LESSON PLAN

PART I
COVER SHEET

LESSON TITLE: Large Area Smoke Screens

TRAINING METHOD: Lecture

REFERENCES: CCDI-89-1052-10, Camouflage, Concealment, and Deception Integration (CCDI) Program Final Smoke/Obscurant Implementation Guide
Technical Report AD-TR-85-24, Smoke Camouflage Test
Technical Report EL-88-1, Airfield Camouflage with Large-Area Smoke Screens
A Guide to Bare Base Camouflage in a Desert Environment
Technical Report ERDEC-CR-071, Environmental and Health Effects for Obscurant Fog Oil
Operational Requirements Document (ORD) for Smoke and Obscurants
An Objective Quantification of Limited Area Smoke Screens Against Airborne Attacks

AIDS AND HANDOUTS: Attachment 1. Surface Winds
Attachment 2. Configurations for the Semi-Fixed Deployment Options

LESSON OBJECTIVE: Introduce the students to the concept of large area smoke screens. They must understand why smoke is an important CCD measure and the potential of large area smoke screens. Additionally, students must understand that detailed planning must take place to develop and implement an effective smoke plan. Additionally, students must master at least four of the six samples of behavior.

SAMPLES OF BEHAVIOR:

1. Select camouflage effects achieved when smoke conceals an airfield.

2. Identify the appropriate application of large area smoke screens as a camouflage technique.

3. Identify critical steps in planning for smoke employment.

4. Identify which meteorological conditions most influence the optimum number and placement of smoke generators.

5. Identify the three deployment strategies for smoke generation.

6. Identify three sample smoke generator placement configurations.

SUGGESTED COURSE(S) OF INSTRUCTION: CCD Users Course, CCD Trainers Course, and CCD Planners Course

ORGANIZATIONAL PATTERN: Topical

STRATEGY: This lesson is a simple introduction to large area smoke screens. Instructors should teach the students DPTP's K1, K3, and K5 prior to this lesson and review available reference material prior to instructing this course. This lesson doesn't, nor is it intended to, address all aspects of the smoke planning, training, and user requirements. The presentation should entice students to look at the reference materials and smoke uses throughout history for a solid planning base.

LESSON OUTLINE:

MAIN POINT 1. Smoke Screen History

MAIN POINT 2 Purpose and Effects

MAIN POINT 3. Operation Categories
- a. Limited Area Smoke Screens
- b. Large Area Smoke Screens

MAIN POINT 4. Planning Factors
- a. Assessing the Base
- b. Define Objectives
- c. Determine Meteorological Conditions
- d. Develop Effective Generator Placement
    1. Deployment Strategies
    2. Estimates for Ideal Set-Up
    3. Placement Configurations

PART II
TEACHING PLAN
INTRODUCTION

ATTENTION: The rapidly expanding potential for increased weapon accuracy and lethality, along with improved targeting systems, makes it necessary to improve our capability to defend against these threats.

MOTIVATION: Large Smoke screens can make people, airplanes, and even airfields disappear from an enemy equipped with binoculars, night vision devices, laser range finders, and more sophisticated equipment. We call this “Multispectral Smoke.”

OVERVIEW: Today we will discuss:

The history, purpose and the effects of smoke screens, two operation categories, factors that planners, trainers, and users must take into consideration, and how to put smoke generators in place.

BODY

MAIN POINT 1. SMOKE SCREEN HISTORY

History records using tactical smoke and obscurants in many military conflicts. While the overwhelming majority of these events were ground-to-ground scenarios, the development of aerial attack capabilities presented the need for screening larger segments of the battlefield. Combining smoke screens with other camouflage, concealment, and deception (CCD) to defend against air attacks is well documented during World War II.

INITIALLY USED INDUSTRIAL OIL BURNERS

Initially, modern militaries used industrial oil burners to produce smoke; however, each succeeding generation of smoke generator has been more effective, lighter, or more mobile than earlier models.

USED IN WWII AND KOREA

The US military used white smoke in World War II and Korea to conceal troop movements, beach landings, and supply lines from ground and aerial reconnaissance. Other nations with well-documented success stories include Germany, Russia, Italy, Japan, and Great Britain. Indeed, most nations have used smoke at some time in their history.

