

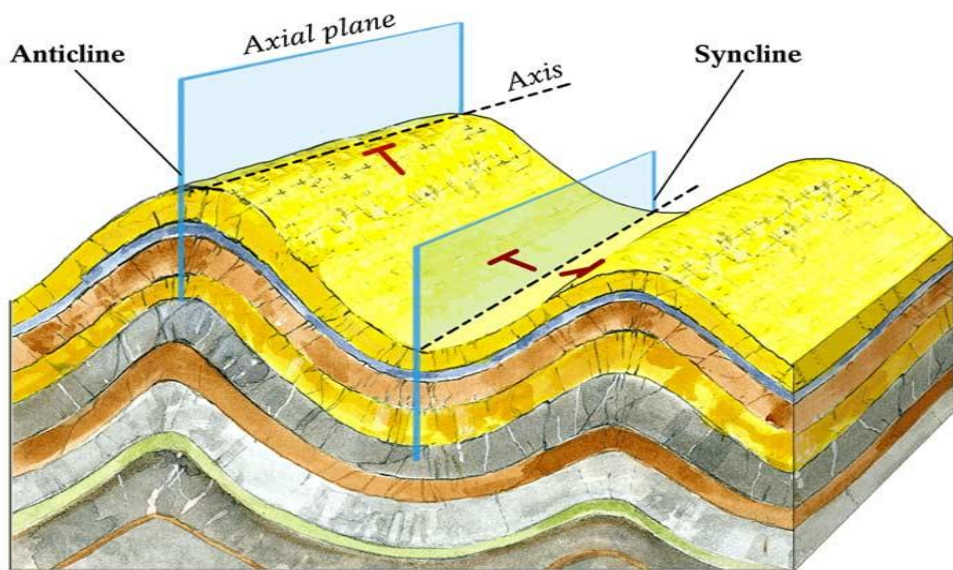


## Attitude of the Geological Structures

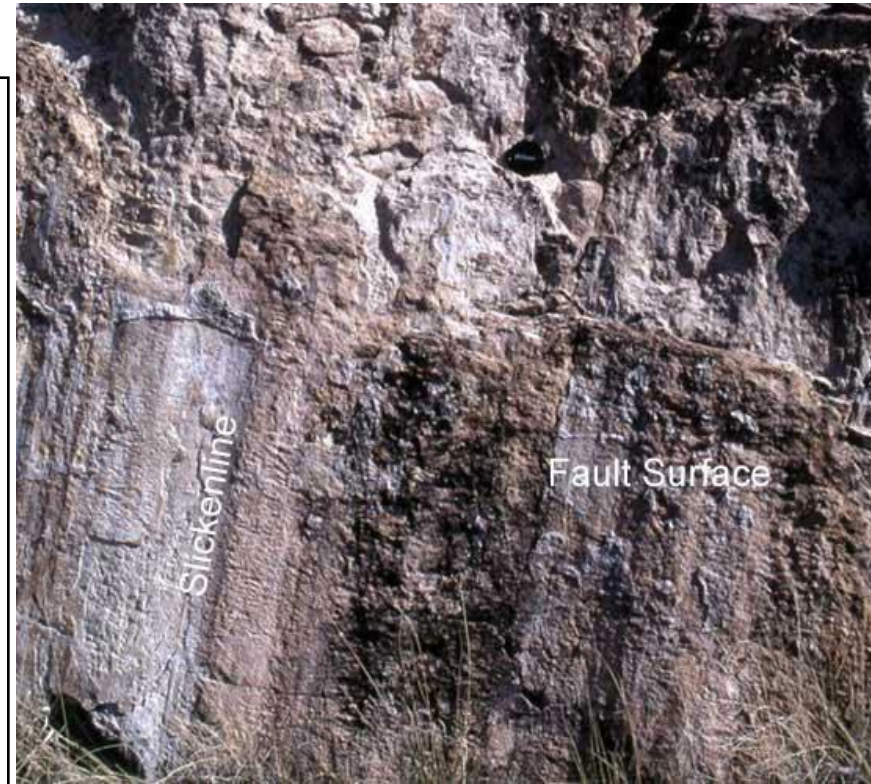
Attitude of the geological structures includes orientation linear structures and attitude planar structures.

