

Section 4



NAVIGATIONAL METHODS AND ROUTE PLANNING

Key Points

- 1 Land Navigation Techniques
- 2 Using OAKOC in Route Planning
- 3 The Four Steps of Route Planning

Strategy is the art of making use of time and space.
I am less concerned about the latter than the former.
Space we can recover, lost time never.

attributed to Napoleon Bonaparte

From Military-Quotes.com

Introduction

In previous lessons, you became familiar with the art of reading maps. You gained hands-on experience in topography, map symbols, and grid coordinates. You learned how to apply magnetic and grid azimuths to plot points and navigate. You understand the relationship between contour lines, contour intervals, and slope. You learned how to visualize and apply two-dimensional terrain features from a map to the actual terrain on the ground, and vice versa.

Now you will take your skills to a new level by combining and applying those skills to the art of route planning—knowing how to pick the best route to move on the battlefield quickly and efficiently in order to accomplish your mission while maintaining combat power. Success in combat will depend on your ability to effectively use the detailed information on your map and your keen sense of observation to analyze the terrain around you while on the move.

Why are these two skills so important to an Army leader in the field? Clearly one reason is to keep from getting lost. But consider also Napoleon's comment about battle strategy: space (terrain, ground, territory) you can recover; it's the crucial element of time that slips away forever. If you're going to be in the right place at the right time to defeat an enemy on the battlefield, not only must you understand your map and the terrain features around you, but you must also understand how that terrain may help or impede your movement or the enemy's movement. You must know how to visualize the shape of the land and estimate distances based on the landmarks you can see, and apply this to your two-dimensional map so that you are always sure of your position as you move along your route.

Your ability to navigate and plan routes is crucial to your success as an ROTC Cadet and an essential skill for any Army officer. In the case of the 1993 "Black Hawk Down" firefight in Mogadishu, Somalia, Soldiers found such skills could mean the difference between life and death.

Wrong Turn in Mogadishu

[Sergeant Jeff] Struecker and the rest of the column timed their departure so they wouldn't arrive out behind the Olympic Hotel before the assault had begun. They had watched the armada move out over the ocean, and left the base only after the helicopters radioed that they had turned back inland. Struecker, who was supposed to lead the convoy, took a wrong turn. He had studied the photomap back in the hangar, and thought he had it down, but once out in the city things tended to get confusing. Every street looked the same, and there were no signs to help. They were moving fast. They went northeast on Via Gesira to the K-4 circle and then north on Via Lenin to the old reviewing stand. There they would turn right on National Street, proceed east, and then turn north on a street that paralleled Hawlwadig [Road] heading toward the target house. But when Struecker took an early left and [Sergeant Danny] Mitchell's vehicle followed, the rest of the convoy didn't.

—*Hey, where the hell are you guys?* came the voice of Platoon Sergeant Bob Gallagher over the radio.

“We’re coming,” assured Struecker. “We turned wrong. We’re on our way.”

It was embarrassing. Struecker managed to steer his and Mitchell’s Humvees back through the maze of streets, and rejoined the rest of the convoy at the hotel. . . .

—*This is Uniform Six Four*, [LTC Danny] McKnight radioed up to the command bird. *I’ve got a critical casualty. I am going to send three out, with one in the cargo that has a casualty in it.*

Struecker told McKnight, “I’ll have him back there in five minutes.”

The lieutenant colonel said the rest of them would be coming along soon. The mission was almost over.

The three vehicles began racing back to base through streets now alive with gunfire and explosions. This time Struecker knew which way to go. He had mapped a return route that was simple. Several blocks over was National Street. They could follow that all the way back down to the K-4 traffic circle, and from there they would bear right back to the beach.

Except things had gotten a lot worse

Mark Bowden, *Black Hawk Down*

Land Navigation Techniques

dead reckoning

a navigation technique in which you travel a set distance (usually in meters) along a set line (usually an azimuth in degrees)

Once you’ve decided the route to take to reach your destination, you must ensure you stay on that route until you arrive. You can choose one of two navigation techniques to do so: **dead reckoning** or terrain association. You may use one or the other or a combination of both.