VARIETY OF FOG OILS AND PETROLEUM PRODUCTS USED

A variety of fog oils and other petroleum products have been used to provide white obscurant smokes. These fog oils include diesel, jet fuel and kerosene. We currently use standard grade fuel SGF-2 fog oil for obscuration year-round.

SGF-2 IS THE CURRENT STANDARD

The SGF-2 fog oil used by the U.S. Army has changed slightly from the 1940's fog oil. The only change is in the refining process. Modifications reduced some harmful components of the material - an important aspect as we look carefully at how we interact with the environment.

SUCCESSFUL USE AT ANZIO

The most successful and well-known American smoke use was by the U.S. forces at the Anzio beachhead in Italy. Three smoke troop companies protected six divisions of Allied forces from intense German artillery bombardment without interfering with normal operations.

COMMANDERS SOLD ON SMOKE AFTER ACTUAL USE

Initially, army and navy commanders were concerned that smoke wouldn't work and that it would be dangerous to the operation. After the offensive was completed, commanders complained if smoke generators were moved out of their areas of responsibility. The smoke not only proved effective during daylight hours, but also against nighttime German bombardment under flares.

TRANSITION:

Now that you have a brief historical perspective, let's turn our attention to the purpose and effects of smoke.

MAIN POINT 2. PURPOSE AND EFFECTS

The purpose of large area smoke screens is to defeat air and satellite reconnaissance, enemy air attacks, and ground-based standoff weapons.

CREATES PERCEPTIONS

Additionally, because the pilot cannot see the target, smoke creates perceptions of isolation, uncertainty, and encapsulation in enemy attackers.

PSYCHOLOGICAL AND PHYSIOLOGICAL STRESS AND DISORIENTATION	Smoke reduces the enemy's effectiveness and raises their susceptibility to stress. Numerous studies and tests indicate intense psychological and physiological stress and disorientation resulting from using smoke.
REPEATED SUCCESS STORIES	Evaluations and tests concealing air base resources with smoke demonstrate repeated success stories. Experts have fully validsted the effectiveness of the various techniques, particularly against attacking aircraft.
ATTACKS FLOWN AGAINST POINT TARGETS	Electronically simulated releases of precision guided weapons have been recorded from realistic mission profiles. Attack profiles include runway point targets such as the intersection of the runway and a taxiway, attacked during daylight hours using an infrared sensor.
INTERESTING TEST RESULTS PROVIDING QUALIFIED SMOKE SUPPORT	The test results are interesting because they provide qualified support for using smoke. They demonstrate various techniques and produce several unexpected pilot perceptions.

OBJECTIVE AND SUBJECTIVE DATA DERIVED UPON MISSION COMPLETION	Test monitors obtained objective data from aircraft sensor system videos and range instruments. They gained the subjective information from structured interviews with the aircrews after each mission.
USEFUL IN VARIOUS ATTACK CONDITIONS	The tests clearly indicate large area smoke screens are a useful camouflage technique in a wide variety of attack profiles and atmospheric conditions. Smoke very effectively conceals airfields and associated targets.
CAMOUFLAGE EFFECTS	We can totally obscure the target, limit enemy exposure times to the target, and reduce the apparent contrast of the target to it's background. Some high-tech weapons (ex: night vision goggles and laser targeting devices) may not be effective when a properly executed smoke screen is present. Radar, GPS and inertial guidance systems are examples of weapon guidance systems that would not be affected by a smoke screen.

SMOKE ELIMINATES VISUAL REFERENCES

Smoke eliminates visual references pilots use to locate specific targets from the air. In many cases accurate targeting was impossible.

FORCES PILOTS TO ATTACK FROM HIGHER ALTITUDES

Aircrews attacking from higher altitudes were able to acquire targets slightly better than attackers at lower altitudes. Smoke was least effective when aircraft made attack passes toward the downwind direction of the smoke generators or with the sun behind the aircraft.

LOWER PASSES INEFFECTIVE

Low-level passes usually proved ineffective under smoke conditions.