### Linear structure

resembles a geometric shape of line. (e.g. hinge line of fold, striation on fault).



1 Folded rocks before erosion

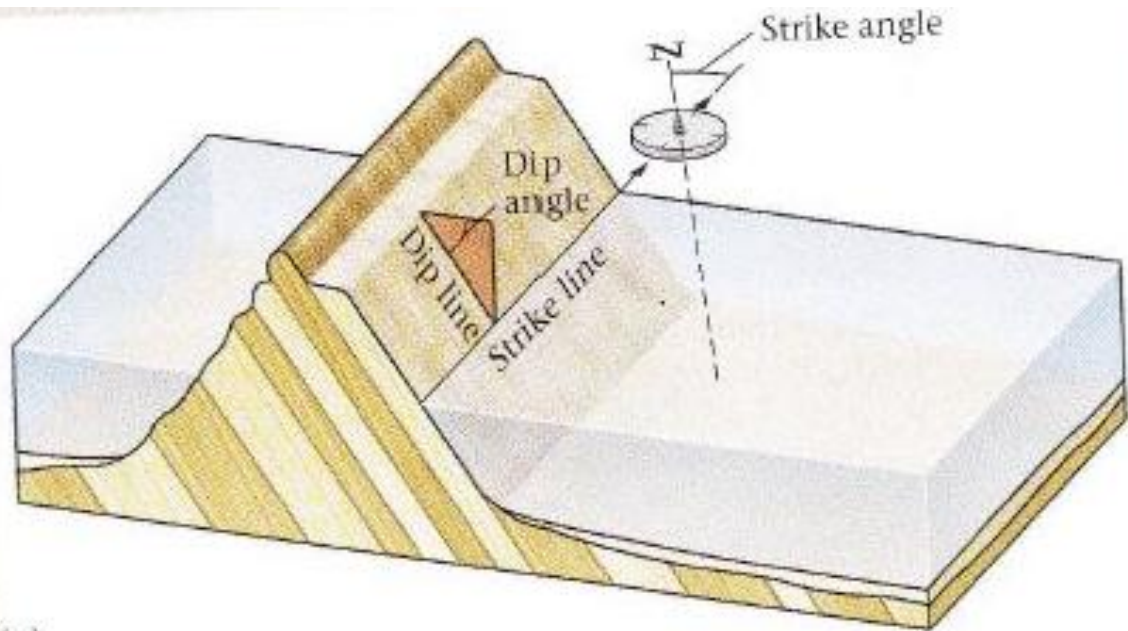


# Attitude

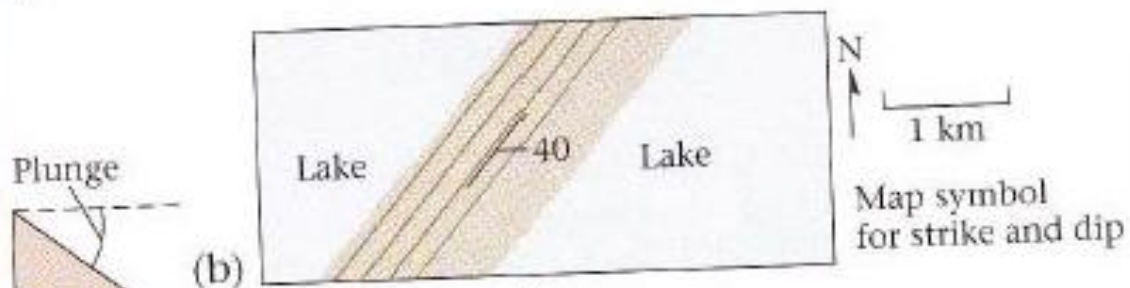
**the orientation of geometrical element (linear or planar) structures in space. Geologists specify the orientation of lines by giving their plunge and trend.**

