates the mission with supported and adjacent units.
• Selects and coordinates smoke lanes (mobile smoke) or smoke lines (stationary smoke).
• Coordinates communications nets.
• Provides input for the smoke annex.
• Identifies additional support requirements within the limitations of command or support relationships.

Chemical Staff Officer's Responsibilities

The chemical staff officer plans and monitors the execution of the smoke plan, in coordination with the FSO and smoke unit commander. The procedures for smoke planning have been discussed. The procedures for monitoring execution are—

• Direct the chemical staff in monitoring the smoke support plan.
• Monitor planned smoke engagement by fire support assets:
 – Coordinate with FScell.
 – Determine whether planned fire was executed.
 – Make changes as necessary.
 – Report changes as required.
 – Update status displays.
• Monitor planned smoke engagement by smoke unit assets:
 – Monitor the smoke unit net.
 – Determine success (Smoke on target on time? Did it achieve purpose?).
 – Make changes as necessary.
 – Report changes as required.
 – Update status displays.
• Monitor planned smoke employment by maneuver units (for example, VEESS and smoke pots):
 – Monitor the appropriate command or maneuver unit net.
 – Determine success (Smoke on target on time? Did it achieve purpose?).
 – Make changes as necessary.
 – Report changes as required.
 – Update status displays.
• Monitor immediate calls for smoke:
 –Monitor the appropriate net (FScell and smoke unit).
 – Determine if smoke support is required.
 – Determine the best asset to engage. (Note: Fire support assets have the quickest response time.)
 – Respond if necessary to coordinate smoke support from other than fire support assets.
 – Update status displays.

Chapter 2

Threat

US forces may have to fight enemies ranging from sophisticated armored forces of Warsaw Pact and the more advanced emerging countries to unconventional forces of the Third World. The reconnaissance, surveillance, and target acquisition (RSTA) capabilities of our potential adversaries range from binoculars and night vision devices to laser and thermal imaging systems. We must focus our training, doctrine, and tactics in smoke and obscurants on degrading and potentially defeating these types of systems.

The training begins with identifying the location, types, capabilities, and employment procedures of enemy systems on the battlefield. The FM 100-2 series covers the Soviet Army and North Korean Army. The Cuban Forces Handbook, DDB-2680-62-86, dated May 1980 and similar handbooks for other countries are excellent sources of information on Third World countries. These are excellent references for unit organization and equipment, operations and tactics, and specialized warfare.

The smoke capability of our potential adversaries ranges from field expedient methods to extensive smoke-producing equipment and organizations in the field. Clearly the most significant Threat smoke capability resides within the Soviet Union. Their continued emphasis on adapting existing smoke assets to tactical missions and the development of new smoke systems allows Soviets to employ smoke in depth and in large areas for extended periods.

Historically, the Soviets relied heavily on smoke. In many instances smoke use was directly responsible for operational success. One Soviet writing states that during an offensive action smoke screens can reduce their losses of combat vehicles by 60 percent to 80 percent. In World War II, the Soviets established smoke lines up to 100 kilometers long, maintaining them for several days, weeks, and months.

The Soviets state that smoke carries more importance today than in World War II. This is due to the growth of highly sophisticated, long-range target acquisition systems that relatively inexpensive smoke and obscurants can defeat. They believe that smoke and obscurants can degrade and potentially defeat the use of optical, laser, night vision, and even thermal imaging systems. For this reason the Soviets plan that they will use smoke whenever and wherever the tactical situation permits.

For these reasons, our intelligence preparation of the battlefield (IPB) must include both Threat RSTA and smoke capabilities. This chapter outlines Threat RSTA and smoke employment doctrine. Chapters 3 through 5 outline doctrine and tactics to attack Threat RSTA efforts and protect the force.

Reconnaissance, Surveillance, and Target Acquisition

The effective employment of battlefield smoke and obscurants requires an understanding of Threat RSTA capabilities and how these capabilities support Threat operations. The Soviets define reconnaissance as the collection of intelligence information about the location, disposition, composition, number, armament, combat preparedness, character of activities, and intentions of the enemy in the interests of combat.

Threat RSTA encompasses all methods, such as photographic intelligence (PHOTINT), imagery intelligence (IMINT), and human intelligence (HUMINT). The most reliable methods and therefore the most used methods of RSTA are also easily defeated by smoke and obscurants. The Threat groups these methods into three major areas (aerial, ground, and artillery) that encompass the strategic, operational, and tactical depth of the battlefield.

Aerial reconnaissance sources are the satellites, front/army aviation assets, rotary-wing aircraft, and remotely piloted vehicles (RPVs).

Ground reconnaissance includes long-range reconnaissance units of front/army and divisional organizations and special reconnaissance, such as NBC, engineer, and medical reconnaissance.

Artillery reconnaissance uses artillery observation posts through direct observation, supplemented by radar, sound, and flash ranging, and

information resulting from electronic means.

Threat forces will conduct reconnaissance to acquire information on US nuclear weapons, force disposition, and intentions. In the Soviet ground forces, dedicated reconnaissance units will conduct aggressive RSTA for commanders from the front down to regiment.

Aerial Reconnaissance

Satellite, or "cosmic" reconnaissance, includes photography and television. It is controlled by the GRU (general staff's main intelligence directorate). One reconnaissance satellite version contains a video system on which images are stored and later retransmitted to Soviet ground stations.

Aerial reconnaissance is the principal method of gathering target intelligence. It provides the most timely and reliable information on the character and location of targets, particularly those in the enemy rear. Aerial reconnaissance recognizes four major categories of targets:
- Nuclear weapon systems and storage depots.
- Active and potential airfields.
- Defensive positions and systems (AD, C3, EW).
- Reserves, logistic facilities, and approaches.

Front air forces normally include an air reconnaissance regiment, but may have as many as three. These regiments are self-contained and process the information they collect. There are 24 to 40 aircraft per regiment. Their collection capabilities include fixed-frame and strip photography, infrared (IR) photography, television, and side-looking airborne radar (SLAR). An example is the FOXBAT B, which carries five nose-mounted cameras and IR linescan equipment. It provides a coverage corridor of up to 70 kilometers. The aerial television with down-link does not give the resolution of still photography, but it is near-real time. About half of the Soviet reconnaissance aircraft

can transmit their information in-flight. High-performance aircraft and helicopters can be equipped with laser range finders and designators.

Reconnaissance aircraft fly at a high speed and low altitude, out to 600 kilometers beyond the forward edge of the battle area (FEBA). However, certain reconnaissance aircraft, such as the FOXBAT B (with visual and IR cameras) and the FOXBAT D (with SLAR), may perform their missions at high altitude without having to cross their forward line of own troops (FLOT).

Front and army RSTA assets may include a squadron of drones, commonly the DR3. Drones may have vertical and side-looking cameras, using visual and IR film. A drone may also carry a video with real-time down-link, though this would reduce its range. One drone squadron could launch 20 missions a day.

Aerial reconnaissance is particularly critical to the initial air operation. Predesignated strikes are planned in detail. Maps and terrain models are used to familiarize pilots, plan approach and departure routes, and determine attack techniques and routes. The vulnerability of high-performance aircraft to ground-based air defense necessitates a low-altitude (ideally, 50 to 100 meters), high-speed approach in minimum time. The pilot has three to six seconds to identify his target. Helicopter squadrons at army and division level will fly missions in support of engineer, chemical, and artillery reconnaissance.

Ground Reconnaissance

Reconnaissance units are assigned to all echelons of the Soviet force structure, from regiment to front. Reconnaissance units are equipped with tanks, BMPs, BTRs, and BRDM2 scout cars, and reconnaissance variants of each. Specialized vehicles perform engineer and NBC reconnaissance.

The BRM is a BMP variant mounting the TALL MIKE ground surveillance radar. Some units will have the PSNR (portable information gathering station), a man-pack radar, or a mixture of both. Detailed information on the reconnaissance units' organization and equipment can be found in FM 100-2-3.

Ground reconnaissance is primarily the concern of the tactical commander at division and below. His or her interest is the enemy and terrain to the immediate front, out to 100 to 150 kilometers. Tactical ground reconnaissance units operate out to 50 kilometers in front of the division. Airborne reconnaissance teams can operate out to 100 kilometers.

The information gathered directly supports the plan of fire and maneuver. Reconnaissance units will operate as patrols of two to three vehicles. The greatest effort will be directed toward suspected enemy strength and primary axes of advance. These patrols will avoid combat if possible. They will concentrate their efforts on finding enemy units, determining their strength, disposition, and weapons. As the battle is joined, these patrols will attempt to penetrate the FEBA to report on rear area activities, movement of reserves, and location of supply routes.

In addition to dedicated reconnaissance units, the organization of the regiment in march maximizes reconnaissance. To maintain the momentum of the attack, the regiment in march allocates its combat power forward in increments of one-third. This march formation assures that the main body is not impeded by a small enemy force.

The first element is the combat reconnaissance patrol (CRP), consisting of a reinforced platoon. Engineer and NBC reconnaissance assets usually will be attached to the CRP. The CRP engages enemy units to determine strength and disposition. If the CRP cannot overcome the enemy, it will attempt to

fix the enemy in place to facilitate the employment of its parent, the forward security element (FSE), consisting of a reinforced company. Next follows the advance guard, a reinforced battalion.

Target acquisition for direct fire begins early in the battle. A PRP3, with its SMALL FRED target acquisition radar, will be found with the advance guard, if not sooner.

Most Soviet combat vehicles carry active IR for night vision and fire control; many are equipped with laser range finders. Laser range finders in vehicles and artillery units are usually Nd: YAG (Neodymium: yttrium aluminum garnett) operating in the visible spectrum at 1.06 microns. Some Third World countries are capable of and have installed thermal imagers rather than active IR optics on their com-

bat vehicles fleetwide. This capability increases the Threat, because reconnaissance and combat units will be able to detect and engage friendly units using these devices.

Artillery Reconnaissance

A network of observation posts controls artillery fire. Artillery observation posts locate targets and reference points. They transmit the data back to the firing batteries and adjust fire. Some observation posts will be located with the advance maneuver elements. Armored command and reconnaissance vehicles (ACRVs) (which function as fire direction centers as well as observation posts) carry day/night observation devices and laser range finders

for target acquisition, topographic survey equipment for location data, and a fire direction computer.

Battlefield surveillance radars also support target acquisition and fire adjustment. The PRP3 mobile observation, a BMP variant, is found in each howitzer battalion. It carries the observation devices of the ACRV and the SMALL FRED radar, which detects targets and adjusts fire out to 20 kilometers. The BIG FRED battlefield surveillance radar, mounted on an MTLB, a light transport combat vehicle, is found in the target acquisition battery of the artillery regiment. The MT2 HOPLITE from the division helicopter squadron is also used for target acquisition and fire adjustment.

Combined Arms Operations

The Soviets believe the tank to be the keystone of the combined arms operation. Their concern about NATO antitank capabilities gives them great incentive to develop

both improved and more extensive obscuration capabilities and tactics. Soviet writings often cite the Arab-Israeli War of 1973, in which ATGMs destroyed over one-third

of Israeli armored vehicles in one week. Their doctrine reflects this concern over defeating enemy antitank weapon systems.

Threat Smoke Tactics, Techniques, and Procedures

In addition to the three battlefield smoke applications, we can expect the Threat to follow several guidelines when using smoke. These include the following:
- Cover an area five times the size of the target, with the target off center within the smoke.
- Light dummy fires or use flares within the smoke to give the false impression of a hit when enemy fire falls within the smoke.
- Initiate the smoke two to three hours before starting the operation; sustain the smoke along a wide front to conceal river crossing operations.
- Place smoke on both sides of the river during crossing operations.
- Make maximum use of floating smoke pots and smoke barrels to cover the crossings.

- Use decoy smoke at one or more likely crossing sites in an attempt to deceive our forces.
- Use smoke to conceal aerial reference points.
- Use smoke to conceal important locations and possible targets such as troop concentrations, crossing sites, bridges, railroad junctions, and unloading areas.
- Screen flanks of attacking echelons.
- Use illumination rounds in conjunction with blinding smoke to destroy night vision on the objective and illuminate the target.
- Screen fronts of advancing maneuver echelons.
- Screen movement of guns and other weapon systems into firing positions and from position to position.

- Use smoke to screen the activities of engineer units when clearing minefield and to mark passages through engineer barriers.
- Use smoke to screen logistics routes and activities that are within range of our fire and observation.
- Use smoke to mark targets for aircraft, artillery preparation, and signaling purposes.
- Use blinding, camouflage, and decoy smoke to conceal the direction and time of attack to minimize losses.

Note: Reliable communication and continuous coordination among units making smoke, units using smoke, forward air warning assets, and air defense systems are essential.

Threat smoke doctrine states that they will use smoke whenever and wherever the tactical situation permits. The extent they use smoke in any offensive operation depends largely on the amount of time available to plan and coordinate for the use of smoke in support of the operation. Smoke usage is also dependent on other variables, such as weather, terrain, and the tactical situation. Nevertheless, we can deduce several doctrinal norms for our IPB in regard to Threat smoke use in the offense. Expect the Threat to—

• Use an intense initial artillery preparation with HE and smoke munitions fired for shock and suppression

• Use sustained HE fire to cause attrition to defenders; this also creates large quantities of dust that stay aerosolized after three to four volleys.

• Place blinding HE dust and smoke on or in front of defensive positions.

• Use smoke to deny acquisition, degrade armor or antiarmor guidance systems, and with toxic smokes create casualties.