Dead Reckoning

Dead reckoning is the technique of traveling a set distance along a set azimuth. (“Move 500 meters on an azimuth of 225 degrees.”) Dead reckoning has two advantages. First, it’s easy to teach and to learn. Second, in most cases it will be your primary method of navigating during hours of limited visibility.

pace count

a method of measuring distance using the number of paces it takes you to walk 100 meters

Pace Count

In dead reckoning, you need to be able to accurately transfer the grid distance that you determined from your map to the ground. The only way to accurately do this without the aid of GPS technology is to use a **pace count**. Your pace count is the number of strides it takes you to traverse a known distance. Most units will create a “pace count course” by measuring off and marking one or more 100-meter courses. To determine your pace count, count the number of times your left foot strikes the ground during the length of the course. If you counted 68 paces, then your pace count is 68.

The pace course, regardless of length, must be on terrain similar to what you will actually be walking over. It's useless to walk a course on flat terrain and then try to use that pace count on hilly terrain. Likewise, you should know what your night pace count is, as your pace count will be less when traversing terrain at night. To determine your pace count on longer courses, such as a 300-meter course, count the paces it takes you to walk the 300 meters, then divide the total paces by three. The answer will give you the average number of paces it takes you to walk 100 meters. You do this because it is easier to count and keep track of a pace count of 68 while moving than to try to count and keep track of a pace count of 204 paces over 300 meters. Another reason is that it is easier to use navigational methods and techniques in increments of 100 meters rather than in increments of 200 or 300 meters. Everyone who navigates on foot needs to know his or her pace count. It's also useful to know your pace count for fractions of 100 meters, such as 25, 33, 50, 66, and 75 meters.

Since everyone's pace count is different, never rely on a friend's pace count for your paces. Shorter Soldiers will have a higher pace count than taller Soldiers, and vice versa.

You can use many methods to keep track of the distance you have traveled while using the pace count. Some of these methods include putting a pebble in your pocket every time you have walked 100 meters according to your pace count; tying knots in a string; or putting marks in a notebook. Don't try to remember the count, however. Always use a mechanical method—or design your own way to keep track.

Many conditions can affect your pace counts in the field. You must allow for them by making adjustments.

Slopes. Your pace lengthens going down a slope and shortens going upgrade. For example, if it normally takes you 120 paces to walk 100 meters, your pace count may increase to 130 or more when you walk uphill, or decrease to 90 walking downhill.

Winds. A headwind in the open shortens your pace and a tailwind in the open may increase it.

Surfaces. Sand, gravel, mud, snow, and similar surface materials tend to shorten your pace.

Elements. Falling snow, rain, and ice shorten your pace because you instinctively take shorter steps to avoid a slip.

Clothing. Excess clothing and boots with poor traction affect your pace length.

Visibility. Poor visibility, such as in fog, rain, or darkness, will shorten your pace because, again, you instinctively decrease your stride to avoid the unknown.

When you are walking along a specified magnetic azimuth across open country during daylight, never walk with the compass in the open position in front of you. Because the compass is not steady or level, it will not give an accurate reading when you hold or use it this way. Begin at the start point and face with the compass in the proper direction, then sight in on a landmark that is located on the correct azimuth you need to follow. When dead reckoning over long distances, you will be more accurate if you select a visible point on your azimuth that is as far out on the horizon as possible. This technique gives more accurate results than selecting several shorter points along the same azimuth. Close the compass and proceed to that landmark. When you get to your point, shoot your azimuth again and continue until you reach your destination. Repeat the process as many times as necessary to complete the straight-line segment (also known as the “leg”) of the route.

steering marks

landmarks located on the azimuth to be followed in dead reckoning—steering marks are commonly on or near the highest points visible along the azimuth line and you select them based on what you see on the actual terrain, not from a map study. They may be uniquely shaped trees, rocks, hilltops, posts, towers, and buildings—anything that you can easily identify