# Bearing

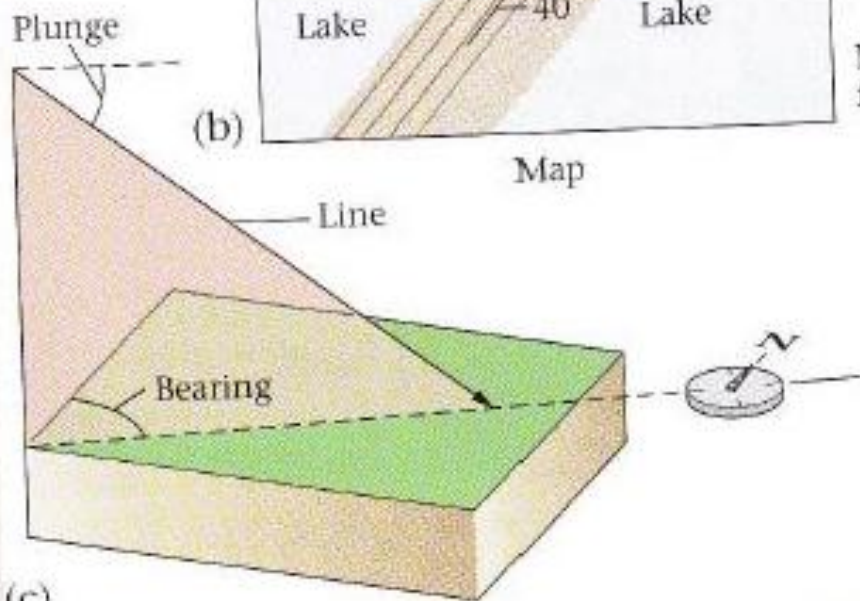
**the horizontal angle between a line and a specified coordinate direction, usually true north or south; the compass direction or azimuth.**



(a)



(b)



(c)

# Trend & Plunge

**Trend: the bearing (compass direction) of a line. Non-horizontal line trends in the down-plunge direction (Fig.1).**

- **Plunge: the vertical angle between a line and an imaginary horizontal plane, as measured with an inclinometer in the vertical that contains the line (Fig.1).**

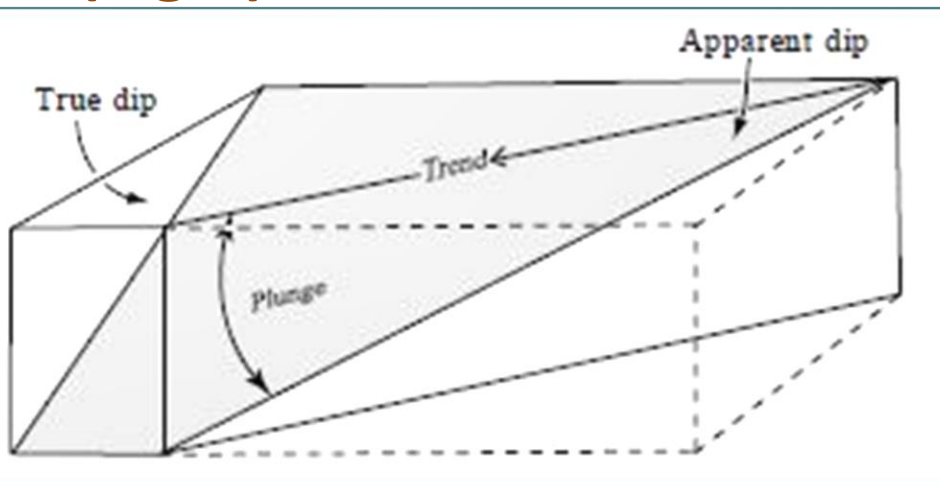


Fig.1 Trend and plunge of a line



# Pitch (rake)

angle measured with an inclined plane between a horizontal line and the line in question (Fig.2).