• In the main attack area, make smoke three to five times wider than the zone of attack.

• On the Threat side of the FLOT, use smoke pots and generators and limited VEESS smoke to camouflage and protect the attacking force's advance from long-range helicopter and indirect fire.

• On the US side of the FLOT, use HE-created dust, projected WP/PWP smoke, and on-board smoke to degrade acquisition and armor or antiarmor guidance systems.

• Increase artillery tempo as attack force approaches the FLOT

• Shift HE and smoke fire to isolate the zone of attack when the attacker is 400 to 1,000 meters from our defense.

• Conduct the final assault unencumbered by their own obscurants

• After a Threat attacking force passes through the FLOT to our side of the FLOT, use consecutive lines of fire with HE and WP/PWP to provide additional blinding smoke.

• Use VEESS/grenades on the US side of the FLOT only on command of the company and battalion commander when required for additional protection.

Threat Smoke Example

The following example illustrates the Threat's use of smoke in the offense. The example does not include consideration of either terrain or local meteorological conditions; therefore, it is largely mission, enemy, terrain, troops, and time available (METT-T) independent. The example centers around the type, extent, and time frame in which the Threat would use obscurants. The example does not consider our countermeasures and does not represent US Army doctrine.

In meeting engagements, the Threat attempts to seize the initiative to either overwhelm or force the opponent into the defensive. These tactics generally occur when covering forces, guard forces, patrols, and units moving to contact encounter the enemy, either intentionally or unintentionally. They are normally conflicts of a few hours duration. A meeting engagement will probably occur more frequently than any other encounter and involve the least amount of deliberate use of smoke and obscurants.

A Threat reinforced motorized rifle battalion (MRB) has penetrated our defensive positions. A second-echelon unit has exploited the breakthrough by continuing the march into our rear area. At H - 9, both sides have located each other, with neither screening force large enough to initiate combat. Therefore, they remain in contact until either side can bring forward a larger force. The distance between the opposing

forward elements is 1,300 meters. The CRP is part of the reinforced motorized rifle company (MRC), which is part of a reinforced MRB. The mission of the FSE is to destroy our reconnaissance forces and to destroy or fix our lead company, thereby fixing our force in position. Twenty minutes behind the FSE is the reinforced MRB (minus the advanced guard) that is to actually conduct the attack.

At H-hour supporting artillery deploy and fire a WP round from each of two 122-millimeter guns to mark the enemy's flanks. The FSE is moving forward and will establish the FLOT along the screen line of the CRP. The advanced guard is moving forward at a rate of 30 kilometers per hour.

The artillery and mortar units begin their fire at H + 1 minute, using HE rounds on the objective. The FSE has deployed along the FLOT with its attached tank platoon in the northern sector.

At H + 9 minutes, the FSE's combat vehicles initiate camouflage smoke with their VEESSs (Figure 1, next page). The artillery and mortar units increase their rate of fire. Two minutes later (H + 11 minutes) the two platoons in the northern sector shut off their VEESS and fire a half volley of their smoke grenades. These two platoons will distract attention from the advanced guard, which will conduct the actual attack along a more southerly axis.

At H + 12 minutes, the MRB (-) arrives at the FLOT and attacks through the area where the two motorized rifle platoons are still generating camouflaging smoke with their VEESS. Each of the two tank platoons from the attacking force now fires a half volley of grenades. The units that had previously fired their grenades to distract attention fire the rest of their grenades and begin to move forward.

At H + 13 minutes, the tanks from the main attacking formation fire the rest of their grenades as they

Table 3. Total Threat rounds used in example.

No. of Tubes	Type	Total Rounds Available	Total Rounds Used
NA	DM11 Smoke Pots	60	0
18	122-mm SP Howitzers	72 WP 1,296 HE 72 AT	56 666 0
6	120-mm Mortar	24 WP 432 HE	24 360

continue to attack forward. The feint has stalled and is now unobscured. HE rounds are still falling on the objective (Figure 2, below).

The mortar and artillery units start firing an HE/WP mix at H + 15 minutes.

At H + 16 minutes, Threat fire shifts to the rear of the defensive positions to isolate our force.

For a list of total obscurant and artillery assets used by the Threat in this example, see Table 3.

Threat Defensive Smoke Use

Threat defensive smoke use can be grouped into two broad categories. These are smoke for protection from fire and smoke to disrupt and defeat advancing forces.

Smoke for Protection

Examples of Threat smoke usage for protection include the following
● To camouflage the maneuvers of their subunits of tanks, infantry, and artillery.
● To conceal engineer activities from our observation.
● To screen replacements of first-echelon units and subunits under conditions of good visibility.
● To camouflage the approach of their subunits for counterattack.

● To ensure flank and maneuver security.
● To mislead our forces on the disposition of second echelons and reserves and planned counterattack directions.
● To conceal the withdrawal of the battle outpost.
● To counter our reconnaissance, intelligence, target acquisition, and weapon guidance and control systems.
● To protect targets from laser designators.
● To blind our observation posts and forward observers.
● To conceal engineer breaching operations.
● To conceal aerial reference points.
● To defeat the light and heat effects of nuclear weapons.

Smoke to Disrupt and Defeat Advancing Forces

The Threat also will use smoke while in the defense to slow, disrupt, and defeat our advancing forces. Several Threat writings expressed concern over identifying targets set against forest or brush backgrounds. For this reason, the Threat developed techniques involving the use of smoke and illumination rounds to serve as an artificial background. This makes target identification easier. These techniques involve firing mortar and/or artillery smoke rounds 50 to 100 meters beyond our advancing forces. Then they place illumination rounds just
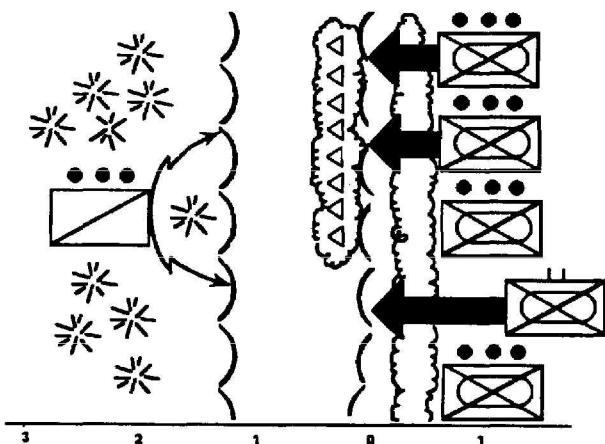

Figure 1. FSE vehicles start the VEESS smoke while artillery prepares the objective with HE, thus concealing the movement of the MRB as it prepares to attack through the FSE.
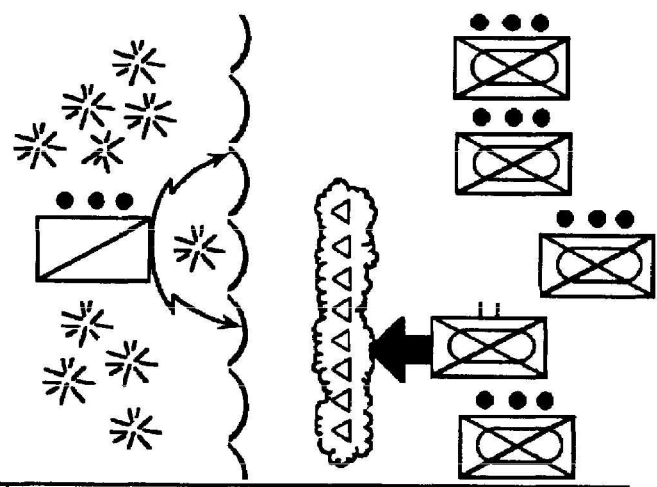

Figure 2. The FSE vehicles stop making smoke, and the MRB emerges from the smoke in position to assault the objective.

beyond the smoke to illuminate the background from the rear. This creates favorable conditions for observation and acquisition.

Also, Threat doctrine states that smoke deprives our units, when shrouded in smoke, of the capability to conduct observation of the field of battle. Smoke will make fire control and navigation more difficult. As a result, our attacking forces can stray off course from the specified directions and get mixed up with each other. There is potential for us to reduce or not aim our fire, creating favorable conditions for Threat second echelons and reserves to deploy, seize the initiative, and counterattack.

Threat Smoke Example

The best illustration of Threat smoke use in the defense is a Threat hasty defense versus a friendly deliberate attack. In the following scenario, Threat forces have attacked and are well within our territory. Threat forces have already made an unsuccessful attempt to attack from a position in contact.

The Threat force commander is preparing to conduct an attack from a position in contact. Before he can initiate this attack we attack. Two minutes after our forces begin their preparatory fire, Threat artillery uses counterbattery fire with HE onto our scout platoon.

When their forces have identified our axis of advance, they begin to establish an obscuring line, using WP and illumination rounds approximately 150 to 200 meters in front of our FLOT. When our attackers emerge from the smoke, Threat forces engage them with ATGM weapon systems.

The Threat will establish a second obscuring line approximately 900 meters in front of our FLOT, using HE and WP fire. Again, ATGM fire will engage our attacking forces when we emerge from the smoke. As our forces reach the point 1,000 meters from the the Threat's FLOT, they will engage us with HE munitions from a 122-millimeter multiple rocket launcher.

Commander's Considerations

Even the most sophisticated weapon systems are limited by terrain and weather. Prior planning by the S2/G2, S3/G3, and the chemical officer can increase the limitations of enemy systems with man-made obscurants. The commander will have to decide how smoke and obscurants will affect his ability to conduct the direct fire fight. Given the various types of EO devices and the number of visual and bispectral obscurants that will be common on any future battlefield, the answer to this question is not easy. The Soviets may not have thermal imagery sights on their weapon systems. However, other potential adversaries are attempting to acquire or already have the systems. During any future conflict, you must know your enemy. "What?" "When?" "Where?" "How?" and "With how many?" will always be the questions to answer. Other PIRs to determine the effects of obscurants are the—
- EO system capabilities of the ememy force.
- Extent of their employment: whether on reconnaissance systems, direct fire systems, or all systems.
- Smoke delivery capabilities of the enemy force.

- Extent of enemy smoke employment.
- Directed-energy weapon capabilities of the enemy force.

We use smoke and obscurants to attack Threat EO systems and to protect our force. Smoke and obscurants can change the number of effective weapon systems available to either force. Once the commander decides to use smoke and obscurants, the outcome of the battle and the proficiency of his intelligence, operations, and chemical officers will determine the effectiveness of his weapons.

The four examples in Figure 3, on the next page, illustrate how smoke affects the number of enemy weapon systems that can engage the combat battalion. Example 1 depicts the force ratio when smoke is not used. In this example, the standard force ratio is Threat forces 6.4:1 over friendly forces. In examples 2 through 4, the same size force uses equal amounts of smoke and puts it in the same location. However, the force ratio changes in each example based on the relative abilities of opposing weapon systems to see through the smoke and engage targets.

Example 2 shows that the Threat use of smoke degrades the enemy's own force combat power when we have ATGMs with thermal sights (for example, TOW II). TOW II can see and shoot through most smokes. This increases our force ratio (2.5:1) over that depicted in example 1 (1:6.4) by removing all Threat long-range direct fire weapons while not significantly degrading friendly long-range tank main gun (M1) and missile shots (IFV and ITV).

In example 3, we use smoke against a high-technology threat. Our use of smoke degrades the Threat's combat power when we have the TOW II. The force ratios are the same as in example 2. In example 4, we use smoke against a low-technology threat. This eliminates the Threat's ability to fight the direct fire fight since none of the enemy's long-range fire systems can see through smoke. In this case, our force ratio significantly increases (8:1). Friendly forces are able to engage the Threat's entire force.