The landmarks you select for these purposes are called **steering marks**, and their selection is crucial to success in dead reckoning. When dead reckoning, you never select steering marks from your map. You select them as you move along your route. They are commonly on or near the highest points that you can see along the azimuth line that you are following. Steering marks may be uniquely shaped trees, rocks, hilltops, posts, towers, and buildings—anything you can easily identify far out on the horizon. It is important to understand that the steering mark you select must be visible while you are traversing your route. It does you no good to select a steering mark that you can see in the open but cannot see when you move into restrictive terrain. The more restrictive the terrain, the more you will need to select closer steering marks and select them more frequently.

Steering marks you select at night must have even more unusual shapes than those you select during daylight. As darkness approaches, colors disappear and objects appear as black or gray silhouettes. Instead of seeing shapes, you begin to see only the general outlines that may appear to change as you move and see the objects from slightly different angles. If possible, select a steering mark that will be silhouetted against the night sky or against urban or suburban nightscapes in the distance. As mentioned at the beginning of this section, one of the biggest advantages of dead reckoning is that it is best applied at night. This is possible, even without the aid of steering marks, because you can follow the luminous degree markings of your compass. With your military compass, dead reckoning is possible in the most pitch-black of nights.

When dead reckoning, it is important that you alternate navigating around small obstacles, such as trees or boulders, by alternately moving to the left or right of the obstacle—especially if you do not have easily observable steering marks along the length of your route. For example, if you always go left around trees in your path, then over a route of several hundred meters you will likely be off to the left of your objective. Some Soldiers prefer to intentionally go to one side or the other. This way, when they do not immediately find their objective, they at least know that the objective is probably opposite the side they favored during the movement.

For larger obstacles along your original line of march, take up a parallel route to your azimuth and return to the original line as soon as the terrain or obstacle permits.

To detour around a large obstacle or opening area, you use the box method. Turn left or right 90 degrees, adding 90 degrees to your original azimuth. Start a pace count at the turn and continue on your new azimuth until you determine that when you return to your original azimuth, your route will miss the obstacle. Remember or mark your pace count and then turn back onto your original azimuth. At this point, you will be traveling parallel to your original route and on the original azimuth. Continue to parallel your original route until you have cleared the obstacle. Turn 90 degrees toward your original route and move for the same distance as your first turn. You have successfully boxed around your obstacle and you are now back on your original azimuth. Shoot your azimuth and select a new steering mark.

When making a detour, be certain that you count as part of your overall distance only the paces you have taken toward the final destination—do not count the paces you took on your two 90-degree legs.

Terrain Association

Terrain association is movement using landmarks as guides. This technique is more forgiving of pace or azimuth mistakes you make during dead reckoning, and with practice can be far less time-consuming than dead reckoning. When navigating by terrain association, you continuously identify terrain features on the map with those on the ground while using **handrails** and **catching features**. You can become disoriented or even lost, however, if you fail to keep your map oriented in your direction of travel.

This method best suits situations that call for movement from one area to another when you are not limited to a restrictive route or axis of advance. In dead reckoning, once you make an error, you're off the track. If you forgot or did not keep track of your pace count, you must backtrack to the last known pace count and then resume your movement. If you get off your azimuth, you must also backtrack to the last known point where you were on azimuth and resume your movement. In either case, you regained the terrain, but you lost the time (remember the quote attributed to Napoleon Bonaparte at the beginning of the section).

When you make an error using terrain association, however, you can easily correct it because you are constantly comparing what you see on the map with what you actually see on the ground. You can anticipate and correct errors quickly, and you can easily make adjustments based on what you encounter. With practice, you and many of your Soldiers can learn to expertly maneuver across all types of terrain under all types of weather and light conditions without the cumbersome use of a compass—this is where the time savings mentioned earlier in the section comes in. Except when using the compass to orient the map to the terrain at the start of movement, the Soldier proficient at terrain association will rarely require his or her compass for the rest of the route. Soldiers proficient at terrain analysis will continuously compare the terrain on the map with the terrain on the ground and will always know where they are.

