Orienteering Made Easy

INTERMEDIATE (Flat Terrain)

Pace Counting

- Used to know exactly how far you have traveled.
- Used to draw very accurate maps in the field during the search.

SAR personnel should not depend solely on electronic devices for orienteering or pinpointing their location within their search area. These devices can fail and you should have an awareness of where and how far you have traveled. Mastering skills using your compass, pace counting, and map drawing will help you know where you are in case of electronic failure.

Distance Conversions

1 yard = 3 feet 1 yard = .91 meters 100 yards = 91.44 meters ** This is the length of a football field. Most people can visualize a football field which helps when visualizing distance in the search area. This will be made clearer later in the lesson.

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1,000 yards = 10 football fields = 914 meters
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1,000 meters = a "click"
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** A grid reader, used in mapping, is measured in 1,000 meters X 1,000 meters . Furthermore each 1000 meters is broken into 10 segments representing 100 meters.

Commonly in SAR missions, distances are given in meters.

We will now put all this together learning to "Pace Count".

Pace Counting

- Measure a distance of 100 meters or 328 feet.
- Place a flag at the beginning and the end point.
- Try and do this on the same type terrain in which you usually search.
- Your walking pace should closely simulate the way you would normally walk; don't over exaggerate or cut your paces short.

Pace Counting

- Put your left or right foot beside the flag and start walking. Count each time that foot hits the ground.
- Continue to count your paces until you get to the ending flag.
- □ This should be repeated for at least 3 repetitions.
- Take the average of the pace counts.
- This is your pace count, in this type terrain , for a distance of 100 meters. (This is about a football field)

Long legged big striding walkers could have a pace count as low as 60 paces.

Short legged short striding walkers could have a pace count as high as 85 paces.

Compass Review

- You should be able to solve basic orienteering problems.
- If given a point to walk towards you should be able to figure out the azimuth.
- If given an azimuth you should be able to point in the direction you should walk.
- You should now be able to add in your pace count as you travel and this will give you the distance between points.

Map Drawing And Knowing Where You Are In Your Sector

- This lesson is to teach you how to draw maps and know where you are without electronic devices.
- It is possible that you could respond to a search and there are no maps available to you.
- All you know is where base camp is and you are pointed to the sector you are to search.
- You need to search that area and be able to produce a very accurate map when you return to base camp.

Search Area









Search Area





This is a 100 acre site and too large to search the whole site with one dog due to the high temperatures. This roadway is a good boundary to use to segment the site. Take your azimuth reading. This is your direction of travel for the first leg of your search. For purposes of training ,we will assume the wind is coming from right to left.

Map Drawing

- You will have to draw your assigned sector map as you go because you have only a visual of the area you are to search.
- When you are actually searching, you will determine how far you will travel on each leg of the search due to terrain features and what is presented to you during the search.
- As long as you can draw an accurate map, you will be able to articulate exactly what area your search team covered when you return to base camp and debrief with incident command.

Map Drawing

DON'T PANIC

You have already learned the tools that you will use to keep yourself and the canine team on track to accurately cover your search sector.

 You will combine your compass skills along with pace counting to draw the search map as you move through the search sector.

For training purposes for this lesson, we will assume that no area maps will be given to you and you will draw your maps as you move through your search sector.

Creating the Search Map (Either print or copy this slide to help with the rest of the lesson)



- For training purposes, let us assume your pace count is 80 paces/100 meters.
- Let us also assume that, due to terrain and weather conditions, you decide that you will grid your sector in 200 meter lengths.
- Remembering from the pictures of your search area, you will be shooting an azimuth down the gravel road and will be working the sector to the right because the winds are blowing right to left.

□ Legs 2, 4, 6 & 8

- The length of these legs are determined by how well the canine is ranging and covering ground. If the canine ranges close in, then the leg will be much shorter than for a far ranging canine.
- The leg length can also change during the search if the canine becomes tired and doesn't range as far.
- □ Legs 1, 3, 5, 7& 9
 - The length of these legs will be 200 meters and will always be parallel to each other. This assures you that the whole area has been searched and you are not leaving out any areas.

■ Leg 1

- This is the gravel road and, when you shoot your azimuth, you come up with 0 degrees which is north.
- Spot an object in the distance to walk towards.
- You and the dog team begin the search with you as navigator keeping yourself on the proper azimuth while the dog team works ahead of you.
- Start your pace counting and go 160 paces which equals 200 meters.
- You have now drawn the first leg of your map.

- Leg 2
 - After running Leg 1, you determine the canine is ranging well and you have a moderate wind. The handler decides to move over a distance of 50 meters before begining the third leg.
 - This means the handler has decided to make 50 meter sweeps through the search area.
 - When you pace count this leg, you will go 40 paces which equals 50 meters. This leg has an azimuth of 90 degrees.
 - When beginning Leg 3, you need to now turn and travel the exact opposite of the first leg which means you will be traveling south (180 degrees) for another 200 meters.