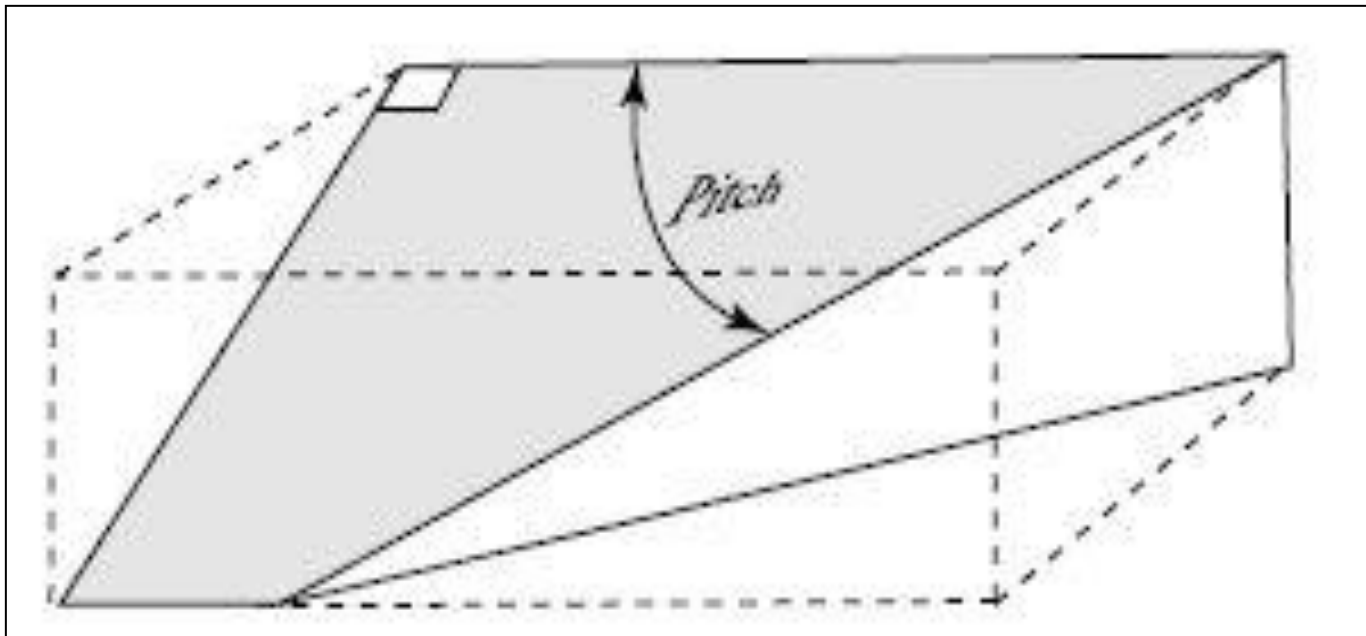


Fig.2 Pitch (or rake) of a line in an inclined plane

There are two ways of expressing the trends of lines and strikes of planes (Fig.3):

- 1-The **azimuth** method is based on a 360°clockwise circle.
- 2-The **quadrant** method is based on four 90°quadrants.

