
PART TWO

CAMOUFLAGE DURING TACTICAL OPERATIONS

Chapter 4

Camouflage Techniques

Camouflage is an integral part of tactical operations. It is integrated into METT-T analyses at all echelons through terrain and weather analysis. The IPB process provides a detailed and documented terrain and weather analysis. Camouflage is a primary consideration when planning operations security and deception measures. The skillful use of all camouflage techniques is necessary if the unit is to conceal itself and survive.

4-1. Natural Conditions. The proper use of terrain and weather is a first priority when employing camouflage. Concealment provided by the terrain and by conditions of limited visibility is often enough to conceal units. The maximum use of natural conditions will minimize the amount of resources and time devoted to camouflage. The concealment properties of terrain are determined by the number and quality of natural screens, as well as terrain patterns.

a. *Terrain.*

(1) **Forests.** Forests generally provide the best type of natural screen against optical reconnaissance, especially if the crowns of the trees are wide enough to prevent aerial observation of the ground. Forests with undergrowth also hinder ground observation. Deciduous (leafing) forests are not effective during the months when trees are bare, while coniferous (evergreen) forests preserve their concealment properties all year round. Move along roads and gaps covered by tree crowns. Use shade to conceal vehicles, equipment and personnel from aerial observation. In the northern (southern) hemisphere, the northern (southern) edge of forests are shaded most of the time.

(2) **Open Terrain.** Limited visibility is an especially important concealment tool when conducting operations over open terrain. The Threat, however, will conduct reconnaissance at these times with night-surveillance devices, radars, IR sensors, and terrain illumination. When using conditions of limited visibility to cross open terrain, supplement your concealment with artificial materials and smoke.

(3) **Dead Space.** Units should never locate or move along the topographic crests of hills or along other locations where they are silhouetted against the sky. Instead, reverse slopes of hills, ravines, embankments, and other terrain features are effective screens for avoiding detection by ground-mounted sensors. The IPB concealment, terrain-factor overlays should identify areas of dead space. See FM 21-26 for more details. If the overlays are not available, use the line-of-sight

method to identify areas of dead space. Dead space for radar sensors is smaller than that of optical sensors. Determine the size of these areas by reducing the rear boundary of visual dead space by 25 percent.

b. *Limited Visibility.*

(1) **Weather.** Conditions of limited visibility (fog, rain, and snow) hamper reconnaissance by optical sensors. Dense fog is impervious to both visible and NIR radiation, making many Threat night-surveillance devices unusable. Dense fog and clouds are impenetrable to thermal sensors (IR). Rain, snow, and other types of precipitation hinder optical and radar sensors.

(2) **Smoke Operations.** Smoke is an effective tool for enhancing other camouflage techniques. Smoke and obscurants can change the dynamics of the battle by blocking or degrading the spectral bands used by Threat target-acquisition and weapons systems. Near- and midterm developments of smoke and obscurants will include the capability to degrade nonvisual sensor systems. FM 3-50 contains detailed information on planning smoke operations.

c. *Data Sources.* Commanders must be capable of evaluating natural conditions in their area to effectively direct unit concealment. They must know the terrain and weather conditions prior to mission execution. In addition to IPB terrain-factor overlays, weather reports, and topographic maps, use aerial photographs, reconnaissance, and information gathered from local inhabitants to determine the terrain's concealing properties.

4-2. Camouflage Materials. While the use of natural conditions is the first priority of camouflage, the use of artificial materials enhance camouflage efforts. Artificial materials available include pattern-painted equipment, LCSS, vegetation, expedient paints, and decoys.

a. *Pattern Paints for Equipment.* Pattern-painted vehicles blend well with the background and can hide from optical sensors better than those painted a solid, subdued color. Pattern-painted equipment enhances antidetection by reducing shape, shadow, and color signatures. Improved camouflage paints resist chemical agents and protect against detection by NIR sensors. The paint helps avoid detection by matching the reflectance levels of vegetation in the visible and NIR portions of the EM spectrum. The result is a vehicle or item of equipment that blends into the vegetation when viewed by optical or NIR sensors. While a patterned paint scheme is most effective in static positions, it also tends to disrupt aiming points on a moving target.

b. *LCSS.*

(1) **Capabilities.** The LCSS not only reduces a vehicle's visibility; it defeats radar sensors. Stainless steel fibers in the plastic garnish material absorb some of the radar signal and reflect most of the remaining signal in all directions. The result is a small percentage of signal return to the radar for detection. The radar-scattering capabilities of the LCSS are effective only if there is at least 2 feet of space between the object to be camouflaged and the LCSS and the LCSS completely covers the object. Since a radar-scattering net placed over a radar set would make the set useless, the LCSS also comes in a radar-transparent model.

