MAGNETIC DECLINATION CALCULATIONS

Going on a search and wish to correct your compass for today’s magnetic declination.

Magnetic declination, sometimes called magnetic variation, is the angle between magnetic north and true north. Declination is considered positive east of true north and negative when west.

As illustrated in the graph to the left, magnetic declination changes over time and with location.

West Declination
Subtract from compass reading to determine true azimuth.

East Declination
Add to compass reading to determine true azimuth.

LINES OF MAGNETIC DECLINATION FOR NORTH AMERICA 1990

COPYRIGHT 2007, ED GELB. ALL RIGHTS RESERVED
Ok, here is the procedure:

STEP ONE .. Go to:  http://www.ngdc.noaa.gov/seg/geomag/jsp/Declination.jsp and look up the latitude and longitude of the search area by entering the Zip Code. For example the latitude and longitude of my town in Wayne, NJ 07470 is: Wayne    NJ    07470    40.947112 Latitude    74.246565 Longitude

STEP THREE .. Compute the Magnetic Declination

The Answer was: Year: 2007 08 14
Declination = 13° 4' W changing by 0° 1' E/year

This is the tricky part. If you visualize North it is also 0° degrees. So you will turn the compass housing 13° 4' toward the West to compensate for the magnetic declination which is really adding 13° to the compass reading.

Ok, you forgot to do this ahead of time and you are out in the field. There is a great method to find the declination wherever you are. This method also corrects for local conditions.

Determine by map inspection the grid azimuth to a known visible distant point.
2) Sign on that distant point with the compass and note the magnetic azimuth. You do this by turning the compass housing so that it is aligned with the needle. Now read the number from the housing where it meets the directional arrow on your compass.
3) Compare the two azimuths. The difference is the declination.

The Reported Change in Declination is NOT A CONSTANT

Ok, we know that the magnetic variation changes each year. Unfortunately this variation is not linear from year to year. This means that if the variation is reported as changing 0° 1' E/year this does not mean that you can assume that this compensation holds from year to year as a direct proportion.

Let take Scottsdale, AZ .. In 2007 the magnetic variation was 11° 19' East with a change of 0° 6' W/year but in 1933 on the same day the magnetic variation is 14° 32' East with a change of 0° 0' E/year. As you can see if the change was linear the difference according to the change would be greater than the actual difference of 3° 13' West.

My point is that members should ALWAYS look at the map to determine the year and magnetic variation at time the map was printed.

Imagine if you are using a map printed in 1933 for Scottsdale, AZ and you did not use the correct variation and were heading to a point on the compass some many miles away.
I read somewhere that if the Grid North is incorrect by 5° and you walk on a bearing without first compensating for this inaccuracy, in one mile you will be almost 500 feet away from your intended target.

Usually we are walking more than one mile so this is a big problem.