- The previous slide describes the pattern of pacing, turning and pacing again which shows how you would progress through the search area while drawing a very accurate map.
- Looking at the map drawing, you will notice that it is laid out in parallel lines and all the turns are 90 degree turns.
- This type of pattern gridding assures that no areas are missed due to drifting while walking.
- The navigator stays dead on course and is used as a guide to the canine team to make sure everything is searched.

Dealing With 90 Degree And 180 Degree Turns

- Referring back to the map previously shown, you can see that all turns are 90 degrees and all grid lines are parallel to each other.
- Remembering that a circle is 360 degrees, it is composed of:
 - Four 90 degree turns
 - Two 180 degree turns

So Legs 1, 3, 5, 7 and 9 are 180 degrees different from each other. And Legs 2, 4, 6 and 8 are 90 degrees different from 1, 3, 5, 7 and 9.

Using A Compass For Navigation

This lesson will cover two different methods of keeping track of the azimuth readings that need to be recorded on your map as you move through the search sector. The first method requires that you do math calculations in the field. The second is another method that can achieve the same thing without having to do math calculations in the field.

Have your compass available to refer to. It will make the following information a lot easier to understand.

Method One

No matter what the azimuth is, it is read here. The back-azimuth is PLUS or MINUS 180 degrees and is directly opposite the azimuth.

If you make a left turn within this azimuth range then you would Subtract the degrees. If you make a right turn within this azimuth range then you would Add the degrees.

Back-Azimuth

Dealing With 90 Degree And 180 Degree Turns

- □ This can be practiced anywhere, even inside.
- Pick any azimuth from 0 to 50 degrees and dial it up on your compass.
- Turn your body to line up with an object in your azimuth path.
- Raise your arms straight out to your sides.
 These point in the direction you would walk if you made a 90 degree turn left or right.

Dealing With 90 Degree And 180 Degree Turns

- For training purposes, let us say you are walking on an azimuth reading of 40 degrees. Dial that up and face in that direction.
- If you needed to make a 90 degree turn to your right, then you would ADD 90 to 40 and come up with an azimuth reading of 130 degrees.
- If you needed to make a 90 degree turn to your left, then you would SUBTRACT 90 from 40 and come up with an azimuth reading of 310 degrees.
- *Remember there are 360 degrees in a circle.*

Returning To Our Assigned Search Sector

- Have your map from slide number 12 for reference.
- Remember that our search sector will take us down the path of the gravel road traveling on a 0 degree azimuth.
- Our map indicates that we will make a 90 degree turn to the right to begin Leg 2.
- Since you will be turning to the right within a 180 degree circumference, you will add 90 degrees to 0 degrees.

- Turn the dial so that you have dialed up a 90 degree azimuth.
- Turn your body and sight an object to walk toward.
- Remember we are making 50 meter sweeps which equals 40 paces for our pace count. (refer to slide #14)
- Once you have paced 50 meters, you now need to make a 90 degree turn to the right to start Leg #3.

- To begin Leg #3, you would again add 90 degrees to your last azimuth reading of 90 degrees.
- Notice that this now gives you an azimuth reading of 180 degrees.
- This is the BACK-AZIMUTH from Leg #1. This is 180 degrees opposite from Leg #1. This allows you to make an exact parallel sweep along Leg #1.

- To begin Leg #4 you will have to make a 90 degree turn to the left.
- You will have 180 degrees showing as your azimuth reading for the last leg that you traveled. This also means that 0 or 360 degrees is your back-azimuth.
- If you are turning left, then you will now subtract 90 degrees from 180 degrees.
- The new azimuth you will travel will now be 90 degrees.

- You would continue to follow the same pattern until you have covered the whole sector.
- You would also continue to pace count and mark your map as you move through the sector.
- It is very important to continually create/draw the map as you search because terrain is not always going to be flat and uniform.
- Sweep distances and leg lengths will change depending on what you come across in the field.

Navigating Through The Sector Using Method Two



- The sighting compass used in this module is ideal for Method Two.
- There won't be any math calculations necessary for this lesson.
- The azimuth bevel on the compass will always remain in the original position.

Remember that we are moving down the road on an azimuth reading of 0/360 degrees.
 The length of the Leg #1 will be 160 paces which equals 200 meters. (refer to slide # 13)





- To begin Leg #2, you would turn to the right 90 degrees.
- Hold the compass at waist level and begin to turn to the right until the red needle is pointing at a 90 degree angle from where it started. As you turn to the right, the needle moves to the left. Walk 40 paces to move over 50 meters.





- To begin Leg #3, you would again turn 90 degrees to the right.
- As you make the turn, you will notice the red needle still moves to the left.
- 90 more degrees now puts the white needle within the red lines.



- Hold the compass at eye level with arm extended and sight an object.
- Walk 160 paces which moves you 200 meters along Leg #3.
- Notice that you are walking the back-azimuth or 180 degrees opposite the beginning Leg #1.
- You started out with your compass dialed up to a 0/360 degree azimuth and you had the red arrow in the red lines.
- For Leg #3, you now have the white arrow within the red lines.