We could describe an infinite number of combinations of smoke and weapon usage; therefore, com-

Force Ratio – Without Smoke

Tanks—58
IFV—108
CFV—12
TOW II—4

Tanks—640
AICV—525

Example 1   Force Ratio 1:6.4

Force Ratio – Threat Attacks With Smoke

Tanks—58
IFV—108
CFV—12
TOW II—4
Plus, can acquire w/
GSR—4
VULCAN—9
CHAPARrAL—5

Tanks—0
AICV—0
Can acquire w/
HIND-D—6
2SU23—16
PRP3—8
BRM—7
Arty C&R—40

Example 2   Force Ratio 2.5:1

Force Ratio – Friendly Attacks With Smoke

Tanks—58
IFV—108
CFV—12
TOW II—4
Plus, can acquire w/
GSR—4
VULCAN—9
CHAPARRAL—5

Tanks—0
AICV—0

Can acquire w/
HIND-D—6
2SU23—16
PRP3—8
BRM—7
Arty C&R—40

Example 3   Force Ratio 2.5:1

Force Ratio – Friendly Defends With Smoke

Tanks—58
IFV—108
CFV—12
TOW II—4
Plus, can acquire w/
GSR—4
VULCAN—9
CHAPARRAL—5

10% of Viewers
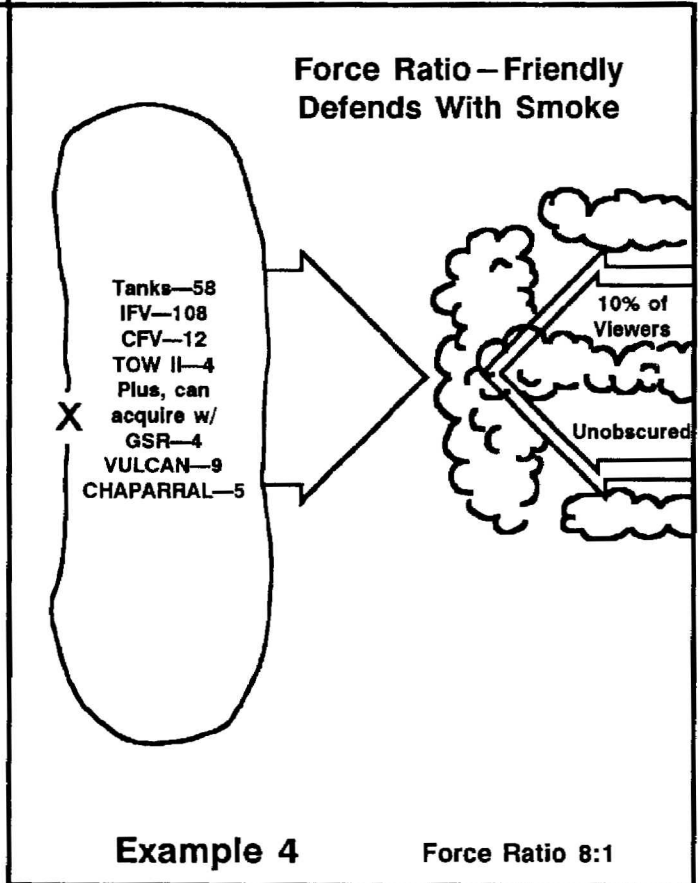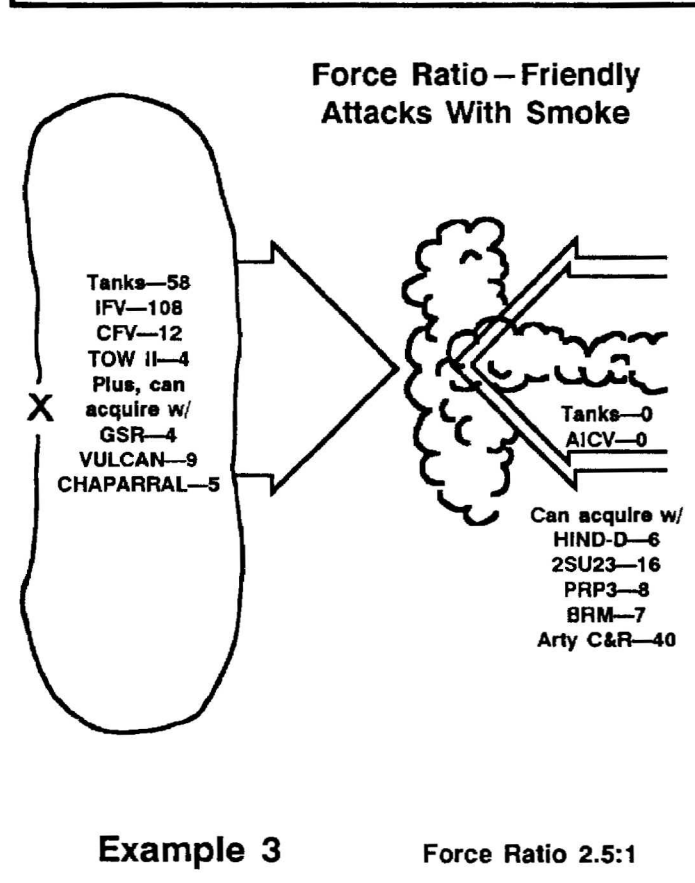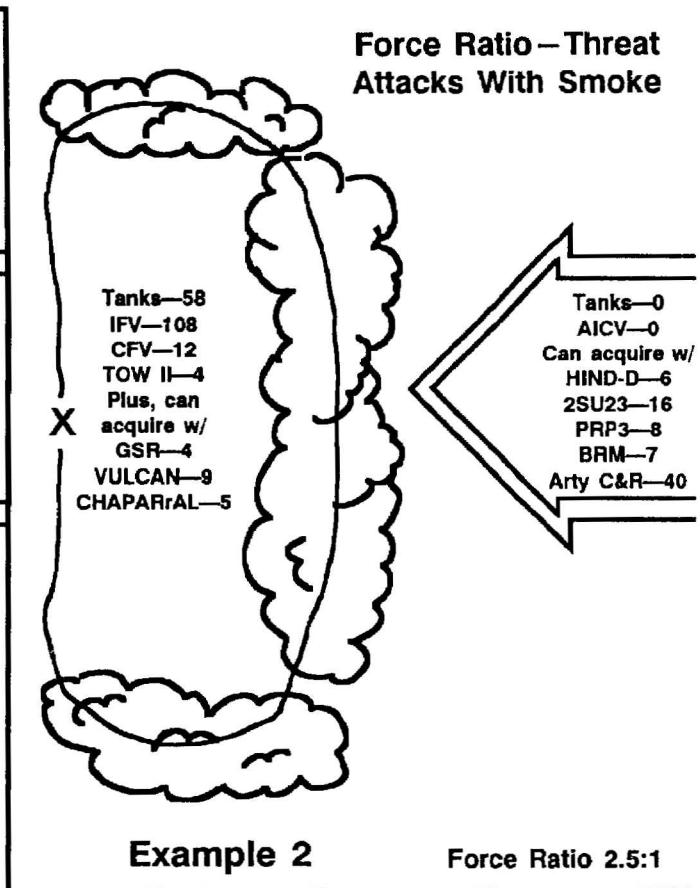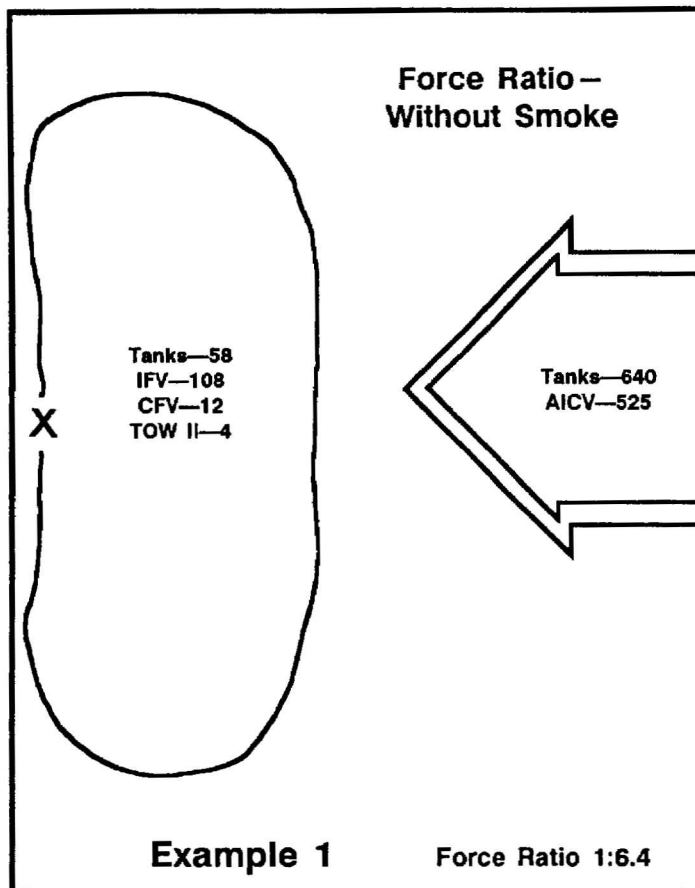
Unobscured

Example 4   Force Ratio 8:1

Figure 3. How smoke can change force ratios in the attack and defense.

manders must consider the following principles when using smoke:
- Smoke usage can change the number of effective weapon systems available to either force.
- Smoke effectiveness is directly related to the relative ability of

Threat direct fire systems to see and shoot through smoke.
- Employing smoke improperly can degrade friendly combat potential. When in doubt, employ smoke only when you can see and fire through it. Know your ability and that of

your enemy to see and fire through smoke. Plan the battle accordingly and never leave smoke employment to chance.

US Countermeasures to Threat Use of Smoke

Threat smoke and obscurant use has the potential for significantly degrading both our defensive and offensive operations. In general, there are two options available to counter enemy smoke use: Move to alernate positions on the battlefield to continue unimpaired operations, or use EO devices that allow operations to continue under smoke.

Our forces must first understand Threat doctrine regarding use of smoke and obscurants to anticipate when and where the Threat will employ them on the battlefield. Next, our commanders must train their units to operate in periods of limited visibility where target acquisition, navigation, and command and control are confusing and difficult. Finally, we must train and use tactics, techniques, and procedures that overcome or minimize the effectiveness of Threat smoke and obscurant usage.

Obstacles

Obstacles placed along the enemy's most likely avenue of advance can slow them, disrupting their timetables. Preplanned fire on these positions can be an effective means of engaging the enemy even in dense concentrations of smoke.

Acquisition devices that are less sensitive to smoke and obscurants can acquire the enemy at choke points and/or barriers and then direct engagement by direct and indirect fire. Obstacles can delay one element of the attacking force, drawing an adjacent element into an engagement area, unable to receive supporting fire. Separation of forces may also occur due to the enemy's own use of smoke.

Dispersion

Dispersing our forces laterally and in depth places a greater burden on attacking fire. Combining dispersion with rigorous counterreconnaissance measures forces the Threat to expend more resources and take greater risks in conducting attacks. The more dispersed you are, the more difficult and costly it is for the Threat to bring blinding smoke fire on your positions. Additionally, dispersing in depth aids in obtaining flanking fire where the Threat smoke is much less concentrated.

Deception

Tactical deception can cause the Threat to ineffectively use smoke assets. For example, an effective ruse might cause the enemy to expend greater resources in attempting to blind friendly gunners and camouflage tank movement. This would reduce overall smoke effectiveness. Using deception means may also cause the enemy to attack in the wrong direction and become silhouetted against their own smoke, allowing us to effectively engage their force without smoke degrading our line of sight.

Friendly Countersmoke

Friendly forces can use smoke and obscurants to counter enemy use of smoke as control measures or phase lines. Friendly visual obscurants can flood the area between friendly defensive positions and enemy smoke lines to disorient the enemy and deceive them as to the actual battle positions. At the same time, friendly units can engage the enemy

using thermal imagers and direct fire weapon systems.

Engagement of Enemy Forces in March Formation

The Threat does not plan as much smoke to protect the force while they are still behind the FLOT. If we engage enemy march formations, less enemy smoke use should enhance our fire.

Limited Visibility Positions

Threat doctrine calls for the Threat to lift all smoke when they come within 1,000 meters of their objective. Using alternate positions forward of your main defense will cause attrition in their attacking force and disrupt their timetables, creating surprise and confusion when they emerge from their final smoke screen. However, the use of any alternate positions increases the need for countersurveillance and counterreconnaissance measures.

Occupation of reverse slope positions coupled with alternate or dummy positions on the forward slope can cause the enemy to waste artillery assets and give friendly defenders more time to react when enemy attackers emerge from their own smoke.

Stay-Behind Forces

Stay-behind forces using nonlinear tactics can engage an enemy from their flanks and rear where they are often unobscured.

Positioning of Observers and Observation Devices

Position forward observers, warning systems, and ground/vehicle laser locator designators (G/VLLDs) where they are less likely to encounter obscuration during the battle. The highest point of a battle position normally offers the best lines of sight for laser designators. However, because of the vulnerability of these G/VLLDs to smoke and obscurants, commanders should attempt to avoid blinding by placing these devices on the flanks of a battle position.

Targeting of Enemy Smoke Assets

In addition to passive countermeasures, we can also take active steps to reduce the obscurant threat. Using IPB with a thorough understanding of how the enemy employs smoke assets, we can determine the location of those smoke assets. Once located, enemy artillery and smoke generator units are extremely vulnerable to friendly fire.

Ground Surveillance Radar

Employ ground surveillance radar (GSR) with maneuver elements to direct, identify, and locate targets in smoke. Ensure our own obscurant operations do not mask GSRs with millimeter wave obscurants and that GSRs can continue to provide targeting data to commanders when smoke obscures other surveillance means.

Use of Threat Smoke to Conceal Our Maneuver

When the Threat uses smoke between their forces and ours, we can exploit the fact that they are as likely to be unable to see through it as we. We can use their smoke to aid in obtaining surprise for our own attack or counterattack.

Use of Friendly Aviation

Use friendly aviation assets to identify gaps in smoke coverage. Target hand-off procedures must facilitate air and ground target engagement.

Preplanned Disengagements

Execute preplanned disengagement based on remote signal devices rather than visual cues. Use a thorough IPB to establish the key event for disengagement on your decision support templates.

Air Defense Positions

Position air defense assets where they obtain the most benefit from enemy smoke. Emplace systems requiring visual target acquisition (for example, Vulcan and Stinger) on high ground clear of the smoke. Use them to look over the smoke and engage low-flying helicopters and aircraft that silhouette against the smoke. Emplace air defense systems using thermal or millimeter wave acquisition in the smoke to mask missile launch points.

Chapter 3

Offensive Operations

The offense is characterized by violence, concentration of friendly forces, disruption of hostile forces, and rapid transitions between different types of operations. Smoke and obscurant use multiplies the commander's ability to project combat power at the critical time and place to defeat the enemy. Smoke and obscurant use will support any type of offensive operation at any level because smoke generally favors the attacker.