Think about this for a minute. You don't find your way to the student bookstore or the gym by dead reckoning your way across campus with a compass and pace count. You adjust your movements based on the familiar landmarks you see along the way. You know that you turn right when you get to the Chemistry Building, then left at the Student Center. You know that you have to take a right down the sidewalk immediately past 16th Street, but if you cross 17th Street, then you have gone too far. This is a very simplistic but relevant example of how most people terrain associate in their everyday lives. It's not that different from terrain associating in the woods with a military map. But you now are beginning to learn methods and techniques that will allow you to move more accurately by terrain association than you have ever moved before.

When you're navigating across open country using terrain association, it's also useful to take periodic compass readings to fix your position on the map using the resection technique you learned in Section 2. By doing this, you can correct your movements, call for fire, call in the location of enemy units, and so forth.

handrails

linear features like roads or highways, railroads, power transmission lines, ridgelines, or streams that run roughly parallel to your direction of travel

catching feature

a prominent feature that warns you of a direction change, located near the point where a handrail or your route changes direction—it can also be used to tell you when you've gone too far

attack points

permanent, known landmarks easily identified on the ground that you can use as final points of reference to find your destination

Using Handrails, Catching Features, and Navigational Attack Points

It can be difficult and potentially less accurate to navigate with your compass over long distances using dead reckoning alone. But you can often get assistance from the terrain around you—it can provide you with handrails, catching features, and navigational **attack points**.

Handrails are linear features like roads or highways, railroads, power transmission lines, ridgelines, or streams that run roughly parallel to your direction of travel. Instead of using precision compass work, you can do less precise compass work without the use of steering marks for as long as the feature travels with you on your right or left. It acts as a handrail to guide the way. To prevent becoming disoriented or lost, however—or if you must quickly know your exact grid location—you still must keep an accurate pace count. Knowing that you are to the left of the stream you are handrailing is one thing. Knowing your eight-digit grid coordinate for where you are located along your handrail is another matter altogether. This illustrates well why you must know your precise starting location before beginning your navigation using terrain association.

When you do reach the point where either your route or the handrail changes direction, however, you must know that it's time to go your separate ways. So you select a prominent feature near this point to provide you this warning. This is called a *catching feature*. You can also use catching features to tell you when you have gone too far. Before continuing on to a change of azimuth or direction, it is important to accurately know your location and plot your location at the start of your next leg, route, or azimuth. Sometimes it may be easier to do this where your route intersects the handrail because many times you can identify this location on your map.

For instance, at the point at which you wish to change direction, or at which your stream changes direction, the stream that you have been handrailing may be very close to another stream, trail, or other easily identifiable terrain feature. Rather than continue and estimate where you are on the map, you can quickly and easily move to the intersection or identifiable terrain feature and begin the next leg of your route. Or, you can simply estimate your distance from the handrail or catching feature, plot it on your map, and continue your movement. Either way is a lot faster than trying to do a resection or modified resection and does not require you to stop your movement to locate your position.

The catching feature may also be your *navigational attack point*. This is the point where your area navigation stops and your point navigation begins. From this easily identifiable attack point, you can continue your movement, but in a more precise and cautious manner along a given azimuth for a specified distance toward your final destination. The navigational attack point you choose is important, because it will be your last easily identifiable point before your objective. Therefore, you should try to select an attack point no farther than 500 meters from your objective.