NUMBER AND SPACING OF GENERATORS CRITICAL

As we mentioned earlier, the number and spacing of generators is critical for effective airfield coverage. If the spacing is not correct, effective coverage may not be achieved.

WIDE RANGE OF ATMOSPHERIC CONDITIONS

Smoke is a useful camouflage agent for a wide range of atmospheric conditions as well. Conditions will exist where smokes effectiveness will be significantly better than others. However, pilot interviews suggest smoke screens will always be advantageous to camouflage airfield targets.

THREE CAMOUFLAGE EFFECTS

At least three camouflage effects are achieved when we use smoke to obscure an airfield:

TARGET TOTALLY OBSCURED

First, the target can be totally obscured to the airborne observer.

SMOKE LIMITS TIME TARGET EXPOSED

Second, the smoke can limit the amount of time a target is exposed by creating curtains around the target. Aircraft must fly through these curtains before the target is in view. The curtain may also reduce visual contrast and image level.

ELIMINATES CUES WITHOUT COVERING AIRFIELD

Third, the smoke can eliminate visual cues for locating the target from the air without completely covering the airfield.

PROGRAM MANAGER PM SMOKE PROGRAM

Tests are being conducted continually at several locations throughout the military services. The primary U.S. agent for smoke and other obscurants is the PM Smoke program at Edgewood Arsenal, Maryland. According to Colonel Birdsong, the product manager for Smoke and Obscurants, “Pretty soon ... the uses of smoke will be limited only by the imagination of the user.”

MAIN POINT 3. OPERATION CATEGORIES

Before we go further, we first need to classify smoke screening operations into two broad categories defined by their focus of employment: (1) limited-area screens; and (2) large-area smoke screens (LASS).

LIMITED AND LARGE-AREA SMOKE SCREENS

Limited-area screens conceal individual targets or closely grouped target clusters. LASS, on the other hand, obscure entire airfields, storage areas, or large groups of fixed facilities.

TRANSITION:

While smoke generators are generally used for defending large parts or the entire base, we also use smoke for a variety of other tasks. Let's turn our discussion briefly to limited area smoke screens.

a. LIMITED AREA SMOKE SCREENS

a. Nighttime Rapid Runway Repair (RRR) and other tasks are conducted under floodlights which present an enemy sniper with inviting targets. A smoke curtain or a thin vertical wall of smoke between the perimeter of the base and the work crews makes sniper fire difficult even with thermal or night vision devices.

SMOKE BLANKET DRIFT HORIZONTALLY OVER AREA

We can cover areas where sensitive operations are taking place outdoors such as "special" weapon loadouts, using a smoke blanket drifting horizontally over the area. This blanket blocks operations from satellites and reconnaissance aircraft view.

b. LARGE AREA SMOKE SCREENS – LASS

b. Large area screening smoke conceals critical assets over a large area of an installation. The Air Force Smoke Generator A/E32U-13 is designed to provide both limited and large area smoke screens.

BEST METHOD-LARGE-AREA SMOKE SCREENS

Large area smoke screens (LASS) are the most effective method of concealing airbases from observation. Smoke and obscurants provide complete visual and near-infrared screening and can even defeat laser based and contrast tracking weaponry.

OPTIMUM TECHNIQUE IS A SMOKE BLANKET

The optimum LASS technique is to spread a smoke blanket covering the entire base and any associated cues. When you use this technique in conjunction with other CCD measures, the effect is impressive.

PILOTS UNABLE TO DELIVER ORDNANCE OR ATTACK FROM MEDIUM ALTITUDE

In tests against F-16 and A-10 attackers, smoke screens were so effective pilots, in some cases, were unable to deliver any ordnance at all. Also, test pilots were forced to attack from medium altitude. Increased altitudes translates into less bombing accuracy. Attacks from this altitude meet heavy fire from integrated air defenses and result in significant increases in the percentage of attackers destroyed.