Historical Perspective

The most recent and perhaps most significant example of smoke in a combat multiplier role occurred during the 1973 Arab-Israeli War. On 6 October 1973, at 1400 hours, Egyptian forces attacked prepared Israeli positions defending the west bank of the Suez Canal. The Egyptians initiated the attack by deploying 200 attack aircraft into the Sinai to destroy Israeli communications centers, airstrips, and artillery positions (Figure 4).

Within moments, Egyptian artillery opened up with a massive barrage of high-explosive munitions and blinding smoke. The Egyptians intended to degrade the ability of the Israelis to engage targets and adjust artillery fire with that blinding smoke. It accomplished its purpose with devastating results; it induced a feeling of total isolation among defending Israeli units. The fear caused by the addition of yellow smoke to the artillery preparation amplified the psychological effects of isolation. The defenders believed they were being gassed.
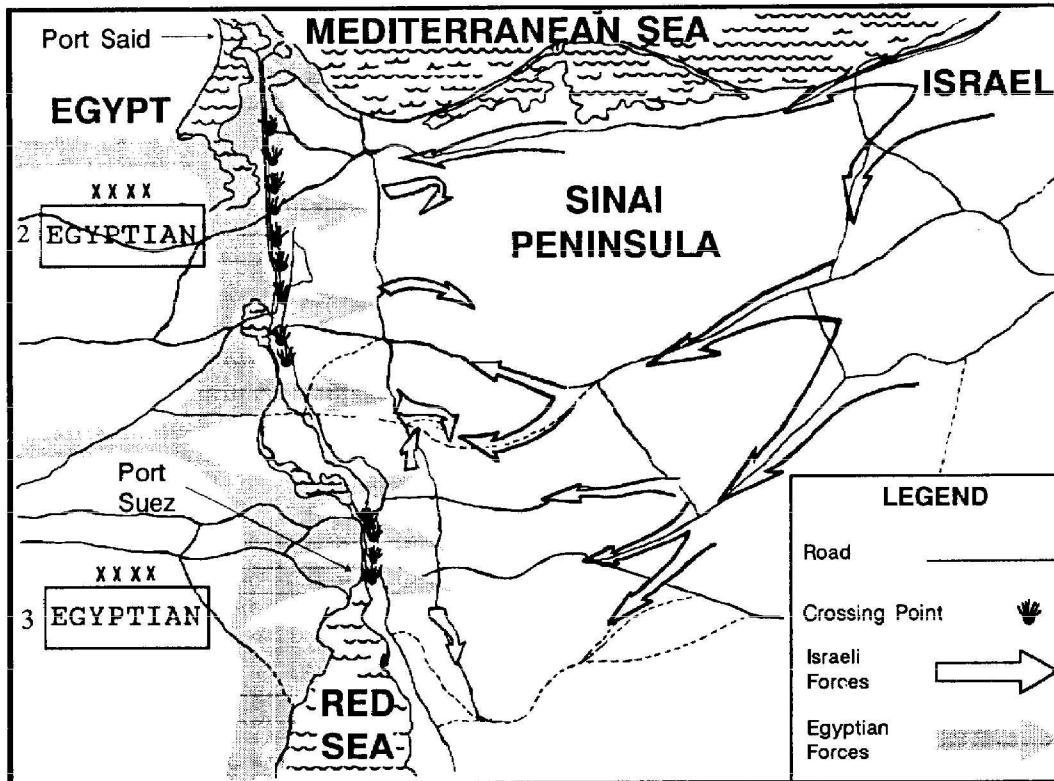

Figure 4. Egyptian assault crossing under smoke at the Bar-Lev Line in 1973. The Egyptian force, indicated by the darker arrows, crossed at mid-day under heavy smoke, and surprised the Israeli forces.

Minutes later Egyptian armored and artillery assets began to deploy forward to firing positions on their side of the canal. These units engaged the Bar-Lev strongpoints with direct fire while infantry units conducted a forced crossing in dinghies under the cover of canister-generated smoke. Air-mobile operations placed commando units 10 miles into the rear to disrupt reinforcing echelons. Egyptian engineer units emplaced bridges over the canal. Smoke from artillery, canister, and smoke generator assets supported the engineer effort.

These actions demonstrated the tremendous impact of smoke when synchronized with a combined arms assault. Within the first 24 hours of the attack, the Egyptians accomplished the almost impossible: They had moved five divisions, 100,000 men, 1,020 tanks, and 13,500 vehicles across the canal and established a bridgehead six miles into the Sinai. The Israeli forces lost 150 tanks, almost one-tenth of their total in the Sinai. The blinding smoke placed on the Bar-Lev strongpoints effectively reduced the Israeli ability to acquire targets and spot for attack aircraft.

The Egyptian Army was eventually driven back and sustained considerable losses. Nevertheless, their forced crossing of what the Israelis believed to be the largest tank ditch in the world was a complete success. The effect that smoke played in that operation was significant. While the crossing may have been effective without smoke, the Egyptian forces could have sustained far greater casualties, and the crossing could have taken far longer to complete without the cover of smoke.

Tactics

The National Training Center (NTC) is an area where smoke training is possible on a large force-on-force scale. MG E. S. Leland, former commander of the NTC, stated, "Smoke is a far more significant battlefield factor than I used to believe. It simply must be a major planning consideration in terms of both friendly employment and reaction to enemy use."

Key insights from the NTC for the offense include the following:
- Smoke favors the attacker.
- Smoke tightens attack formations.
- We must capitalize on thermal imager capability.
- We must plan command and control without visual cues.
- Training and rehearsal are the keys to success.

Smoke and obscurants integrated throughout the offensive framework provide major contributions to combat power in deep, close, and rear operations. In the offense, use smoke to—
- Support maneuver by—
- Concealing maneuvering forces from enemy observation.
- Providing tactical surprise and allowing the commander to set the terms of combat.
- Allowing the commander to mass forces unobserved.
Defeating enemy surveillance efforts.
- Supporting the deception plan.

- Provide additional firepower by—
- Changing friendly to enemy force ratios by using thermal imagers and millimeter wave acquisition devices such as radars to see through visual smokes and using smoke to isolate defending and second-echelon forces.
- Defeating enemy counterreconnaissance efforts.
- Enhancing friendly target acquisition efforts by silhouetting enemy vehicles with smoke and using smoke and obscurants we can see through but the enemy cannot. Disrupting enemy maneuver and reinforcement.
- Disrupting the enemy's ability to communicate.
- Protect the force by—
- Reducing friendly force vulnerability by concealing support forces from enemy observation and defeating enemy reconnaissance efforts.
- Concealing obstacle breaching.
- Defeating enemy weapons by defeating enemy target acquisition efforts, defeating enemy guidance systems, and negating standoff capability of enemy long-range direct fire weapons.
- Degrading or defeating enemy directed-energy weapons.

Use

Smoke and obscurant use in the offense requires careful planning and execution to prevent interference with movement, assault operations, or target acquisition; to retain the element of surprise; and to avoid silhouetting or drawing undue attention to friendly forces.

Smoke use is not without risks. Our use of smoke must increase friendly force survivability without seriously degrading operational capabilities. It must decrease Threat force command, control, communications, and intelligence gathering capabilities (C3I).

In addition to the general employment techniques detailed in Chapter 1, techniques to minimize interference in the offense include the following:
- **Use covered and concealed maneuver techniques.** Assume the enemy can see through the smoke. Do not take unnecessary risks with the force.
- **Time smoke delivery with decision points.** Conduct a thorough IPB and time your use of smoke to key decision points in your tactical plan: for example, "When we reach Hill 285, we will call for A Battery to fire smoke and HE onto target XY1007 and sustain that fire to obscure enemy observa-

tion of our flanking of Objective White."

● **Use unobscured weapons to overwatch.** The overmatching elements should have target acquisition devices such as thermal imagers that can see through our own smoke and engage the enemy. This prevents surprise and enhances the ability to suppress enemy fire during the assault.

● **Do not let your own smoke silhouette your forces.** Never overrun your smoke cloud prior to the final assault. "Walk smoke in" towards enemy positions wherever possible. This ensures your forces remain concealed and confuses the enemy as to your exact location and intent.

● **Plan to engage through or around the smoke.** Plan to use weapon systems that can acquire and fire through the smoke. Plan limited visibility positions for those systems that smoke degrades (for example, position target acquisition assets on flanks or above smoke).

● **Plan for enemy countermeasures.** Enemy forces will counter your smoke use. Plan to intensify your counterreconnaissance and air defense efforts. The enemy may use countersmoke to confuse your command and control, so avoid reliance on visual signals. The enemy will increase use of indirect fire weapons when direct fire target acquisition is ineffective. Therefore, plan artillery counterbattery and countersmoke fire after crossing the line of departure/line of crossing (LD/LC).

● **Plan for additional maneuver time under smoke.** Smoke slows maneuver. Base the planning factor on METT-T and the proficiency of your unit to operate under smoke as shown in previous combat (or training) operations.

● Verify enemy locations (responsibility of reconnaissance). The enemy can use both our smoke and theirs to conceal movement to alternate positions or to break contact. Aggressive reconnaissance before and during the engagement will allow you to shoot and remain in contact.

Goal

The main focus of smoke in the offense is to defeat enemy RSTA efforts, conceal maneuver and support forces, and contribute to tactical deception operations. Our intent is to deny the enemy information about the disposition and composition of our forces, which provides surprise and security. It also allows the commander the flexibility to mass the forces required to conduct attacks. The next section presents the tactics for using smoke in offensive operations. Appendix A contains tactical decision aids for determining which smoke delivery means to use against the specific smoke targets covered by these tactics.

Phases

The phases of the offense are preparation, attack, exploitation, and pursuit.

Preparation

The preparation phase of offensive operations involves the concentration of attacking forces and associated support elements into contact with the enemy.

The overriding imperative in a movement to contact is initiative.

Use smoke to –

● Conceal movement of maneuver and support forces, allowing the commander to mass forces unobserved.

● Provide tactical surprise, allowing the commander to seize the initiative and set the terms of combat.

● Defeat enemy reconnaissance and counterreconnaissance efforts.

● Conceal obstacle breaching or crossing.

Smoke employment tactics in the preparation phase are the following:

● Screening smoke. Use screening smoke to conceal maneuver and obstacle breaching or crossing. Use smoke in the main body area and along the flanks to conceal movement. You must carefully control the smoke to prevent silhouetting

your units. Begin making smoke prior to crossing the line of departure to confuse the enemy as to the actual location and size of the force.

● Protecting smoke. Use protecting smoke as required to defeat enemy ATGMs and air defense systems.

● Obscuring smoke. Use obscuring smoke to defeat enemy reconnaissance and counterreconnaissance efforts. Use projected smoke means to deliver smoke mixed with high-explosive rounds before the enemy can pinpoint your units. Plan obscuring fire based on decision points for the enemy, isolating and confusing their reconnaissance forces.

● Marking smoke. Use smoke to mark enemy targets for rapid destruction or to reduce the potential for firing on friendly forces.

● Smoke for deception. Use this smoke to draw attention to areas of little or no importance. Create large-area smoke away from the main body. Consider using smoke mixed with high-explosive rounds to conduct preparatory fire on dummy objectives.

Figure 5, on the next page, illustrates smoke employment in the preparation phase.

Attack

A hasty attack will normally immediately follow a movement to contact. If the contact reveals an overwhelmingly superior enemy force, or our hasty attack is unable to either outflank or overcome the enemy defense, we will conduct a deliberate attack. In the attack phase, use smoke to—

● Provide tactical surprise, allowing the commander to seize the initiative early.

● Conceal movement of maneuver and support forces, allowing the commander to mass forces unobserved. Smoke must provide the commander with the ability to concentrate the maximum possible shock and violence against the enemy.

● Ruin the enemy commander's synchronization.

- Conceal obstacle breaching or crossing.
- Defeat enemy target acquisition, weapon guidance, and directed-energy weapon systems.

The overriding imperative in hasty attacks is agility. Therefore, smoke use in a hasty attack must assist the commander to fix and contain the enemy, deploy into combat formations, and maneuver additional forces to the flank and rear where the enemy is destroyed by fire or assault.

Smoke employment tactics in a hasty attack include obscuring smoke, screening smoke, marking smoke, protecting smoke, and deceptive smoke:

- Obscuring smoke. Use obscuring smoke to isolate the objective, defeat enemy target acquisition and guidance systems, and defeat reconnaissance and counterreconnaissance efforts. Use projected smoke means to deliver smoke mixed with high-explosive rounds in front of the objective; between enemy formations; and on identified forward observer, ATGM, and tank unit positions before the enemy can pinpoint your units as targets. Using projected smoke as countersmoke and to isolate the objective can significantly interfere with the enemy commander's synchronization.
- Screening smoke. Use screening smoke to conceal maneuver as you bypass small pockets of resistance and breach obstacles. Use it also along the flanks to protect the force and in the rear to conceal disposition and composi-

tion of reserves. Use self-defense and generated-smoke means to deliver smoke across danger areas and to the flanks of the force to limit enemy observation and engagement.
- Marking smoke. The tactics are the same as in the preparation phase.
- Protecting smoke. The tactics are the same as in the preparation phase.
- Deceptive smoke. The tactics are the same as in the preparation phase.