You have probably used an attack point and never realized it. Can you recall a time when you were given directions to a place you had never been before, like directions to a sporting event, to a store in another part of town, or to a new friend's house for a birthday party? “*When you reach the intersection of King William Avenue and Bellwood Street, take a left onto Bellwood Street, and continue two miles to the first driveway on your left.*” Well, if you know where either King William Avenue or Bellwood Street is, then you really don't need a map or compass to get you to the intersection or the birthday party. You drive to the intersection (your attack point), and from there you use your odometer to keep track of when you have driven two miles (pace count) and you arrive quickly and safely at the correct driveway. As you can see, you are already familiar with many aspects of terrain association; you simply need to expand and apply your knowledge to a military setting.

Critical Thinking

Think about a time when you were lost on campus, in town, or in a city you didn't know. How did you find your way to a familiar place? How would you do so if you got lost now?

Disadvantages of Terrain Association

For all its advantages, however, terrain association has some potentially serious disadvantages, too. The main disadvantage is that you have to be skilled at map reading and analyzing the terrain and features around you. It's harder to master and retain the skills you need for terrain association than it is to learn those you need for dead reckoning. Mastering terrain association takes lots of practice in varied terrain, light, and weather conditions. You must be able to recognize terrain and other features, determine and estimate direction and distances, and quickly figure out where you are. The other potential disadvantage is that you may not always travel exactly along your planned azimuth. One technique to minimize this disadvantage is to always mark your azimuth on your map and always terrain associate as close to your actual azimuth as possible. In addition, always know how many meters you are to the left or right of your actual azimuth.

Using OAKOC in Route Planning

In Section 3, you learned how to analyze terrain, weather, and light using the acronym OAKOC. Here, you will learn how to analyze your area of operation using OAKOC to help you select the best route to achieve your mission. Because you must always consider how the elements of OAKOC apply to both you and the enemy, analyzing terrain with OAKOC can be time-consuming. Taking the time to do so, however, could save both time and lives.

Observation and Fields of Fire. Identify the areas where the enemy can observe you or place fires onto you. Plan routes that avoid these areas. Identify catching features that will signal when you are approaching these areas, so you do not stray into them. If you must enter or cross areas where the enemy has good observations and fields of fire, then at least you know where they are and you can plan to treat them as danger areas and rehearse crossing them.

Avenues of Approach. If you have properly analyzed the observation and fields of fire, cover and concealment, obstacles, and key terrain, it will be easy to see your choices for avenues of approach. After you mark all of those areas that provide the enemy good observation and fields of fire, you mark those areas that have vegetation or terrain that affords you cover and concealment. Then, you mark those obstacles that impede your movement, as well as those obstacles that will provide you flank protection from enemy attacks. Take care as well to avoid natural lines of drift—the paths of least resistance that people and animals naturally take through difficult terrain.

Terrain Analysis:
OAKOC
 Observation and
 Fields of Fire
 Avenues of Approach
 Key and Decisive Terrain
 Obstacles
 Cover and Concealment

Finally, you mark the terrain that benefits the enemy and the terrain that would benefit your maneuver. What you are left with is a reduced and well-defined number of avenues of approach through your area of operation that you could select as routes. Some avenues of approach may be too large and open for consideration. Others may be too narrow or confined for the size of your unit. After considering how the enemy may use one or more of the avenues of approach, you select a primary and alternate route for your use.

Key and Decisive Terrain. Key terrain is any terrain in your area of operation that provides a marked advantage for whoever controls it. When route planning, you must analyze the terrain that the enemy would consider key to defending—and then plan your route away from it or around it, to avoid enemy observation and fields of fire. For you, key terrain may be the only terrain in the area that allows you to move while covered and concealed, such as a drainage ditch on the outskirts of a town held by the enemy. Key terrain could also be a hill or tall building that, if occupied by the enemy, could prevent you from moving undetected. Although not directly on your route, you could control the high ground by placing indirect fires on it just long enough to maneuver past it. In this way, you have controlled the key terrain by denying the enemy its use without placing a single Soldier on or near the key terrain.

