

Measuring the Orientation of Rock Beds

Rock beds may be horizontal when deposited, but they are often tilted over time.

The degree to which a bed is tilted (the angle from the horizontal) is referred to as its dip.

The direction of the dip, its compass heading, is hard to measure since most compass needles cannot rotate unless the compass is held horizontal. So, what geologists measure is the direction perpendicular to the dip direction. This is called the strike.

The Brunton compass can measure both dip and strike.

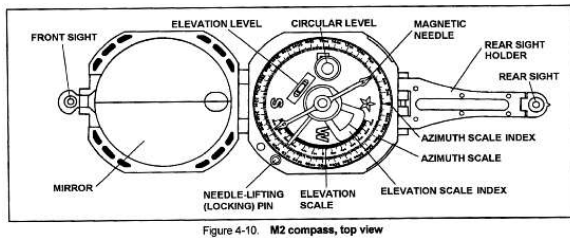
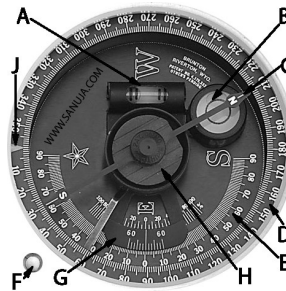


Figure 4-10. M2 compass, top view



It has a standard compass needle that points to magnetic north.

The white tip of the needle points to the direction that the rear site is pointing.

It also has a clinometer scale that can measure what angle the compass is tilted to when it is on its side.

Strike

Begin by taking the strike of a bedding plane. For these measurements we will use a Brunton compass like the one you see in the pictures above. In order to measure the strike, place the bottom of the side edge of the compass against the plane of the outcrop. Sometimes it is easier to put your field book against the outcrop and then the compass against the book to get a smoother and/or a larger surface. Now, rotate the compass keeping the lower side edge of the compass fixed, until the bulls-eye level bubble (B) is centered (the round tube; not the long narrow one). When the bubble is centered, the compass is horizontal against the plane and parallel to the line of strike. Now, with the bulls-eye bubble centered, record the number that either end of the compass needle (C) is showing on the compass direction scale (D).

Dip

The dip is perpendicular (90°) to the strike. However, one must note which direction it is dipping. If the strike is northeast/southwest, the rock can be dipping down either to the southeast or the northwest. You need to record which it is.

To measure the dip of the bedding plane, take your compass and put the flat side against the rock so that it points directly down the slope. Move the clinometer (G) using the lever at the back of the compass until the clinometer level bubble (A) is centered. Read the dip from the clinometer scale (E).

Record the orientation as a strike followed by a dip, such as $045^\circ/20^\circ$ SE. This reading indicates that the strike is at an orientation of 45° from north, and the dip is 20° from horizontal going down to the SE (135°) as opposed to NW. The general direction of the dip is given in the nearest standard compass direction.

Read this article on the use of a Brunton compass.

http://web.mit.edu/12.114/03_fall/www/lectures/compass.htm

The best way to think about the strike of a surface is as one of the contour lines for that surface.

On a geological map, a strike and dip measurement is indicated by the following symbol which is aligned to the map grid.



The long line indicates the strike direction while the short line gives the compass direction of the dip. The number is the dip angle below the horizontal. In the above case, if north is to the top of the page, then the rock layer is dipping down towards the south east. We would give a strike direction of either north east or south west. The slope of the surface would be 25° below horizontal.

1) Which measurement does this picture of a Brunton compass represent?

- a) Dip b) Strike



2) Which measurement does this picture of a Brunton compass represent?

- a) Dip b) Strike c) It can't be either



3) If a strike is measured as 235° , what are the two possible dip directions?