The overriding imperative for the **deliberate attack** is synchronization. Therefore, smoke use in the deliberate attack must assist the commander to fix and maneuver against the enemy and prevent the enemy from breaking contact. It must also force penetration of the enemy's defense and prevent reinforcement or counterattack by enemy reserves or second-echelon forces. Smoke employment tactics in a deliberate attack have the same

names as for the preparation phase, but read on.
- Obscuring smoke. Use obscuring smoke to isolate the objective and complement countermobility efforts. Use it also to defeat enemy target acquisition and guidance systems and defeat reconnaissance and counterreconnaissance efforts. Use projected smoke means to deliver smoke mixed with high-explosive rounds in front of the objective, between enemy formations, on identified forward observers, and on ATGM and tank unit positions before the enemy can pinpoint your units as targets. Use smoke mixed with scatterable mines for countermobility behind enemy positions. Use it also between the enemy first-echelon, reserve, and second-echelon forces. The critical activity in planning obscuring fire in the deliberate attack is synchronization of all direct fire, fire support, smoke support, and engineer assets to create maximum combat power.
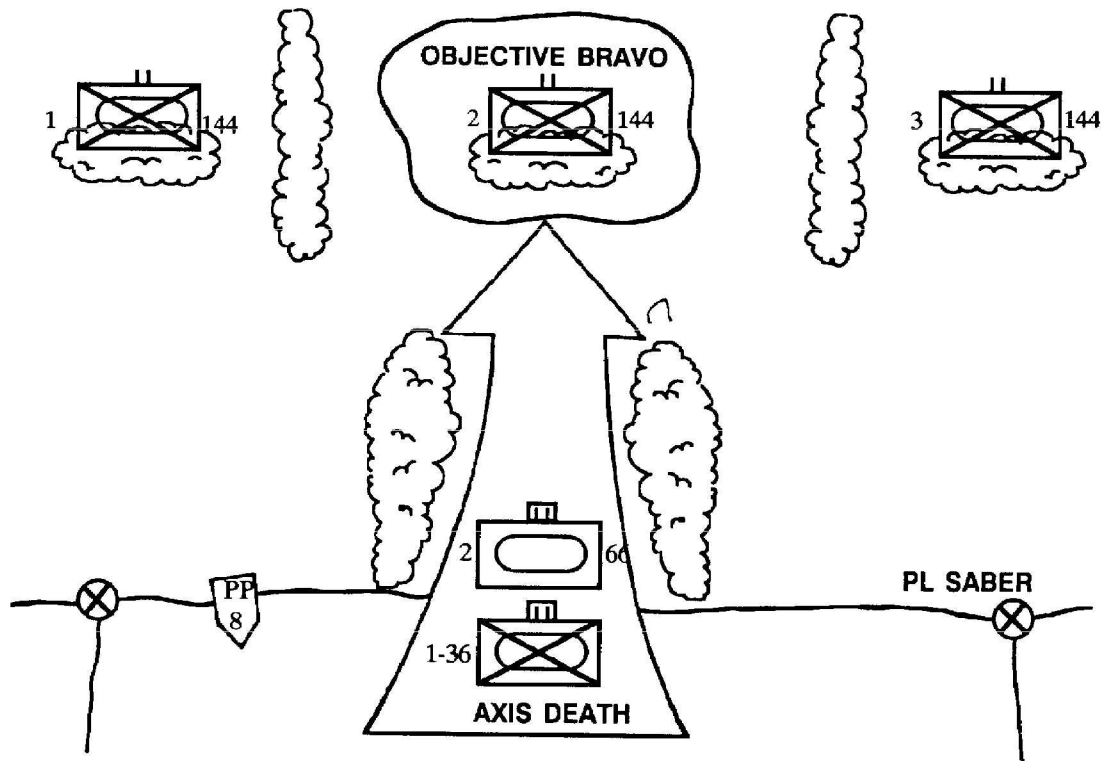

Figure 5. This example of employment in the preparation phase uses mechanized smoke units on the flanks of Axis Death to protect the force. Projected smoke and HE fired at TAIs blind the enemy recon assets and isolate enemy formations from each other. By suppressing enemy RSTA efforts, the brigade can close on the enemy without significant losses.

● Screening smoke. Use screening smoke to conceal maneuver as you cross the line of contact, bypass small pockets of resistance, or bypass or breach obstacles; along the flanks to protect the force; and in the rear to conceal disposition and composition of reserves. Use large-area generated smoke to conceal passage of lines and confuse the enemy concerning the disposition and composition of your force. Reconnaissance of enemy obstacles is critical to ensure timely employment of large-area smoke to conceal breaching or crossing of obstacles. Use self-defense and generated-smoke means to deliver smoke across danger areas and to the flanks of the force to limit enemy observation and engagement.

● Marking smoke. Use marking smoke to mark enemy targets for rapid destruction or to reduce the potential for firing on friendly forces. Use projected smoke means such as helicopter rockets to mark close and deep targets for engagement by close air support aircraft.

● Protecting smoke. If the enemy has known or suspected directed-energy weapon capability, concealing your force in a blanket of oil smoke will attenuate some of the energy. In the far term, using large-area projected smoke containing millimeter wave obscurants directly on the enemy positions will reduce our vulnerability to directed-energy weapons,

● Smoke for deception. Use supporting smoke to draw attention away from the main effort to areas of little or no importance. Use generated-smoke means (in a deliberate attack, the best means may be smoke pots and generators) to create smoke away from the main body. The deception story must be integrated into the overall tactical plan for smoke use to be effective.

Exploitation

Commanders should plan to follow every attack by bold exploitation to keep the enemy under pressure, compound their disorganization, and erode their will to resist. The overriding imperative in exploitation is depth. In the exploitation phase, use smoke to—

● Ruin the enemy commander's synchronization.

● Isolate enemy forces, allowing the commander to keep the enemy in contact and under pressure.

● Conceal movement of maneuver and support forces, allowing the commander to protect logistical units and convoys required to sustain the momentum of the exploiting force.

● Defeat enemy target acquisition, weapon guidance, and directed-energy weapon systems. This is particularly important as the exploitation force bypasses or contains small groups of enemy forces.

Smoke employment tactics in the exploitation phase use the same five types of smoke as follows:

● Obscuring smoke. Use obscuring smoke to complement countermobility efforts, defeat enemy target acquisition and guidance systems, and isolate enemy forces for piecemeal destruction. Use projected means to deliver smoke mixed with high-explosive rounds onto targets between enemy formations, onto enemy units as they attempt to regroup, and in front of enemy strongpoints as you bypass them. Use smoke mixed with scatterable mines behind moving enemy formations to impede their ability to break contact and to compound their disorganization.

● Screening smoke. Use this smoke to conceal maneuver and support forces and defeat enemy target acquisition and guidance systems. As protection of supplies and support units is essential to maintain the rapid tempo of the exploitation, priority of effort for smoke assets must go to sustainment activities. Use generated-smoke means to deliver smoke onto key logistics activities and to protect convoys. Use self-defense and generated-smoke means to conceal maneuver units as they bypass or harass enemy forces.

● Marking smoke. Use marking smoke to mark targets for destruction, identify bypass routes, and signal for battlefield activities. Use projected smoke means to deliver smoke onto identified enemy strongpoints or larger formations and to signal forces to consolidate on a particular objective or rally point. As exploitation force commanders rely heavily on air cavalry units for reconnaissance, helicopter-delivered smoke rockets will provide the best delivery system. Use generated-smoke means to mark bypass routes (for example, scouts could drop smoke pots at 100- to 200-meter intervals along a bypass route).

● Protecting smoke. The risk of nuclear weapon use increases when conventional means are ineffective in stopping our advance. If the enemy has known or suspected nuclear or directed-energy weapon capability, concealing your logistics activities in oil smokes may attenuate some of the energy.

● Supporting smoke for tactical deception. Use supporting smoke to keep the enemy off-balance and to draw attention away from critical sustainment activities. Use generated-smoke means to deliver smoke to multiple locations to the rear of the exploitation force to force the enemy to expend resources to target logistical activities.

Pursuit

As the enemy becomes demoralized and their formations begin to disintegrate, exploitation may develop into pursuit. Commanders attempt to annihilate the enemy force using a direct pressure force that keeps the enemy units in flight and an encircling force to envelop, cut off, and destroy or capture the fleeing enemy force. In the pursuit, use smoke to—

● Ruin the enemy commander's synchronization, denying the enemy time to reorganize a cohesive defense. If the enemy is able to establish a perimeter, smoke must help to defeat enemy target acquisi-

tion, weapon guidance, and directed-energy weapon systems.

- Isolate enemy forces, allowing the commander to keep the enemy in contact and under pressure.
- Conceal movement of maneuver forces, allowing the commander to envelop the enemy force.

Smoke employment tactics in the pursuit include the following applications of the five basic smoke types:

- Obscuring smoke. The tactics are the same as in the exploitation phase. Additionally, use generated smoke from the direct pressure force towards the enemy to obscure their observation while giving the encircling force freedom of maneuver. When in place, the encircling force could use generated smoke towards the enemy to obscure our forces, silhouette the enemy, and generally increase the enemy commander's synchronization problems.
- Screening smoke. Use screening smoke to conceal maneuver forces and defeat enemy target acquisition and guidance systems. Since the encircling force generally advances on parallel routes, screening smoke along the flanks of the encircling force can conceal their maneuver. However, since smoke draws attention, you may risk losing the element of surprise. Use self-defense and generated-smoke means to conceal maneuver units as they bypass or attack enemy forces.
- Marking smoke. The tactics are the same as in the exploitation phase.
- Protecting smoke. The tactics are the same as in the exploitation phase.
- Smoke for deception. Use this smoke to keep the enemy off-balance and to support hasty attacks if the enemy is able to establish a perimeter. Use smoke generators to deliver smoke to multiple locations creating false passage points and to draw attention away from the main effort.

Figure 6, below, illustrates smoke employment in the exploitation and pursuit phases.

Attack Scenario

The following scenario illustrates possible smoke employment options in the offense, from the preparation through the pursuit phases. It depicts a mechanized infantry heavy brigade conducting the movement to contact. The brigade is the 2d Brigade, 54th Infantry Division (M).

Smoke delivery means include the direct support artillery battalion, battalion mortars, smoke generator platoon, VEESS, smoke pots, smoke grenades, and aviation assets on-call. Field expedient smoke delivery means include smoke pots strapped to armored vehicles with electrical ignition wires running inside the vehicle.

2d Brigade will conduct a movement to contact commencing at H-hour today. The commander's intent is
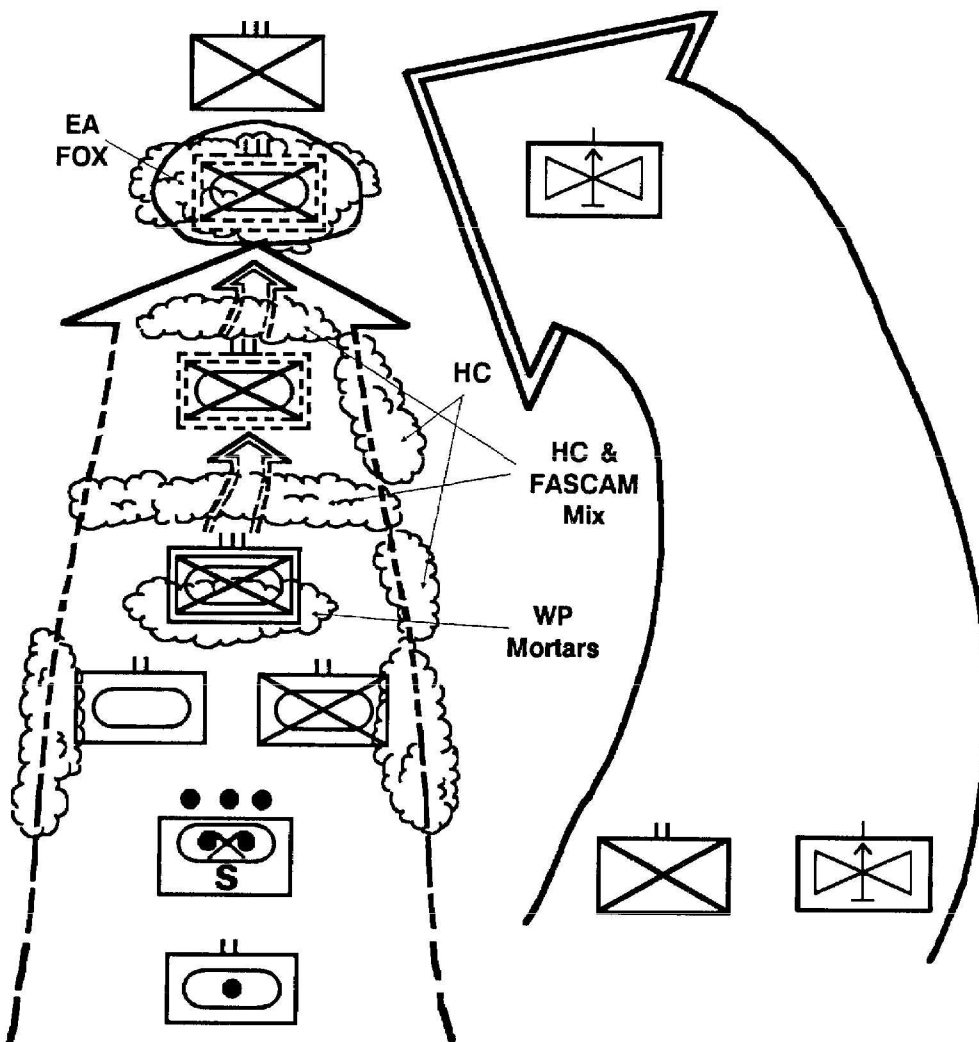

Figure 6. In this pursuit phase example, we are using FASCAM at choke points behind the enemy formation. As the enemy nears the choke points, artillery-delivered HC smoke further delays and complicates enemy command and control. Our lead task force in the direct-pressure force mixes HE and WP on the enemy formation, delaying it. The artillery fires HC smoke on the flanks to mark the flanks and to protect the movement of the encircling force. As the enemy emerges from the smoke in EA Fox, they are silhoutted against it and engaged by our direct fire weapons.

to reestablish contact with the enemy, seize the brigade objective, and exploit any success onto the division objective. The brigade objective is Objective Fox. The brigade's follow-on objective is Objective Jack. The division objective is Objective Midas some 40 kilometers beyond the line of departure.