SMOKE COVERAGE CAN BE ACCURATELY PREDICTED USING LASS MODEL

Many commanders express reservations about using smoke because they perceive smoke can't be controlled. While not an exact science, good approximations of smoke coverage can be predicted by simply using a personal computer and the Army's LASS (Large Area Smoke Screen) Model.

ENTER APPROPRIATE INFORMATION TO DERIVE FORECAST COVERAGE

By entering the locations and types of smoke generator used, wind speed and direction, and other meteorological information provided by your local weather detachment, you could derive coverage forecast.

CAN USE SMOKE 95% OF TIME

Typically, we can use smoke 95% of the time with little or no loss in operational mission capability.

REMOTE CONTROL THROUGH THE SRC

We can activate any smoke generator by remote control from the Survival Recovery Center (SRC), activating only those generators required to cover a specific target area.

DISPERSAL TIMES CALCULATED

We can also calculate dispersal times. The LASS computer model lets commanders know when the airfield will be clear to land aircraft or continue other operations.

SMOKE CLOUDS DISPERSE IN 3 TO 10 MINUTES

Smoke clouds disperse in as little as three minutes and have never taken longer than 10 minutes. When we use smoke in response to air attacks, damage assessment teams take at least those 3 to 10 minutes assessing the base. No aircraft can land or take off until the assessment teams give the all clear.

MAIN POINT 4. PLANNING FACTORS

Although the purpose of this lesson is not to teach you how to plan a smoke operation, it is important for you to know what planners consider when developing the installation smoke plan. Before employing smokes or other obscurants, smoke experts recommend these critical steps in the planning process:

STEP 1

Step 1. Identify critical base assets and reference points used to support tactical targeting.

STEP 2

Step 2. Identify site specific objectives to achieve with smoke generation.

STEP 3

Step 3. Collect site-specific meteorological data, particularly wind direction, speed, and air temperature. Determine the prevailing wind direction on a month-by-month basis through the Air Weather Service (AWS) climatic briefs. These are available from base meteorology personnel. Up-to-date information is the key.

STEP 4

Step 4. Determine generator locations for achieving the site-specific objectives.

A. ASSESS THE BASE

a. Planners assess the CCD needs of the site by studying aerial and ground photographs of the site and the surrounding area. Photographs and video coverage following different approach patterns provide good data on existing structures. They will the select likely enemy approach routes.

TRAINERS MUST KNOW WHAT INFORMATION IS REQUIRED

Unit trainers must know what information is required based on the threat, resources available, terrain characteristics, and requiring protection.

USERS MUST UNDERSTAND HOW AND WHY THEY ARE EMPLOYING SMOKE

Users often find themselves simply doing the job they are told to do. If they have an understanding of the information required in planning, they will provide better eyes and ears as the person in the field to assist the control centers in making sound command and control decisions.

GROUP OBJECTS INTO CLASSES

Planners group objects into classes such as critical functions, priority targets, and potential reference points to critical assets. Assume the pilot will use visual sensors for location information. Pilots will translate targets and aim points; reference points will provide orientation information, as well as enabling weapon delivery offset from the target.

B. DEFINE OBJECTIVES

b. Another critical step is defining objectives. These objectives should take into account the number of available smoke generators and the prevailing meteorological conditions.

OBSCURE REFERENCE POINT, GROUPS, OR ENTIRE SITE	Objectives center on obscuring a reference point or a single critical asset; obscuring one or more groups of relevant targets; or obscuring the entire site or as much of it as possible.
CONFUSE PILOT MAKING TARGETING MORE DIFFICULT	In each of these cases, the smoke is intended to obscure part of the base from an enemy pilot's view; thereby, confusing him or making targeting more difficult.
UNIT TRAINERS	Unit trainers must know where reference points are located, what the critical targets are, and what resources are required to obscure any portion of the base.
USERS	When moving smoke generators into positions that seem unlikely, a user is in the best position to determine whether or not the generator is best located where directed, or if there is another location nearby that can meet the objectives defined by the planners.

DETERMINE METEOROLOGICAL CONDITIONS

c. The optimum number and placement of smoke generators is significantly influenced by the prevailing meteorological conditions. Specifically, we are concerned with wind speed, wind direction, and atmospheric condition.