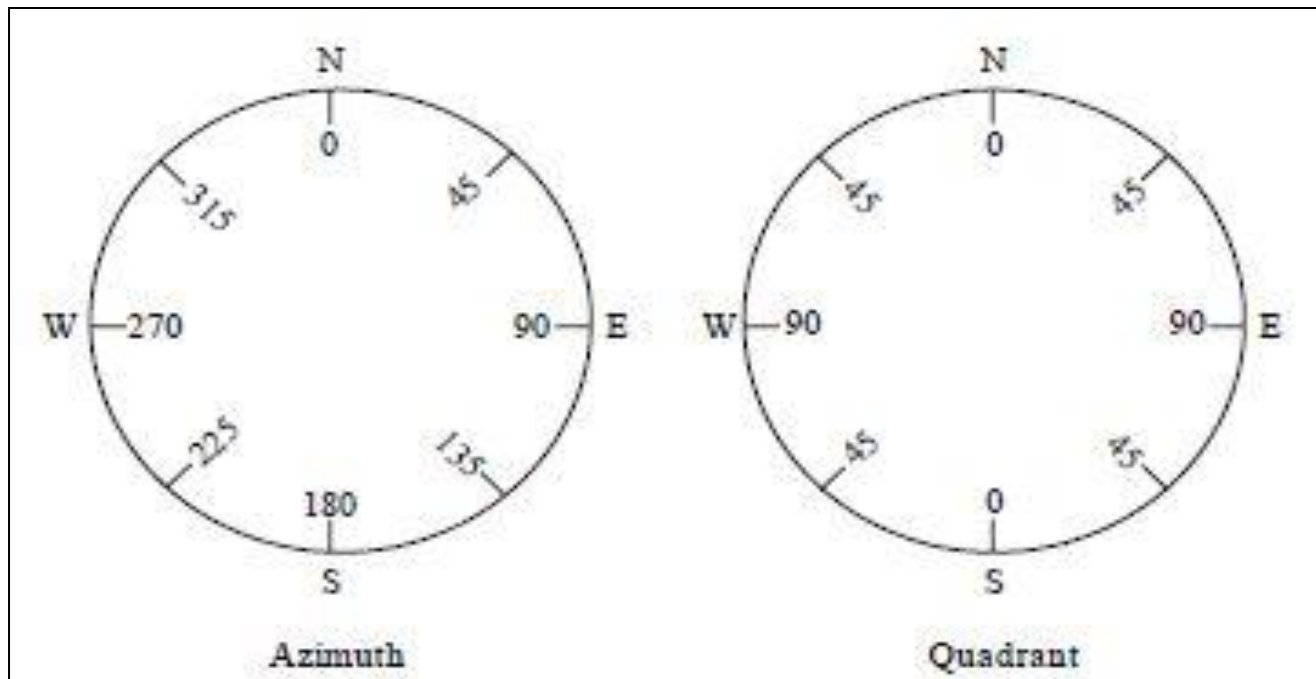
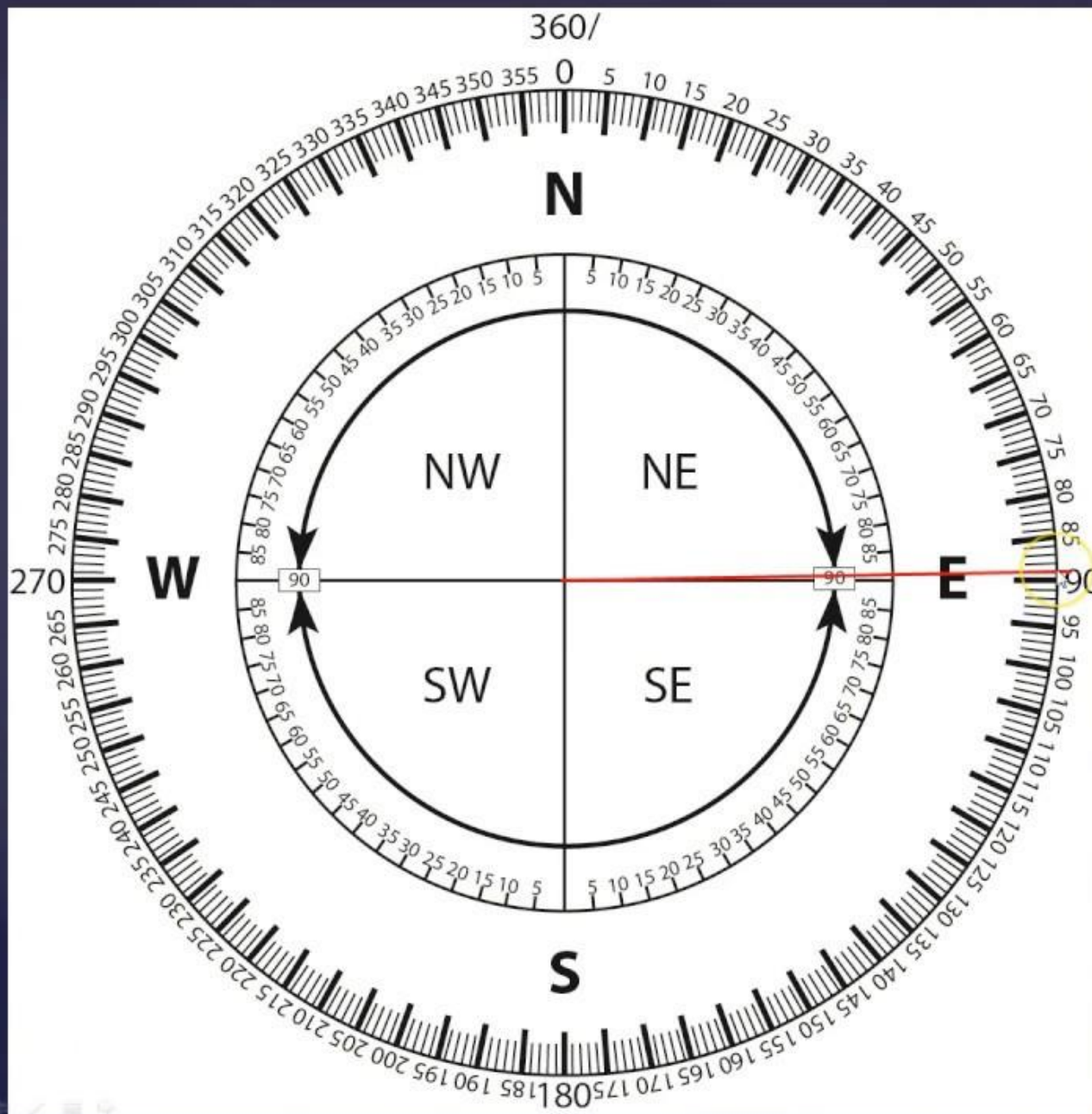