Intelligence indicates that the enemy is the 1st Guard Motorized Rifle Division, 2d Combined Arms Army, which relieved another motorized rifle division and is conducting a meeting engagement from the march. The enemy is marching by regiments, with three regiments in front and a combined arms reserve instead of a second echelon. Terrain is fairly open to the west of Hill 268 but is restricted to the east of Hill 352. The enemy has excellent observation and fields of fire from both hills. Figure 3-6 illustrates the disposition of forces as of H-1 hour.

At H – 24 hours, the commander issues the restated mission and his planning guidance. The brigade chemical officer, S2, and FSO go to the intelligence cell and begin target development.

The brigade chemical officer has completed his estimate at H – 18 hours and provides a draft target list to the FSO. While the brigade chemical officer briefs the commander, the brigade chemical NCO continues smoke target analysis in coordination with the smoke platoon leader.

At H – 15 hours, the brigade chemical officer, FSO, and smoke platoon leader finalize the smoke support plan. This includes a draft smoke support annex to the brigade OPORD.

Preparation Phase
(Movement to Contact)

Prior to H-hour the security force and flank security elements prepare expedient smoke devices using smoke pots strapped onto their vehicles. The fire support plan includes quick smoke to isolate the enemy combat reconnaissance patrols (CRPs), so WP and HC smoke ammunition is pre-positioned forward of the artillery battalion in the security force area.

The fire support plan also calls for aviation assets to use smoke rockets to mark the gaps between the enemy CRPs and FSEs. The S3 (air) has coordinated for the attack helicopter squadron to carry extra WP rockets in their first two sorties. The smoke platoon initially travels with the main body and has on-board capability to make smoke for 70 to 140 minutes.

At H-hour, our forces cross the line of departure.

Thirty minutes later, aviation reconnaissance sights the lead elements of the enemy CRP. When the CRP is within 3,000 meters of the security force, the artillery battalion fires HE and smoke (HC) in front of each CRP.

At H + 35 minutes, the security force sights the CRP through the smoke using thermal imagers. The security force then attempts to fix the CRP by engaging it with direct fire weapons through the smoke.

At H + 36 minutes, the security force will also locate and mark bypass routes. The security force ignites smoke pots and drops them off at 200-meter intervals to mark and conceal the bypass.

The smoke platoon moves toward the LD at H + 36 minutes. NOTE: The smoke platoon should always remain behind the security force.

At H + 38 minutes, the aviation reconnaissance and security force sight the enemy FSE. The FSE is moving forward to establish the FLOT along the screen line of the CRP.

At H + 39 minutes, the maneuver battalion mortars begin to fire HE and WP on top of and in between the CRPs. The artillery battalion shifts fire to the area between the FSEs and CRPs, obscuring with a mix of HE and HC.

The smoke generator platoon begins to make smoke at H + 40 minutes at the LD. In addition, the flank security force on the eastern flank ignites and dumps its smoke pots within 500 meters of the LD.

At H + 40 minutes, the security force combat vehicles initiate screening smoke with their VEESS. The ar-

tillery and mortar units increase their rate of fire.

At H + 45 minutes, the main body crosses the LD. The main body maneuvers to the west of the smoke along the bypass route (Figure 7, on the next page).

Attack Phase

The movement to contact has developed into an actual engagement. The commander seizes the initiative and orders the brigade to attack toward Objective Fox. The main attack is in the west along Axis Andy. The supporting attack is in the east along Axis Tony. The brigade will consolidate on the objective and continue the attack towards the division objective.

At H + 46 minutes, the artillery shifts fire from the area between the CRP and FSE to the area between the FSE and advanced guard (AG), obscuring the target with a mixture of HE and HC. Also, the mortars shift fire from the CRP to between the CRP and FSE, obscuring with a mixture of HE and WP.

When the main attack has cleared the LD, the security force elements in the west turn off their VEESS. At the same time the supporting attack force engages the enemy FSE and AG with flanking fire.

At H + 50 minutes, the artillery shifts fire from the area between the FSE and AG to the area between AG and the main body in the west, and onto the objective in the east. The artillery continues to fire a mix of HE and HC.

Also at H + 50 minutes, the mortars shift fire from the area between the CRP and FSE to the area between the FSE and AG, obscuring with a mix of HE and WP.

At the same time, the smoke platoon stops making smoke. This will ensure the objective itself is unobscured during the assault.

The main attack force is in position to make the assault on the objective at H + 55 minutes. The artillery shifts fire to the regimental main body beyond the objective, now firing only HE. The mortars shift fire onto the AG in the center and in the west,

obscuring and isolating them with HE and WP mix.

At H + 1 hour, the main attack force assaults the objective. Artillery and mortars continue to fire on the enemy main body, isolating the objective from external Support.

Exploitation Phase

The enemy resistance is crumbling. 2d Brigade has significantly disrupted the enemy's synchronization and has the initiative. Upon securing the brigade objective, the brigade rapidly consolidates and the commander orders them to continue the attack. The brigade's follow-on objective is to secure Objective Jack and destroy the remnants of the enemy division artillery group (DAG). The main attack is in the east along Axis Stef, with the supporting attack in the center along Axis Gay.

At H + 1.25 hours, the mortars begin to fire on the remaining regimental main bodies, obscuring them with a mixture of HE and HC.

At the same time, the artillery begins to fire scatterable mines and HE and HC mix into the area behind the first-echelon regiments. This isolates the first echelon from the combined arms reserve and delays their retreat.

At H + 1.5 hours, the smoke platoon begins to make smoke in the west of the sector to isolate the remnants of the easternmost first-echelon regiments from the other first-echelon regiment. This further disrupts the enemy commander's synchronization, command, and control.

The main and supporting attack forces begun moving towards Objective Jack, keeping the enemy under pressure. They will bypass any enemy
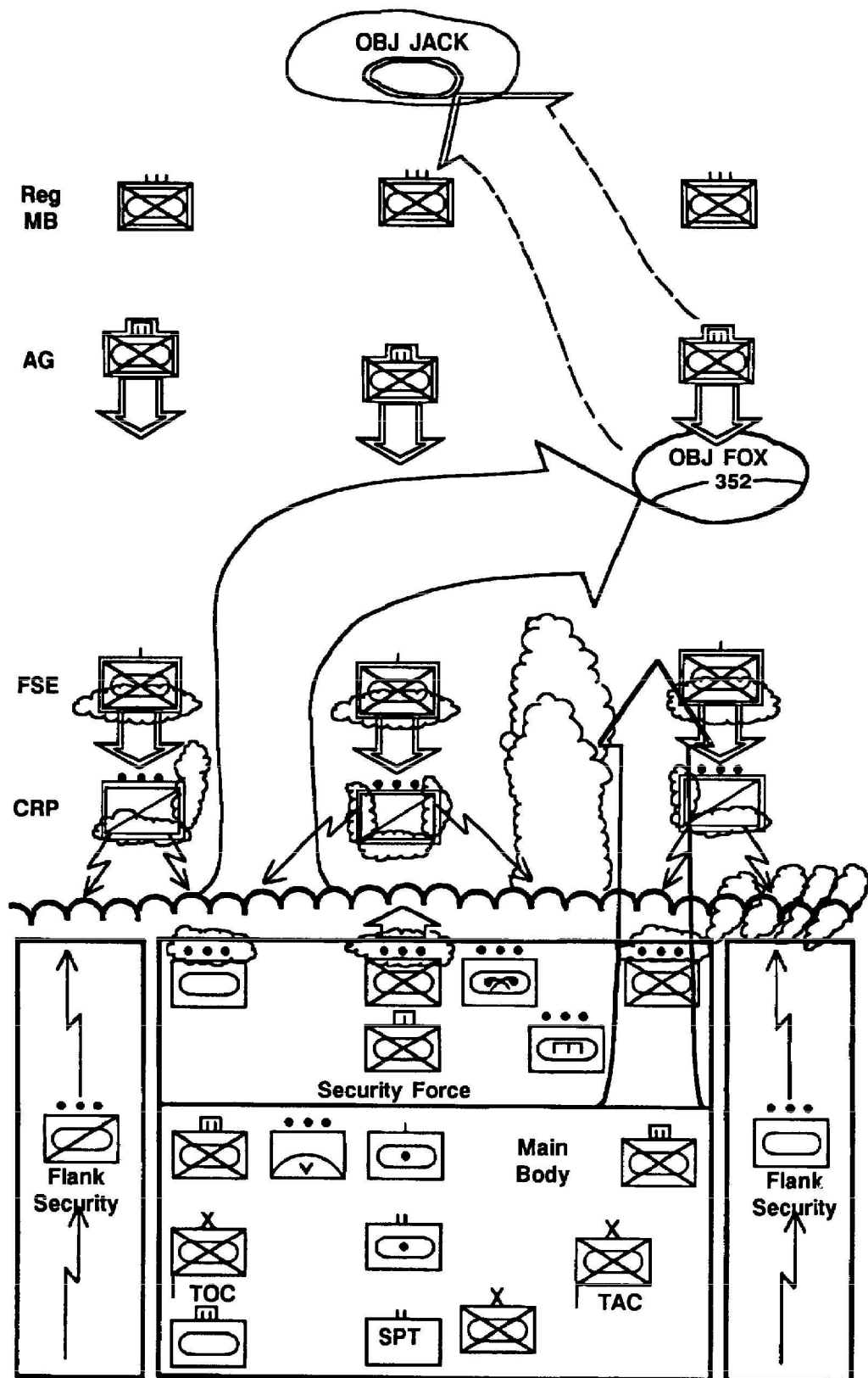

Figure 7. In this attack scenario, we are using the mechanized smoke platoon to produce a large-area smoke cloud to isolate enemy regiments in the east from each other. The security force vehicles use their VEESSs to conceal the movement of the main body behind the LD/LC. Projected smoke, fired at TAIs and known enemy positions, obscures enemy RSTA and protects the force as we begin to cross the LD/LC.

forces they encounter, with the brigade follow-on forces containing and destroying pockets of enemy forces bypassed by the main body.

At H + 1.75 hours, the mortars and artillery shift to fire behind the first-echelon regiments and onto Objective Jack, respectively. Both mortars and artillery will fire a mix of HE and WP for obscuration and lethality.

The mortars shift fire onto Objective Jack at H + 2 hours, and the exploitation force positions for the final assault on the objective.

At H + 2.10 hours, the mortars and artillery shift fire beyond Objective Jack. The main attack force assaults the objective, destroying the enemy DAG.

Pursuit Phase

By H + 2.25 hours, it is obvious that the enemy can no longer maintain their position, and 2d Brigade is capturing significant numbers of soldiers and equipment. The enemy resistance has crumbled. The enemy is now in full flight.

Upon securing the brigade follow-on objective, the brigade rapidly consolidates, and the commander orders them to conduct the pursuit. The direct pressure force moves rapidly forward along all available roads, bypassing small enemy pockets of resistance. The encircling force plans to move rapidly to the division objective and cut off the enemy retreat.

At H + 2.50 hours, aviation assets locate and mark the larger enemy formations with WP rockets. The mortars and artillery assets with the direct pressure force then fire successive belts of scatterable mines behind these larger formations. They also fire HE and HC mix onto the formations to further slow them and complicate command and control.

At H + 2.75 hours, the encircling force leaves its assembly area, moving rapidly along the western flank towards the division objective. By H + 3.5 hours, the encircling force has bypassed and outdistanced the entire enemy formation. The encircling force commander now establishes a hasty defense, blocking the enemy's escape route.

At H + 3.75 hours, the smoke platoon starts its third mission. The smoke platoon begins to make a smoke curtain across the enemy's escape route, while the artillery and mortars from the direct pressure force stop firing smoke. This allows the direct pressure force to engage the enemy with direct fire weapons that are unobscured while concealing the encircling force's preparations.

At H + 4.25 hours, the enemy is forced into an engagement area between the direct pressure and encircling forces. The smoke from the smoke generator platoon silhouettes the enemy force for attack by the direct pressure force. At the same time, the encirling force is able to engage enemy forces through the smoke or as they emerge from the smoke on the other side. The enemy is destroyed and forced to surrender.

Chapter 4

Defensive Operations

Defensive operations retain ground, gain time, deny the enemy access to an area, and damage or defeat attacking forces. Smoke and obscurant use multiplies the commander's ability to disrupt enemy attacks, seize the initiative, and project combat power at the critical time and place to defeat the enemy. Smoke and obscurant use will support any type of defensive operation. Used correctly it will overcome any initial advantage of the attacker.

Historical Perspective

During World War II, large-area smoke denied the Germans observation for directing accurate, indirect fire onto the US Fifth Army at Anzio. The 24th Decontamination Company landed at Anzio on D day, equipped with Ml smoke generators, M4 smoke pots, and eight Navy Besler generators.