WIND SPEED

Wind speed determines the smoke coverage achieved because it governs the rate of downwind travel. The concentration or density of smoke at a given downwind location is also related to the wind speed. Increased speeds narrow the smoke cloud as well as reducing its density.

WIND DIRECTION

To provide the best smoke coverage possible, smoke generators should be placed along the upwind perimeter of the coverage area. In some locations, this can create a problem since wind directions change not only from season to season, but also from hour to hour.

MOST USEFUL INFORMATION - PERCENTAGE OF TIME WIND BLOWS FROM EACH DIRECTION

The most useful type of monthly information is the percentage of the time the wind blows from each of the sixteen points of a compass. The meteorology personnel on the airbase maintain this report as well.

INSTRUCTORS NOTE: Use Attachment 1 as an example of surface winds weather Information.

PREVAILING WINDS

This chart shows particular months the winds at a generic air base blow from the north most often, 14.9% of the time. The wind blows from NNW and E 13.5% and 12.7% of the time, respectively. Therefore, the prevailing wind direction is N/NNW 28.4% of the time; and the next most prevalent direction is E at 12.7%.

SHIFTS WITH THE SEASONS

The prevailing wind direction commonly shifts with the seasons. In this case, multiple deployment schemes have to be developed to take the seasonal wind directions into account.

PLANNERS	Planners must ensure they have the most accurate meteorlogical information available. When developing the plan, input from agencies that work with this data is critical. The unit trainer will give as much training or will coordinate meteoroligical training between the weather detachment and unit planners.
TRAINERS	Unit trainers should gather as much information as possible from the local weather detachments and be familiar with the terminology and calculations the detachment provides. Provide any asistance to the planner as needed.
USERS	The user again provides the eye in the field. If weather conditions observed by the user operating the smoke systems doesn't match what the SRC or control center is reporting to the field, the user reports the correct information immediately so that adjustments can be made.

D. DEVELOP EFFECTIVE GENERATOR PLACEMENT

d. The goal in developing effective generator placement is to achieve the CCD objectives while minimizing cost and manpower. We do this by considering deployment strategies, estimating the ideal set-up, and determining placement configurations.

1. DEPLOYMENT STRATEGIES

1. Let's first consider the three deployment strategies: fixed, semi-fixed, and mobile systems.

FIXED DEPLOYMENT

Fixed systems require the largest number of smoke generators; because the units may form a ring around the site perimeter. The major advantage is that it is always in position providing 360° coverage. This permanent emplacement eliminates the requirement to relocate units and account for wind direction changes, thereby requiring only minimal manpower after the initial deployment.

NOT NECESSARY TO ACTIVATE ALL GENERATORS UNLESS EXTENDED COVERAGE IS DESIRED

Since the generators encircle the base, it is not necessary to operate all units during every attack, unless extended coverage is desired. The units in the downwind regions of the base provide the extended coverage. For example, if extended coverage is not desired and the wind is blowing from the east, do not activate smoke generators on the western edge of the base.

INSTRUCTORS NOTE: Use attachment 2 to demonstrate an example of possible configurations for the semi-fixed deployment of smoke generators.

SEMI-FIXED DEPLOYMENT

Semi-fixed deployment requires permanently emplacing only a certain number of smoke generators. These fixed units are supplemented as required, by moving generators as the wind direction dictates.

PLACE FIXED GENERATORS AT INTERVALS AROUND THE BASE

For example, place units considered fixed at intervals around the perimeter of the base. If the wind is blowing from the east, place the supplemental generators among the permanently located generators on the eastern edge of the base. On a day when the wind is from the north, place the supplemental generators among the permanently located units on the base's northern edge.

OVERALL COVERAGE REQUIRES FEWER UNITS FOR SEMI-FIXED EMPLOYMENT

For overall coverage, the base needs fewer total units for the semi-fixed than the fixed concept since we'll move some units around. Manpower and the necessary additional time must be available under this concept to set the supplementary units in place whenever major wind shifts occur.

MOBILE DEPLOYMENT

Finally, the mobile deployment scheme assumes all available smoke generators are deployed where needed to provide a smoke screen only for the current wind direction.