Obstacles. When route planning, you must use your map to identify those existing obstacles (natural or man-made obstacles depicted on your map) that will hinder your movement. Plan your route around such obstacles. In addition to existing obstacles, you must also predict where the enemy may emplace reinforcing obstacles (either independently or tied into existing obstacles) to disrupt, turn, fix, or block your maneuver. When you are route planning, it is also important to identify those known existing or reinforcing obstacles that will protect your movement and to select your route to take advantage of such protective obstacles. Selecting a route that puts a ravine between you and the enemy will protect your flank as you move—the ravine is a blocking obstacle for the enemy. Selecting an infiltration lane through a bamboo grove is an example of using an existing obstacle (the bamboo grove) to protect your movement from enemy observation or attacks.

Cover and Concealment. Identify the type of vegetation in your area of operation. Select routes through denser vegetation to conceal your movement from the ground and from the air, or through areas with larger trees to provide cover from direct or indirect fire. Look for terrain—such as draws, cuts, or depressions—that masks your movement from known or suspected enemy locations.

Using Terrain Association

Terrain association is currently the most widely used method of navigating large or multiple units over large areas or over large distances. Planners analyze terrain and select axes of advance, or routes, that offer the best freedom of maneuver while supporting the characteristics of the offense. Prior to movement, leaders and Soldiers familiarize themselves with major terrain features, roads, buildings, and other easily identifiable characteristics along the route. Doing so allows leaders and Soldiers to quickly identify handrails or catching features while on the move. This allows them to maintain speed and tempo on the offense.

Moving by terrain association allows units to get from Point A to Point B as quickly as possible with the least amount of pause to check azimuths or grids, and without becoming overly concerned about pace counts or distance. When using terrain analysis on the offense, planners select easily identifiable objectives and limits of advances so that units do not pass by or overshoot their objectives. In terrain association, the details of how and where you maneuvered to get to the objective are not as important as simply arriving at the right objective on time. Once moving along his or her route, it is not uncommon for a leader to adjust the unit's route using the following guidelines:

Consider Tactical Aspects. Select terrain as you move that offers good overwatch positions and concealed routes.

Consider Ease of Movement. Use the easiest possible route and bypass difficult terrain. Remember that a difficult route is harder to follow, is noisier, causes more wear and tear (and possible recovery problems), and takes more time. You achieve tactical surprise by doing the unexpected. Try to select an axis or corridor instead of a specific route. Make sure your vehicles have enough maneuvering room.

Use Terrain Features as Checkpoints. You must be able to easily recognize these checkpoints in the light and weather conditions during your move and at the speed at which you will travel. You should be able to find a terrain feature from your location that you can recognize from almost anywhere and use as a guide—such as a uniquely shaped building or a major intersection. Consider using overhead power lines, but remember that in a combat zone there is no guarantee that the power lines will still be where the map indicates they are. Use streams, rivers, paved roads, ridges, valleys, and railroads, as well. The next best checkpoints are elevation changes, such as hills, depressions, spurs, and draws. When maneuvering through relatively flat terrain, look for terrain features that have two or more contour lines of change, since you won't be able to spot fewer than two lines of change while in a vehicle.

Follow Terrain Features. Consider naming checkpoints at the start or end of easily identifiable terrain features. Handrail from terrain feature to terrain feature and call in your checkpoints as you reach them.

Determine Directions. Break down your axis of advance or avenue of approach into smaller routes or segments (legs) and determine the rough directions that you'll need to follow for each leg. You won't need to shoot exact azimuths with your compass so long as the terrain features keep you on your main direction of travel towards your objective. For example, if your route requires an azimuth of 83 degrees, you can generally move east and navigate by terrain association. Before moving, identify those terrain features that you can identify at a distance along your desired azimuth and use those terrain features as a point of reference as you move along your route. Check your general azimuth and pick up the next set of terrain features each time you reach a checkpoint or cross a major terrain feature, such as a street or stream.

Determine Distance. Obtain the total distance you need to travel and the approximate distance between checkpoints or the length of each section or leg of your route. If you're in a vehicle, use your vehicle's odometer to keep track of distance traveled. On foot, use the pace-count method and keep a record of the distance you have traveled. It is best to use terrain features that are perpendicular to your direction of travel as the start and ending points for your distances.