On its first night ashore the unit smoked the beaches and anchorage. Within two days they had set up a smoke line nearly 2 miles long. As the beachhead forces expanded, other smoke troops, including a British unit and the US 179th Smoke Generator Company, moved to Anzio to increase the size of the cloud. Initially, smoke at Anzio was intended to be part of the antiaircraft screen. This included making smoke at night, when flares dropped by lead planes appeared to be extinguished as they dropped into the smoke.

The Fifth Army's VI Corps began an end run that bogged down. The Germans contained the beachhead from its establishment on 22 January 1944 until the Allied breakout the following May. Experience showed that a favorite enemy tactic was low-level bombing attacks at dawn and dusk. Consequently, it soon became standard practice to smoke the port at dawn and dusk and during red alerts for antiaircraft defense. The Luftwaffe made at least one raid each night until mid-February, when the artillery fire increased. The Allies used 8-inch howitzers to demolish farmhouses suspected of harboring German observers. They fired smoke from chemical mortars and small-caliber artillery onto nearby ridges and towers.

Yet, enemy observers had an unrestricted view of the entire harbor from the mountains in the background for pinpoint firing with long-range guns. Although the entire beachhead was within range of enemy guns, the Allies failed to obscure the beachhead itself in January and February. The air defense, artillery, and naval commanders were afraid that smoke on the beachhead itself would interfere with observation for friendly fire and with unloading the ships at anchorage. From 22 January to 10 February alone, the Allies took average daily losses of almost 28 tons of ammunition from enemy long-range fire and bombing.

To reduce these losses, the corps chemical staff and chemical unit commanders, with the approval of the VI Corps commander, MG Lucian K. Truscott, developed a new technique for use of the mechanical smoke generators. The technique resulted in the production of a light haze between the harbor and the front lines. The haze was thin enough to permit normal operations within it and thick enough to prevent German observation from the encircling hills.

On 18 March 1944, the 179th Smoke Generator Company moved from the harbor to forward positions. The smoke line formed a 15-mile arc around the port (Figure 8, on the next page), with 22 possible positions on land. Based on wind direction, 19 of those 22 positions had smoke generators. Also, two generators were mounted on Navy patrol craft in the harbor. The smoke generator positions were at 1,000-meter intervals just beyond the antiaircraft positions of the port and just short of the field artillery observation posts. The latter prevented enemy observation from the flanks of the concave harbor. The smoke sections began operations ½ hour before dawn and made smoke until 14 hour after sunset every day from 18 March until after the breakout in May 1944. During this period, the Allied troops at Anzio were able to unload an average of 3,500 tons of supplies daily.

Tactics

The National Training Center (NTC) is an area where smoke employment is possible on a large force-on-force scale. Key insights from the NTC for the defense include the following

• Smoke compresses the battlefield with engagements fought at shorter range.

• We must use alternate weapon positions in smoke.

• Smoke employment requires more detailed planning.

• Smoke can be used in deception, at night, and for obstacle reduction.

• Units that do not train in smoke do not perform well.

Uses

Smoke and obscurants integrated throughout the defensive framework provide major disruptions to enemy synchronization providing windows of opportunity for our forces to seize the initiative and set the terms of combat. In the defense—

• Use smoke to support maneuver by-

- Concealing disengaging and moving forces.
- Slowing and disrupting enemy movement.
- Isolating attacking echelons.
- Concealing engineer operations and defensive preparations.

In addition, use the guidance in Chapter 3 for additional ways to support maneuver.

• Use smoke to provide additional firepower by disrupting enemy command and control and forcing the enemy to mass, thus providing a lucrative target. Other ways are identical to those in offensive operations. See Chapter 3.

• Use smoke to protect the force in the same way as in offensive operations. See Chapter 3.

In addition to the general techniques listed in Chapters 1 and 3, techniques to minimize interference in the defense include the following

• **Verify enemy locations** (responsibility of reconnaissance).

- The enemy can use both our smoke and theirs to conceal move-

German Observation Points

◉ = Smoke
Generator Positions

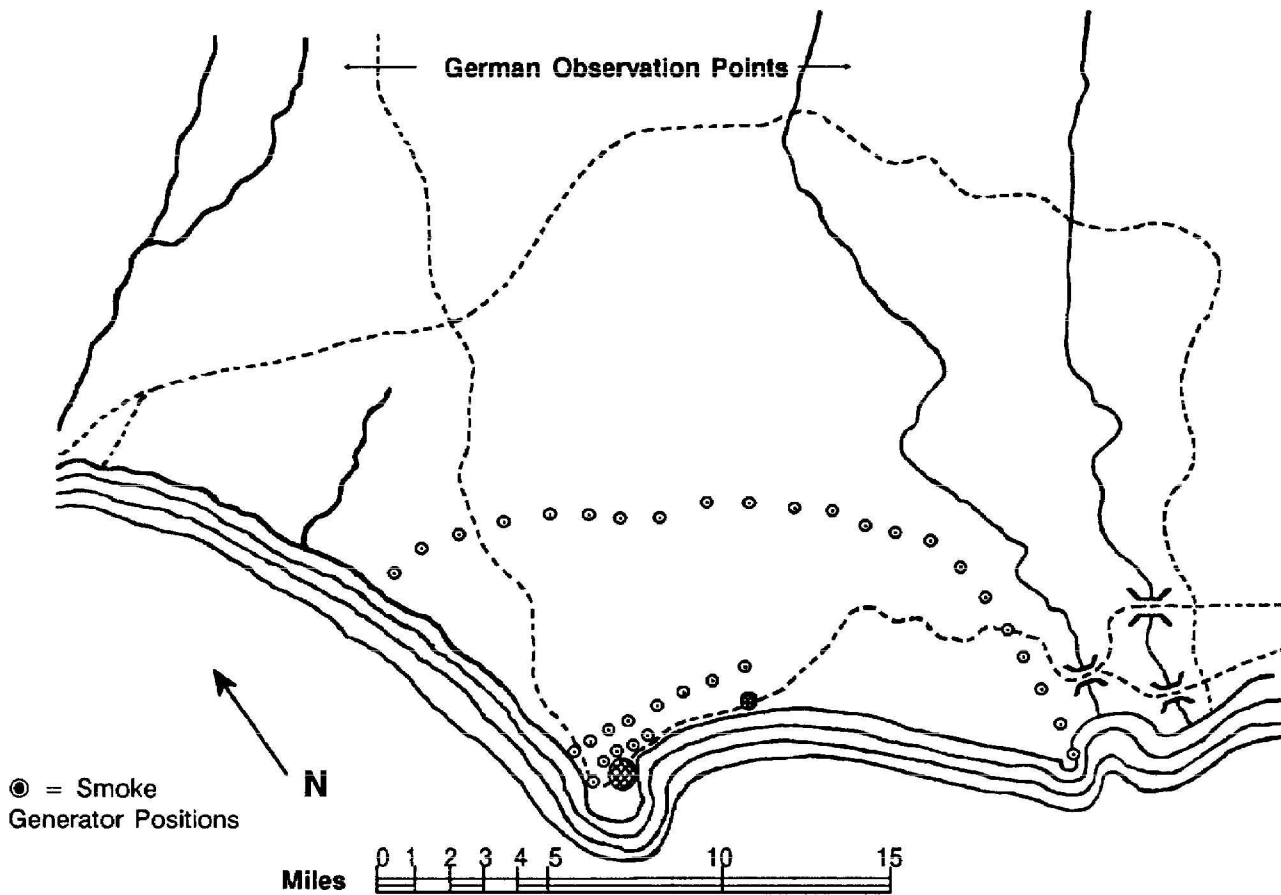**N**

Miles 0 1 2 3 4 5 10 15

Figure 8. Smoke unit positions at Anzio Beachhead after 18 March 1944.

ment to alternate positions or to break contact.

– Aggressive reconnaissance before and during the engagement will allow you to shoot and remain in contact.

– You can use aviation assets to spot and mark enemy targets for destruction by indirect and direct fire.

● **Plan and use all sensor and viewer capabilities.** Consider placing ground surveillance radar, air defense weapons, and target acquisition radars on the flanks or high ground to acquire targets through the smoke. Maintain communications between these systems and both direct and indirect fire elements. Use the acquisition element to observe and adjust direct and indirect fire at targets.

● **Plan for enemy countermeasures.** Enemy forces will counter your smoke. The enemy may use countersmoke to confuse our command and control, so avoid reliance on visual signals. The enemy will increase use of indirect fire weapons when direct fire target acquisition is ineffective. Therefore, plan artillery counterbattery and countersmoke fire when you stop or delay the enemy.

Goal

As in offensive operations, the main focus of smoke in the defense is to defeat enemy target acquisition and reconnaissance, and to conceal maneuver and support forces. Our intent is to deny the enemy information about the disposition and composition of our forces. That allows us to gain time, concentrate forces elsewhere, control key or decisive terrain, and wear down enemy forces as a prelude to offensive operations.

Our overall goal is to improve the commander's ability to retain his initiative in operations against a potentially numerically superior force. Appendix A contains tactical decision aids for determining which smoke delivery means to use against the specific smoke targets covered by the tactics for using smoke in defensive operations.

Elements of Defense

The five complementary elements of the defense are deep operations forward of the FLOT, security force operations forward and to the flanks of the defending force, defensive operations in the main battle area (MBA), reserve operations in support of the main defensive effort, and rear operations.

Deep Operations

In the defense, deep operations are aimed at preventing the enemy from concentrating overwhelming combat power by disrupting their momentum and destroying the coherence of their attack. In deep operations, use smoke to —

● Force the enemy to deploy into our strength.

● Defeat or disrupt command and control efforts.

● Isolate reinforcing echelons from the assault force.

Smoke employment tactics in deep operations are identical to those in offensve operations (preparation phase). See Chapter 3.

Security Force Operations

The fundamental purposes of security force operations are to defeat and destroy enemy reconnaissance forces, force the enemy to deploy, confirm the direction and strength of the enemy attack toward the main body, and buy time for the main body to deploy forward and laterally. Use smoke in security force operations to—

● Conceal movement of maneuver and support forces, allowing the commander to mass forces unobserved.

● Provide tactical surprise, allowing the commander to seize the initiative and set the terms of combat.

● Defeat enemy reconnaissance and counterreconnaissance efforts.

● Conceal obstacle emplacement.

The first part of the defensive battle that the friendly commander must win is counterreconnaissance. Counterreconnaissance is an integral part of the security mission. The focus of the Threat's reconnaissance is to confirm or deny the dispositions and intentions of our force. Use smoke as an active counterreconnaissance measure to—

● Fix the enemy reconnaissance force.

● Mark the enemy reconnaissance force for destruction with direct and indirect fire weapons.

● Deny the enemy reconnaissance force information about the disposition, composition, or intent of friendly forces.

Smoke employment tactics in counterreconnaissance are the following:

● Screening smoke. Use screening smoke to conceal maneuver and obstacle emplacement. Use smoke in the security force area and along the flanks to conceal movement. Use smoke forward of the battle hand over line to allow the security force to disengage. You must carefully control the smoke to prevent silhouetting your units.

● Protecting smoke. Use protecting smoke to defeat enemy antitank and air defense systems.

● Obscuring smoke. Use projected smoke mixed with high-explosive rounds before the enemy can pinpoint your units. Plan obscuring fire based on decision points for the enemy to isolate and confuse their

reconnaissance forces. Plan obscuring fire during the battle hand over to allow the security force to disengage and pass through friendly lines unobserved.

● Marking smoke. Use marking smoke to mark enemy targets for rapid destruction or to reduce the potential for firing on friendly forces. Aviation reconnaissance assets are particularly useful to spot the reconnaissance force and mark it with helicopter-delivered smoke rockets.

● Smoke for deception. Uses are identical to those in offensive operations (preparation phase). See Chapter 3. Figure 9, below, shows smoke employment in security operations.

Main Battle Area

The decisive battle usually takes place in the MBA. The defender concentrates the strongest possible forces for decisive action against the enemy main effort. Use smoke to –

● Defeat enemy target acquisition efforts without degrading our own ability to acquire and engage.

● Create opportunities for commanders to seize the initiative locally and attack.

● Slow the advance of the attacking force.

● Separate and isolate the attacking echelons.

● Force enemy infantry to dismount.

● Disrupt the enemy's ability to exercise command and control.

● Once the enemy is in the engagement area of our choosing, prevent them from breaking contact so we can destroy them immediately.