PROVIDES GREATEST FLEXIBILITY BUT LONGEST SETUP

While this option provides the greatest flexibility, it also requires the longest set up time. Why? Because it requires you to move the greatest number of units. Correspondingly, planners can expect high manpower requirements for mobile deployment when available manpower will be limited and when time is a constraint.

ADVANTAGE OF MOBILE DEPLOYMENT - USES LEAST GENERATORS

The major advantage of the mobile deployment scheme is that it uses the least number of smoke generators. The major disadvantage is a significant shift in the wind direction requires us to relocate the units.

MAXIMUM GENERATORS REQUIRED FOR ENTIRE BASE COVERAGE

When providing the entire base with smoke coverage regardless of wind direction, the maximum number of generators for a site is required.

IDEAL COVERAGE IS PERMANENT EMLACEMENT ALONG PERIMETER

The ideal coverage is having sufficient smoke generators available to permanently place along the perimeter of the site. When this is not possible or feasible at your base, position several clusters of units in centralized areas.

LOCATED IN CENTER OF BASE DECREASES TIME FOR COVERAGE

Locating clusters of units in the center of the base decreases the time to achieve coverage and provides the base with at least partial coverage regardless of the wind direction. Centering the clusters keeps us from having to relocate the generators.

TRANSITION:

Once planners select a deployment strategy they take a look at how many generators are required for ideal coverage of an entire base.

2. ESTIMATES FOR IDEAL SET-UP

2. Here are the equations used to estimate the maximum number of generators needed for an ideal set-up:

WIND SPEEDS 2.5 - 3 METERS PER SECOND

The maximum numbers of generators required with typical wind speeds of 2.5-3 meters per second. This is equal to 4.9-5.8 knots or 5.6-6.7 mph:

Large sites = (length of perimeter/300) + 6
Small sites = (length of perimeter/300) + 3

4-5 METERS PER SECOND

For typical wind speeds of 4-5 meters per second (7-9.7 knots = 8.9-11 mph):

Large sites = (length of perimeter/250) + 6
Small sites = (length of perimeter/250) + 3

WINDSPEEDS AND NOMINAL SPACING

For typical wind speeds of 2.5-3 meters per second, three hundred meters is the nominal spacing for units along the base perimeter. For windspeeds of 4-5 meters per second, reduce the spacing to 250 meters for better coverage. Depending on the size of the base, experts recommend positioning one or two clusters of three generators in the center of the base.

TRANSITION:

Again, these equations estimate the maximum number of generators required at a base. The actual number required depends on the areas needing coverage, the bases nominal wind speeds, and the deployment option chosen. Now let's look at three sample smoke generator placements.

3. PLACEMENT CONFIGURATIONS

3. Three sample smoke generator placements configurations are: single generators, clusters of three units, and lines parallel to the edge of a site.

SINGLE SMOKE GENERATOR	Use a single smoke generator to mask a reference point or a critical asset. Planners may possibly mask a group of assets if they are in close proximity.
IF NO PREVAILING WIND, PLACE GENERATOR AMONG CLUSTER OF CRITICAL ASSETS	If there is not a prevailing wind direction, placing the generator becomes a problem. A possible approach is placing the unit in a centralized location among a cluster of critical facilities or assets. In this way, at least we can achieve partial coverage.
PLACE CLUSTERS IN CENTER TO PROVIDE OMNI-DIRECTIONAL COVERAGE	Place clusters of units in the center of the site to provide omni-directional coverage. All of the units in the cluster should operate regardless of wind direction.
SUPPLEMENT BY ADDING SMOKE GENERATORS ALONG SITES PERIMETER	Supplement this coverage by adding generators along the site's perimeter. Place the smoke generator cabinet so that the end containing the exhaust pipe is at least 16 meters from a building or asset. Position the other sides of the cabinet at least 3 meters from buildings and assets.

RULES FOR LINE OF SMOKE GENERATORS

For a line of smoke generators, the following rules apply:

- Best case coverage is attained when the wind is at an angle to the line,
- Adequate coverage is attained when the wind is perpendicular to the line,
- Worst case coverage is attained when the wind is parallel to the line.