Fig.3 Azimuth and quadrant method of expressing compass direction

# Azimuth Vs Quadrant



## QUADRANT

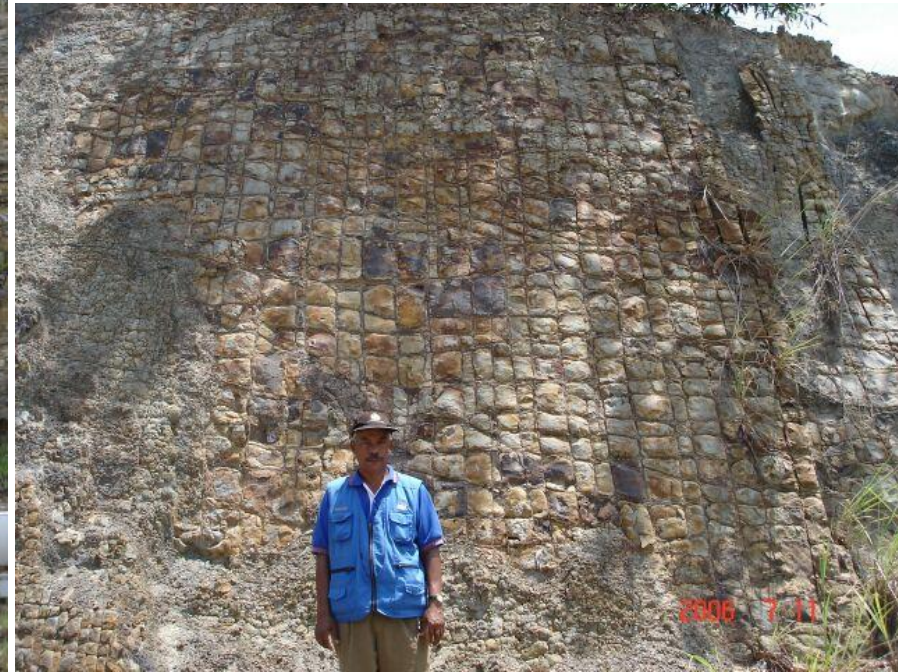
- N33W
- N89E

## AZIMUTH

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**Planar structures**: they resemble the geometric shape of a plane (like faults, joints, and veins). A planar structure's orientation can be specified by its strike and dip (Fig.4).





# There are two main conventions for writing attitude of planar structures:

- **I: Strike/ True Dip Angle (T.D.D.=Name of quadrant=NE, or SE, or SW, or NW).**
- **II: True Dip Direction/ T.D.A.**

The right-hand rule states that you choose the strike azimuth such that the surface dips to right (more precisely, record strike in the direction that your right-hand index finger points when your thumb points down the dip) (Fig.6).

In azimuth method the right hand rule is commonly followed: `

**Strike (azimuth .conv.) - 90° = T.D.D.**      Or

**T.D.D.(azimuth.con.) + 90° = Strike**

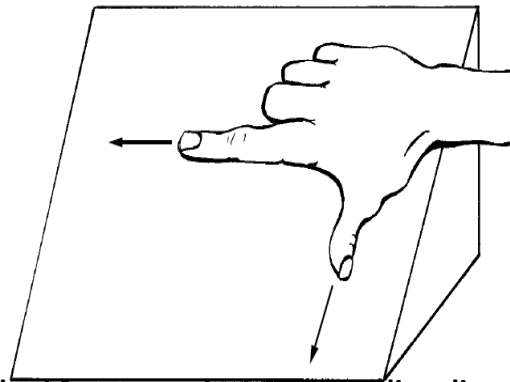


Fig.6 The right hand rule method for measuring and recording dip and strike