- To begin Leg #4 you need to turn to the left 90 degrees.
- As you turn to the left, the red needle moves to the right.
- Once you have turned 90 degrees, begin to pace count 40 paces or 50 meters.
- You have now finished Leg #4 and are ready to begin Leg #5.

- To begin Leg #5, you will need to make a 90 degree turn to the left.
- As you turn your body, you will notice that the red arrow will now end up back inside the red lines.
- Refer to your map and you will realize that Legs 1, 5 and 9 are all moving in the direction of North or an azimuth of 0/360 degrees.
- Refer to your map and you will realize that Legs 3 and 7 are a back-azimuth of Legs 1, 5 and 9.

Conclusion

- There is more to orienteering and map drawing than what is covered in this lesson.
- Become very comfortable using your compass and pace counting while drawing a map before moving to the advanced lesson.
- Remember in a "real search" situation, you may very well be the only back-up for the canine team and must handle communications, orienteering, map drawing and should be able to help watch the canine work.
- This may sound impossible to do but, with practice during training, you will master the skills needed.

Authors Notes And Ideas

- I started searching in the early 90's when there were no GPSs and you certainly were never given any maps. The skills we all developed then are great skills new handlers should develop in case of electronic malfunction.
- Maps drawn in the field as you move through the search sector need to be accurate so that you can brief Incident Command as to what you have searched.
- You may edit your map several times as you discover terrain features that occur in your sector. (This will be made clear later)

Authors Notes And Ideas

- Afternoon showers are very common in the south. Therefore using a water repellent tablet is helpful when drawing maps.
- The scuba diving shops have very good options. I personally choose the tablets that are two sided and they have about 6 sheets. A pencil comes attached.
- This allows you to draw 12 different maps so editing your map is easy.
- The tablets can be cleaned with household sink cleaner allowing you to start with clean sheets for the next day's searches.

Authors Notes And Ideas

- □ There is no absolute set way to draw your maps.
- The important thing is: You need to be able to create an accurate accounting of where your team searched for the final documents given to Incident Command (IC).
- Figure out what works for you and get very comfortable with it.
- I will show you what I have come up with and what has worked for me over the years. Even though, these days, I do usually receive a topo map, I still draw my own map.

- You have to start somewhere and build the map as you go. I use a sighting compass so I do not change the azimuth reading once I start.
- I usually mark the top of my tablet as North and begin with a blank square drawn on the tablet.
- □ I use a dash (-) for each 100 meters that I walk.
- I write down pace counts and convert them to meters later.
- Always put the date, time search started, time search ended. I don't care about break times.



Finished search map: This will be explained in progressing steps.

Write down the original compass heading. Start pace counting and make a mark each 100 meters. Notice as I move through the sector, I start to run out of map room. No problem; just put tick marks closer together. You can adjust on the next leg you walk. BUT the map shows that you walked 600 meters for the first leg of the search.



The canine handler decides how far over they want to move according to how the dog is searching. I write down the pace count . Later I will convert to meters.

100 meter marks are now more spaced out since I know we are traveling 600 meter legs.

At about 560 meters we hit a swamp area that was too dangerous to search. Mark it on the map and move on.

This "20" means that as we were walking the next 100 meters we stopped to talk or rest the dog. If I am going to start chatting, then I write down the pace count so I don't have to remember it and I can start counting again when we resume the search pattern.

Canine handler moved over 50 paces.

Swamp

SO

wam

50

Dog is getting hot and not ranging as far so handler is cutting the sweeps more narrow to make sure the whole sector is covered.

Notice the 100 meter marks have changed position due to the fact that we are not searching the swamp area.



The map shows that we did chose to traverse through the swamp area at this point.



The last sweep we made was 25 paces wide. We moved 600 meters and then stopped.

> Make a very conservative estimate on the area the dog actually covered in the easterly direction of the last sweep.

What Do We Tell Incident Command ?

- □ IC already knows your assigned sector.
- We would tell them that we were moving 600 meters deep into the sector.
- We would also tell them that the sector we covered was about 250 meters wide.
- When we show them what we covered, we would make sure to show them what part of the swamp area that we never searched.



Search Area What If We Find The Victim?

- An accurately drawn map will help tremendously if your GPS goes out.
- You will be able to direct rescue very close to your position.
- When they get close, you can blow your whistle or shout to bring them right to your location.

What If We Find The Victim?



Find victim on the fourth sweep through the sector.

How do you call this in? IC knows where we started searching because we called in our location as we began our search. Our call name has been assigned the same as the canine working which is canine Tracer.

This is Team "Tracer" checking in to report a find. Victim ok but need light transport. Our location is: Start at the south-west corner of our sector. Go due east 130 meters. Go due north 375 meters.

What If We Find The Victim?

- If you have a GPS, then you can give IC your exact coordinates.
- In the case of electronic failure, you have given IC a really close proximity to where you actually are.
- IC can look at the working map and find your location on that map.
- IC may choose to access your location differently than the way you explained but the point is: They know right where you are within a reasonable distance.