Smoke employment tactics in the MBA are the following:

● Obscuring smoke. Use obscuring smoke to isolate the engagement area and counterattack or spoiling attack objectives, defeat enemy target acquisition and guidance systems, and defeat reconnaissance and counterreconnaissance efforts. Use projected smoke means to deliver smoke mixed with high-explosive rounds in front of the objective; between enemy formations; and on identified forward observer, ATGM, and tank unit positions before the enemy can pinpoint your units as targets. Using projected
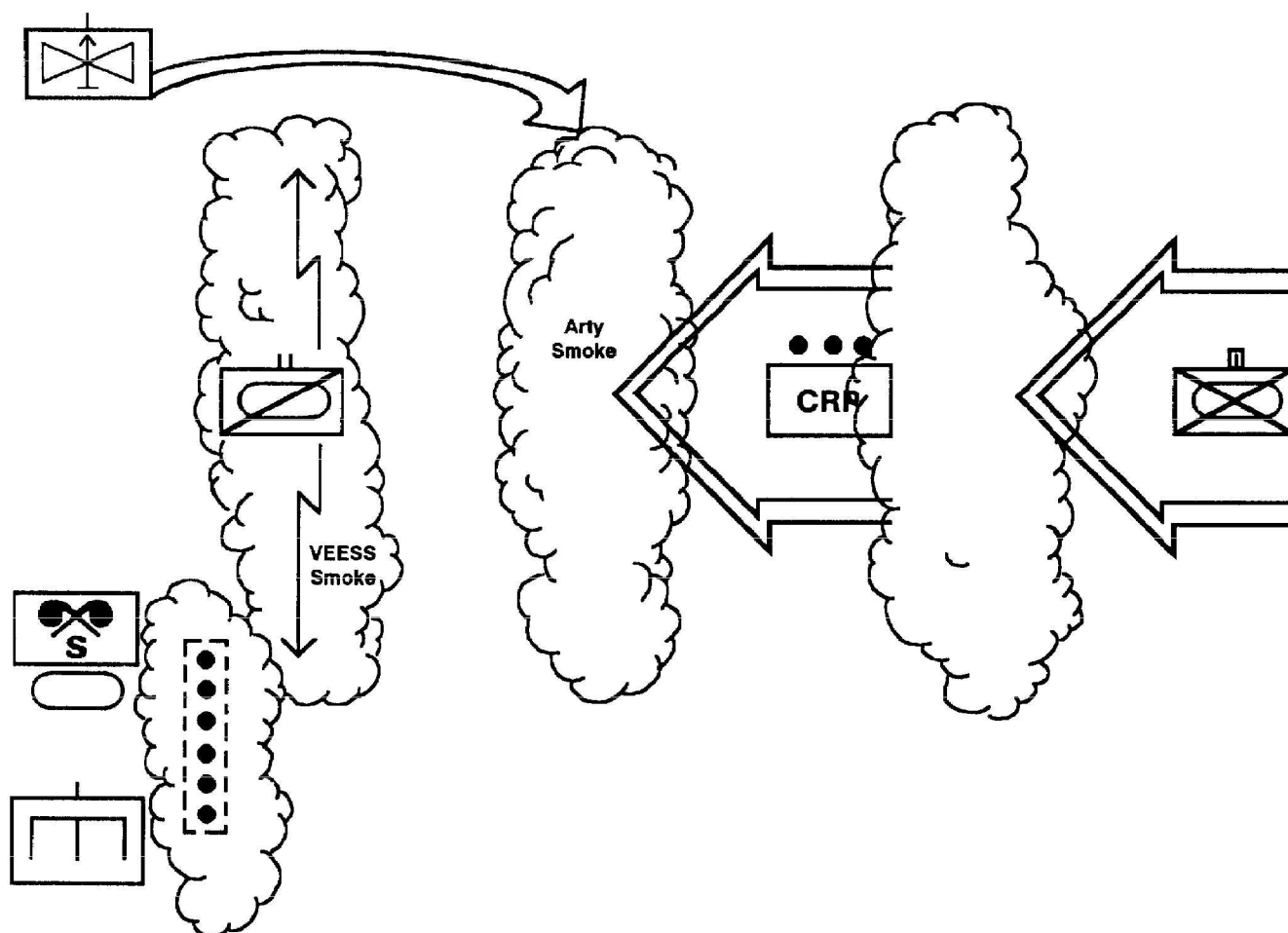

Figure 9. Example of smoke use in security force operations, with helicopter and artillery smoke marking and obscuring enemy formations; thus, isolating them from each other and denying their RSTA efforts. The cavalry squadron uses its VEESSs to conceal the location of the main battle positions from direct observation. Mechanized smoke assets conceal engineer obstacle emplacement, protecting that critical asset from interdiction.

smoke as countersmoke and to isolate the objective can significantly interfere with the enemy commander's synchronization.

● Screening smoke. Use screening smoke to conceal maneuver as you move to new positions; conceal the force as you bypass, breach, or cross obstacles or small pockets of resistance in counterattack or spoiling attack; along the flanks to protect the force; and in the rear to conceal disposition and composition of reserves. Use self-defense and generated-smoke means to deliver smoke across danger areas and to the flanks of the force to limit enemy observation and engagement.

● Identifying smoke. Use the same technique as in the security force operations.

● Protecting smoke. If the enemy has known or suspected directed-energy weapon capability, concealing your force in a blanket of oil smoke will attenuate some of the energy.

● Smoke for deception. Use this smoke to draw attention away from the main defensive effort and the counterattack or spoiling attack to areas of little or no importance. Use generated-smoke to create small- to large-area smoke away from the main body.

Reserve Operations

The primary purpose of the reserves in the defense is to counterattack, to exploit enemy weaknesses, and to reinforce forward defensive operations. Use smoke in reserve operations to—

● Deny the enemy information about the location and strength of reserve forces.

● Conceal movement of reserve forces, allowing the commander to mass forces unobserved.

● Provide tactical surprise, allowing the commander to seize the initiative and set the terms of combat.

The employment tactics for smoke support in reserve operations depend on how, when, and where the commander chooses to use his reserves. In general, the tactics for

smoke employment for reserves in a counterattack or spoiling attack role are the same as smoke tactics for the preparation phase of offensive operations. For reserve forces in a reinforcing role, the smoke tactics are the same as those for security force operations in the defense.

Rear Operations

We conduct rear operations to allow the commander freedom of maneuver and for continuity of operations, to include continuity of sustainment functions and command and control. Use smoke in rear operations to—

● Conceal support forces, facilities, and activities. Reducing enemy observation reduces the necessity to move frequently. When necessary, conceal movement of support forces.

● Deny the enemy use of landing zones and/or drop zones.

● Isolate enemy forces in the rear area.

● Defeat rear area Threat acquisition efforts and support base, base cluster, and rear operations response to the Threat.

Smoke tactics in rear operations are also dependent upon the commander's intent and the threat. In general, use smoke to attack enemy target acquisition and engagement efforts when identified. The smoke employment tactics are similar to those for a hasty attack. Figure 10, on the next page, illustrates smoke use in rear area operations.

Example

The following example depicts a mechanized infantry heavy brigade conducting the movement to contact. The brigade is the 2d Brigade, 54th Infantry Division (M). Smoke delivery means include the direct support artillery battalion, battalion mortars, smoke generator platoon, VEESS, smoke pots, smoke grenades, and aviation assets on-call. 2d Brigade will defend in sector, commencing at H-hour. The commander's intent is to force the

enemy to deploy prematurely, seize the initiative, and conduct local counterattacks to destroy the enemy force.

Intelligence indicates the enemy is the 1st Guard Motorized Rifle Division, 2d Combined Arms Army, which relieved another motorized rifle division and is conducting a meeting engagement from the march. The enemy is marching by regiments, with three rrgiments in front and a combined arms reserve instead of a second echelon. Terrain is fairly open to the west of Hill 268 but is restricted to the east of Hill 352. The enemy has excellent observation and fields of fire from both hills.

At H – 48 hours, the commander issues the restated mission and his planning guidance. The brigade chemical officer, S2, and FSO go to the intelligence cell and begin target development.

The brigade chemical officer has completed his estimate at H – 42 hours and provides a draft target list to the FSO. While the brigade chemical officer briefs the commander, the brigade chemical NCO continues smoke target analysis in coordination with the smoke platoon leader.

At H -36 hours, the brigade chemical officer, FSO, and smoke platoon leader finalize the smoke support plan. This includes a draft smoke support annex to the brigade OPORD.

At H -33 hours, the brigade commander approves the final OPORD. The brigade commander and staff issue the order to the commanders and specialty unit leaders.

Three hours later, the smoke platoon makes smoke to conceal obstacle emplacement.

At H – 24 hours, the brigade chemical officer finalizes smoke support coordination with all units. This includes coordination with adjacent units that might be affected by smoke if the wind shifts.

At H – 20 hours, the brigade chemical NCO verjfies with the FScell that the additional smoke munitions for the artillery and mortars are on hand and prepositioned.

The brigade chemical officer receives a brief back from the smoke platoon leader and assistant S3 (operations) officer at H -18 hours. These officers verify rehearsals in the smoke platoon and maneuver units (for on-board smoke use). The FScell and chemical cell also check communications circuits at this time.

At H – 15 hours, aviation reconnaissance spots enemy divisional reconnaissance assets. Helicopter-delivered rockets mark this enemy element for destruction by CAS aircraft.

At H – 12 hours, the security force encounters enemy reconnaissance assets. Based on the commander's decision support template, the DS artillery battalion begins to fire a mixture of HE and smoke (HC) onto identified targets. Mortars moving with the security force also fire a mixture of HE and smoke (WP) between the security force and the reconnaissance assets. This will deny the enemy information and confuse them as to the location and disposition of our force.

Thirty minutes later, the security force engages the enemy reconnaissance with direct fire weapons. Artillery and mortar fire shift to behind the enemy reconnaissance force. This shifting of fire silhouettes the enemy, isolates the enemy, and prevents obscuration of our own direct fire

At H – 8 hours, the security force identifies elements of the enemy FSE moving into the brigade area of operations. Aviation and artillery assets mark targets with WP for attack by CAS aircraft.

The security force, at H – 6 hours, identifies elements of the enemy AG moving into the brigade area of operations. The smoke platoon stops smoke at the obstacle emplacement.

At H – 2 hours, the security force begins to withdraw. Security force mortars fire HE and WP mix to allow the security force to disengage. The smoke platoon makes smoke at the battle hand over line to conceal the rearward passage of lines.

At H-hour, aviation reconnaissance identifies elements of the division main body entering the brigade area of operations. The security force has done its job and forced the enemy to deploy along the western approach, avoiding the high ground on Hill 352. The artillery begins to fire on the flanks and forward elements of the enemy AG and main body. The mortars begin to fire on the flanks and forward elements of the enemy FSE. Both use a mixture of HE and WP. This will isolate the enemy forces and serve as good reference points for adjusting indirect and direct fire.

At H + 30 minutes, the enemy main body has entered the engagement area. Our indirect fire has caused attrition to their FSE and A G and forced the main body into our strength. The brigade commander now orders the artillery to fire FASCAM mixed with HC behind the engagement area to delay reinforcements and to isolate the main body for destruction.

At H + 1 hour, the direct fire fight has begun. Artillery fire switch to HE and HC mix. Mortars fire HE onto the enemy and WP onto the flanks. Our GSR teams pass target acquisition information to the TOW sections of each company. Our forces use thermal sights to acquire and engage the enemy, who cannot see through the smoke.

By H + 2 hours, the enemy commander is unable to maintain his momentum and begins to withdraw.
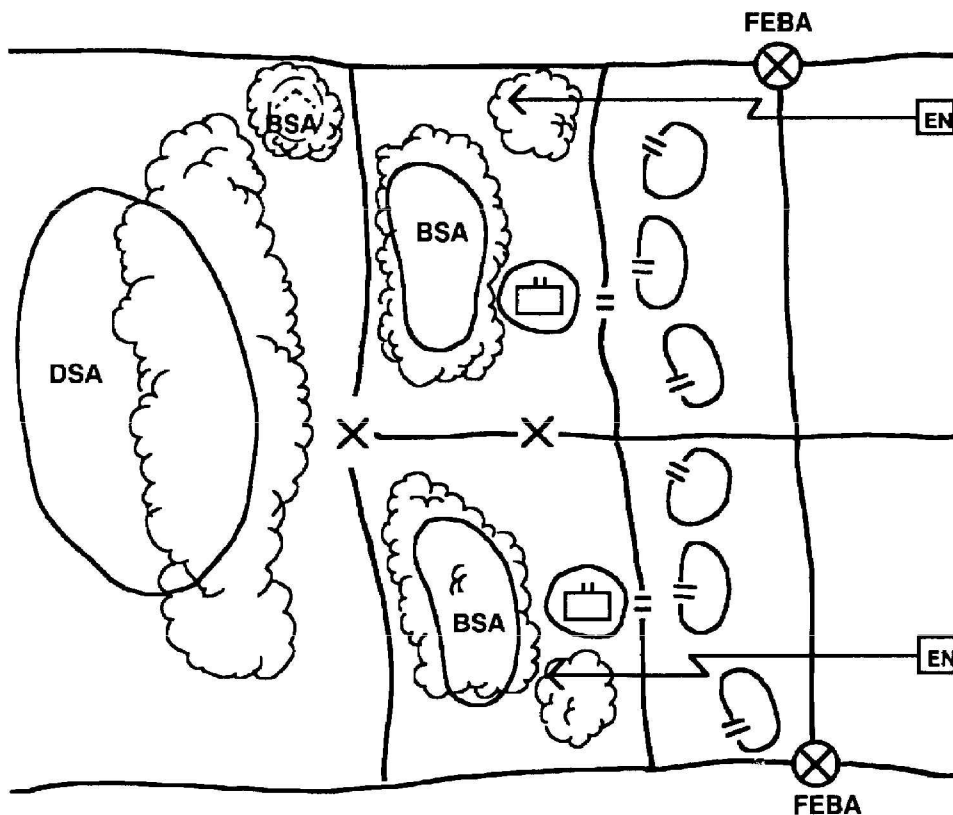

Figure 10. This example of smoke employment in rear operations uses large-area smoke clouds to conceal support activities from enemy RSTA efforts. A dummy BSA also has smoke support to complicate enemy intelligence gathering and to make our deception plan more believable. If enemy forces penetrate to our rear area, a mixture of HE and WP will delay their movement and mark them for destruction by responding forces.