Make Notes. Mental notes are usually adequate. One of the reasons it is important for all Soldiers to know and study the route ahead of time is so that everyone has the opportunity to imagine what the route looks like and commit it to memory. Leaders and Soldiers can visualize, make notes, or memorize the key terrain, direction, and distance of each leg. Knowing this before moving will help prevent Soldiers and units from getting lost.

Plan to Avoid Errors. Study the route you've selected. Try to determine where you're most likely to make mistakes and how to avoid any trouble. Consider naming as checkpoints those areas that may cause problems.

Use a Logbook. When you've selected the routes and divided into segments the distance you'll be traveling, prepare a logbook. The logbook is an informal record of the distance and azimuth of each leg, with notes to aid you and your Soldiers in following the correct route. Your notes should list easily identifiable terrain features at or near the point where your direction of movement changes. Ensure that this information is passed down through the chain of command and reaches every Soldier.

Some situations involving travel in a vehicle may call for you to combine and use both dead reckoning and terrain association. Just remember the characteristics of each. Terrain association is fast, tolerates more errors, and is best under most circumstances. You can use it day or night if you are proficient at it. Dead reckoning is very accurate—if you do everything correctly. You must be very precise. It is slow and will work on all terrain, but it works best on open or flat terrain, and at night.

That said, you will frequently combine both. For example, you may use dead reckoning to travel across a large, flat area to a ridge, and then use terrain association for the rest of the move.

You must be able to use both methods. Experience shows that the most probable errors, in this order, will be:

- failing to determine the distance(s) to be traveled
- failing to travel the proper distance
- failing to properly plot or locate the objective
- failing to select easily recognized checkpoints or landmarks
- failing to consider ease of movement.

A lost or late-arriving unit—or a tired unit tasked with an unnecessarily difficult move—does not contribute to a mission's success. On the other hand, units that move too quickly and carelessly into destructive ambushes or that leave themselves open to air strikes also don't contribute to a mission's success. You should carefully plan and study each time you need to select a movement route, recognizing that time, as well as distance, influences travel.

Critical Thinking

In planning a route, how important is it that you know where the enemy is? What if you're not sure where the enemy is? What if you're sure that the enemy will be able to observe you as you move?

The Four Steps of Route Planning

To be an effective route planner you must:

1. Plot all points and determine all azimuths accurately
 - a. Be familiar with 1:25,000 and 1:50,000 scale maps
 - b. Understand how to use your protractor (GTA 5-2-12)
 - c. Use a 0.5 mm mechanical pencil
2. Determine attack points, and consider the road intersections and checkpoints
3. Determine azimuths from attack points to plot points—determine the grid azimuth first and then convert grid to magnetic
4. Plan your route: How will you get to your various attack points and in what order? Become familiar with how long it takes you to go certain distances and remember not to move faster than you can navigate.



CONCLUSION

Skillful leaders know the importance of terrain, weather, and light to friendly operations. They also understand how these same factors affect the enemy's ability to fight. The success of your mission is closely linked to how much attention you give to terrain analysis and the reconnaissance aspects of the troop leading procedures.

Making good use of the information on your map and what you can see on the ground around you increases your chances for success in navigation. Once you have repeatedly practiced the skills of identifying and discriminating among the many types of terrain and other features, you'll recognize how valuable these features can be. You will eventually become proficient in visualizing the actual shape of the land by studying the map and estimating contours, terrain features, and distances. You'll choose good routes and arrive at your objectives on time.

Key Words

dead reckoning

pace count

steering marks

handrails

catching feature

attack points

Learning Assessment

1. Explain navigation by dead reckoning and by terrain association.
2. Explain the advantages and disadvantages of navigating by terrain association.
3. Define handrails, catching features, and navigational attack points.
4. List the four steps in route planning.

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