(2) Characteristics. There are three different LCSS color patterns: desert, woodland, and arctic. Both sides of each type of LCSS have slightly different patterns to allow for seasonal variations. The LCSS employs modular construction, allowing the capability to cover various sizes of equipment. Appendix B discusses the required components and instructions for assembling LCSS structures for different sizes of equipment.

c. *Vegetation.* Use branches and vines as temporary concealment for vehicles, equipment, and personnel. Attach vegetation to equipment, using camouflage foliage brackets or spring clips. Use cut foliage to complete or supplement natural, growing vegetation. Also use cut foliage to augment other artificial camouflage materials, such as placing branches on LCSS to break up its outline. Take care to place green vegetation correctly. The underside of leaves present a lighter tone in photographs. Replace cut foliage often because it wilts and changes color rapidly. Table 4-1 lists the approximate periods that different types of foliage can be expected to retain their camouflage values. When selecting foliage for camouflage, consider the following:

- Coniferous vegetation, if available, is preferred because it will not wilt as rapidly as deciduous vegetation.
- Foliage cut during periods of high humidity (at night, during a rainstorm, or when there is fog or a heavy dew) will have a higher moisture content.
- Foliage with leaves that feel tough to the fingers and branches with large leaves are preferred as they stay fresher longer.
- Branches that grow in direct sunlight are tougher and will stay fresher longer.
- Branches that are free of disease and insects will not wilt as rapidly.

(1) *Living Vegetation.* Living vegetation is easily obtainable, and its color and texture make it a good blending agent. However, the foliage requires a large amount of maintenance to keep the camouflage material fresh and in good condition. If branches are not placed in their proper growing position, they may give away your position to enemy observers. As cutting large amounts of branches can also reveal the site, all cutting should be done away from the camouflaged area. As the branches wilt, they lose both their color and NIR-blending properties.

(2) *Dead Vegetation.* Use dead vegetation, such as dried grass, hay, straw, or branches, for texturing. While dead vegetation is usually readily available and requires little maintenance, it is flammable and offers little camouflage against NIR sensors.

d. *Expedient Paints.* Use earth, sand, and gravel to change or add color, to provide a coarse texture, to simulate cleared spots or blast marks, and to create shapes and shadows. Mud makes an excellent field expedient for toning down bright and shiny objects (for example, glass, bayonets, and watches). Add clay (in mud form) of various colors to crankcase oil to produce a field-expedient paint. FM 5-34 provides instructions on how to mix expedient paints.

4-3. Camouflage Discipline. Camouflage discipline, a principle of camouflage, denies the enemy indications of a unit's location or activities by avoiding any disturbance in the area's appearance. To help maintain unit viability, the unit must integrate all available camouflage means into a

cohesive plan. Camouflage discipline involves light, heat, noise, spoil, trash, and movement discipline. Successful camouflage discipline depends largely on the actions of individual soldiers. Many of these actions make the soldier's life more difficult, and a failure by only one soldier can defeat an entire unit's camouflage efforts.

Table 4-1. Retention Values of Cut Foliage

Species	Hours in Sunlight Without Water	Days in Sunlight With Water
AdlerApple	3 to 4	1 to 2
Apple	8 or more	6 or more
Ash	2 or less	Less than 1
Aspen (Poplar)	2 or less	Less than 1
Austrailian Pine***	24 to 72	8 to 16
Basswood (Linden)	5 to 7	3 to 5
Beech	5 to 7	3 to 5
Birch	3 to 4	1 to 2
Black Locust	2 or less	Less than 1
Blueberry*	8 or more	6 or more
Butternut*	2 or less	Less than 1
Cherry	3 to 4	1 to 2
Chestnut	5 to 7	3 to 5
Coconut Palm Leaves***	72 to 144	4 to 8
Elderberry	2 or less	Less than 1
Elm	3 to 4	Less than 1
Fishtail Palm Leaves***	72 to 144	4 to 8
Hawthorne	8 or more	6 or more
Hickory*	3 to 4	1 to 2
Lilac	5 to 7	6 or more
Mangrove***	12 to 24	0.5 to 1
Maple	8 or more	1 to 2
Palomaria***	72 to 144	8 to 16
Privet**	8 or more	6 or more
Screw Pine***	72 to 144	3 to 6
Sumac*	2 or less	3 to 5
Sycamore (Plane)	3 to 4	1 to 2
Walnut	2 or less	Less than 1
White Oak group	5 to 7	3 to 5
Willow	2 or less	Less than 1
Yellow Poplar (Tulip)	3 to 4	1 to 2
*North America only **Europe only *** Tropics only		