DETERMINE PREVAILING WIND THEN PLACE SMOKE GENERATOR UPWIND 500 METERS

First, determine the prevailing wind direction for the current time of year. Next, place the smoke generator approximately 500 meters upwind from the target. For example, if the wind blows from the north, place the smoke generator 500 meters north of the target.

PROVIDE BASE MAP WITH SMOKE GENERATOR LOCATIONS

Use a base map to layout the positions for smoke generator placement. This will provide field personnel a visual guide when placing the smoke generators. Different maps can be generated for each prevalent wind direction and for limited area screens. A blank map will be useful during contingency planning. These maps may become an attachment to your base CCD plan.

CONCLUSION

SUMMARY: In this lesson we have discussed:

The history, purpose and effects of smoke screens, the two operation categories, factor planners must take into consideration, and how to put smoke generators in place.

REMOTIVATION: Large area smoke screens can make people, airplanes, and even airfields disappear from an enemy equipped with binoculars, night vision devices, laser range finders and designators.

CLOSURE: This concludes the lesson on large area smoke screens.

PART III
EVALUATION

STUDENT PERFORMANCE STANDARDS

TEST ITEMS

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1. LESSON OBJECTIVE: Select camouflage techniques achieved when smoke conceals an airfield.

QUESTION: (True or False)

Smoke screens are effective against visual targeting means, but are ineffective against "high-tech" weapons such as laser targeted weapons.

a. True
b. False

Key: b

Reference: Main Point 2

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2. LESSON OBJECTIVE: Identify the appropriate application of large area smoke screens as a camouflage technique.

QUESTION: (True/False)

Large area smoke screens provide camouflage in a variety of attack profiles and atmospheric conditions by concealing airfields, associated targets, runway repair teams, and weapons load crews.

a. True
b. False

Key: b

Reference: Main Point 3

3. LESSON OBJECTIVE: Identify the three deployment strategies for smoke generation.

QUESTION: (Multiple Choice)

Which of the following are the three deployment strategies for smoke generation?

a. Fixed, semi-fixed, and mobile systems.
b. Semi-fixed, fully operational, and mobile systems.
c. Weather-based, fully operational, and fixed systems.
d. Fixed, semi-operational, and weather based systems.

Key: a

Reference: Main Point 4

4. LESSON OBJECTIVE: Identify three sample smoke generator placement patterns.

QUESTION: (Multiple Choice)

Which are three sample smoke generator placement patterns?

a. Single generator, clusters of three generators, and a dozen generators.
b. Single generator, clusters of three generators, and sets of ten generators.
c. Single generator, sets of five generators, and parallel lines of generators.
d. Single generator, clusters of three generators, and parallel lines of generators.

Key: d

Reference: Main Point 4

5. LESSON OBJECTIVE: Identify critical steps in planning for smoke employment.

Which of the following are critical steps experts recommend planners consider for employing smoke screens.

a. Identify site specific objectives to achieve smoke generation.
b. Determine generator locations for achieving site-specific objectives.
c. Identify critical base assets and reference points used to support tactical targeting.
d. All of the above.

Key: d

Reference: Main Point 4

6. LESSON OBJECTIVE: Identify which meteorological conditions most influence the optimum number and placement of smoke generators.

QUESTION: (Multiple Choice)

Which of the following meteorological conditions influence the optimum number and placement of smoke generators?

a. Temperature, wind speed and direction.
b. Precipitation, wind speed, and temperature.
c. Atmosperic condition, wind speed and direction.
d. Atmospheric condition, temperature, and precipitation.

Key: c

Reference: Main Point 4

PART IV

RELATED MATERIALS

ATTACHMENT 1. Surface Winds
ATTACHMENT 2. Configurations for the Semi-Fixed Deployment Options

GLOBAL CLIMATOLOGY BRANCH
AIR WEATHER SERVICE

SURFACE WINDS

PERCENTAGE FREQUENCY OF WIND DIRECTION AND SPEED (FROM HOURLY OBSERVATIONS)

(STATION) (STATION NAME) (YEARS) (MONTH)

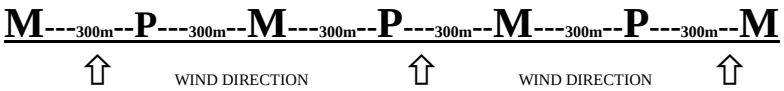
(CLASS)

(CONDITION)

SPEED (KNTS) DIR.	1-3	4-6	7-10	11-16	17-21	22-27	28-33	34-40	41-47	48-55	>55	%	MEAN WIND SPEED
N	**1.4**	**3.2**	**4.7**	**4.5**	**.8**	**.2.**	**.0**					**14.9**	**9.5**
NNE	**1.3**	**2.3**	**2.2**	**.6**	**.0**							**6.4**	**6.4**
NE	**1.9**	**2.1**	**1.6**	**.4**								**6.1**	**5.5**
ENE	**1.9**	**2.0**	**.7**	**.2**								**4.8**	**4.5**
E	**3.9**	**5.9**	**2.6**	**.3**								**12.7**	**4.9**
ESE	**1.8**	**3.4**	**1.8**	**.0**								**7.0**	**5.1**
SE	**.9**	**1.4**	**.9**	**.1**								**3.2**	**5.2**
SSE	**.5**	**.8**	**.6**	**.1**								**2.0**	**5.8**
S	**.3**	**.3**	**.4**	**.3**	**.1**	**.0**						**1.9**	**7.3**
SSW	**.2**	**.5**	**.7**	**.6**	**.1**							**2.0**	**8.7**
SW	**.1**	**.4**	**.3**	**.2**	**.0**							**1.0**	**7.5**
WSW	**.3**	**.2**	**.3**	**.2**	**.1**							**1.2**	**7.8**
W	**.5**	**.6**	**.5**	**.6**	**.5**	**.4**	**.0**					**3.2**	**11.5**
WNW	**.4**	**.5**	**.6**	**.7**	**.5**	**.3**	**.0**					**3.1**	**11.6**
NW	**.3**	**1.1**	**1.4**	**2.1**	**.9**	**.4**	**.1**	**.0**				**6.3**	**12.0**
NNW	**.4**	**1.6**	**2.9**	**5.3**	**2.1**	**1.1**	**.1**					**13.5**	**13.0**
VRBL	**.6**	**.4**	**.1**	**.0**								**1.1**	**3.9**
CALM												**9.6**	
	16.8	**27.2**	**22.2**	**16.4**	**5.1**	**.3**	**.3**	**.0**				**100.0**	**7.4**

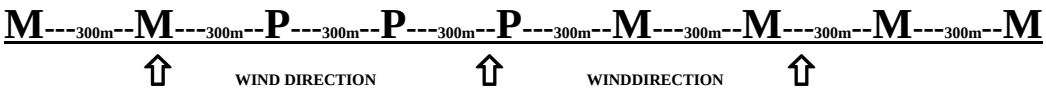
TOTAL NUMBER OF OBSERVATIONS_____

ATTACHMENT 1: SURFACE WINDS



Large Area Coverage Configuration

Key: **P** - Permanently Emplaced Generators
M - Mobile Generators
___ - Base Perimeter



Specific Area Coverage Configuration

Key: **P** - Permanently Emplaced Generators
M - Mobile Generators
___ - Base Perimeter

ATTACHMENT 2:
CONFIGURATIONS FOR THE SEMI-FIXED DEPLOYMENT OPTIONS

TRAINING PACKAGE COMMENT REPORT

RTP # _____ RTP DATE: _____

To get an *immediate response* to your questions concerning subject matter in this Readiness Training Package (RTP), call the author (listed on the front cover) or the Contingency Training Section at DSN 523-6458 between 0700-1600 (CT), Monday through Friday. Otherwise, write, fax, or E-mail the author to make comments, suggestions, or point out technical errors in the area of: references, body information, performance standards, test questions, and attachments.

NOTE: Do not use the Suggestion Program to submit corrections for printing or typographical errors.

Comments:

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