Dear Students and learners of Geology, I am uploading some Reading material on Structural Geology as "Basics of Structural Geology"

It will be useful for Students of Undergraduate courses and as revision of Postgraduate Students as well as Civil Engineering Courses.

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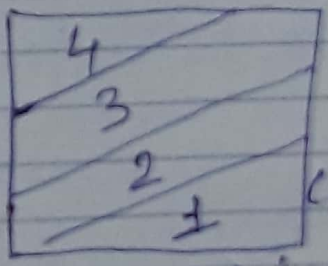
Basics of Structural GEOLOGY.

1) Introduction :-

Structural Geology is a branch of Geology which deals with various structures found in rock masses and their interpret-ations. Such structures are Bedding, Fold, Fault, Joints, Unconformities etc.

Few figures of these structures are as below which you might have seen along hill sides, valleys and along many picnic spots specially in Jharkhand and almost all parts of South India.



(i)

(ii)

(A) Beddings – (i), (ii)
(Layered structures)

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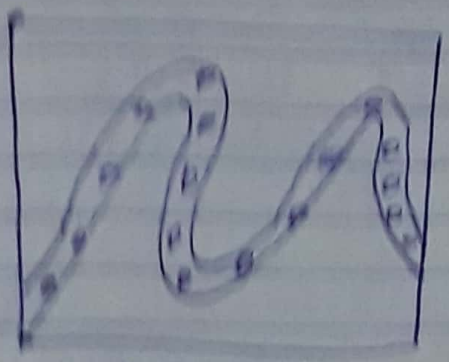
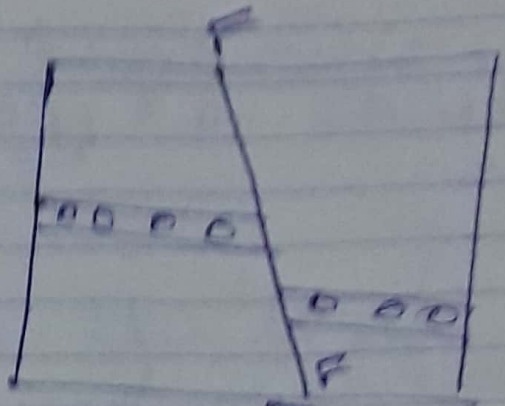
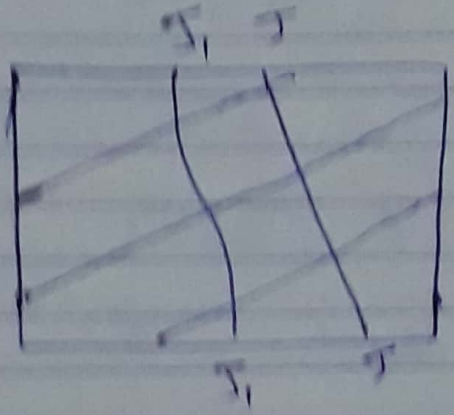


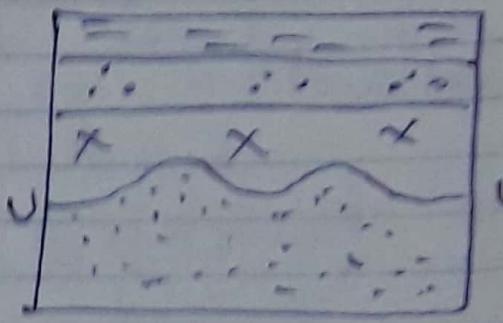
(B) Fold



(C) Fault-
(FF - fault plane)



(D) Joint
(J-J & J1-J1)



(E) Unconformity
(UU - unconformity plane)

Fig 1. Some structures of the rock (A to D)

(Rock = Rocks are aggregate of Minerals formed by natural processes).

(2) Some Terms required to understand Geology or Structural Geology —

(A) Beddings — The layers or stratā found in rocks are called as Beddings. The line or plane which separate a bed or stratā from other is called as Bedding plane where as each layer is called as Bed or stratā

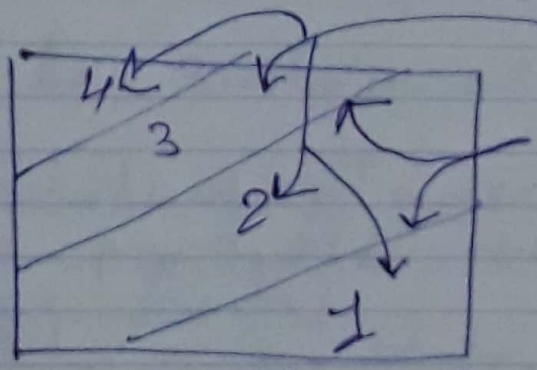


Fig - 2 - Beds and Bedding planes.

Beds or Beddings may be of three types -

(i) Horizontal
(ii) Vertical
(iii) Inclined.

All are dealt with

figures as beelow —

(a) Horizontal — Bedding or beds which have zero(0) degree dip.

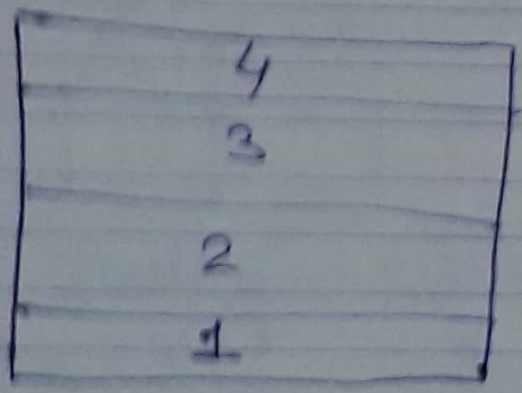


Fig: Horizontal Beds (Dip = 0°)

(b) In geological maps if the Bedding planes and Contours are parallel they are Horizontal Beds.
The sign of these Beds are

i.e. cross of equal length like sign of Medical

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(b) Vertical - The Beds with 90° dip are called as vertical.

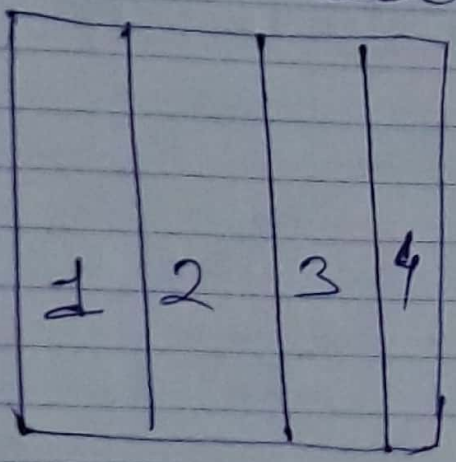

Fig-4 - Vertical Beds (Dip - 90°)

(In geological maps the sign of ⊕ or ⊕ indicate vertical beds. Cross of unequal length. The contours cut the bedding at one place only).

(c) Inclined Beds - The beds which dip more than zero but less than 90° are inclined. It appears as →18° ←20 →30

(In geological map various contours intersect the bedding atleast at two places. So for each bed two or more strike line are found. Dip is represented from

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higher contour to lower and amount is accordingly calculated)

Fig-5 Inclined Beds
Dip $0^\circ <$ but $> 90^\circ$

(when you are lying on the bed, you are horizontal, when get up and stand on bed it is vertical when as the position in between these are examples of inclined.)

(B) Strike —

Strike is the direction of intersection between a plane and the horizontal plane. Such plane may be a bedding plane, fault plane, joint plane or any plane.

Strike is always a

direction and discuss with respect to N. eg. N30°E, S30°W, N-S, E-W or W20S - E20°N. It is always right angle to dip direction.

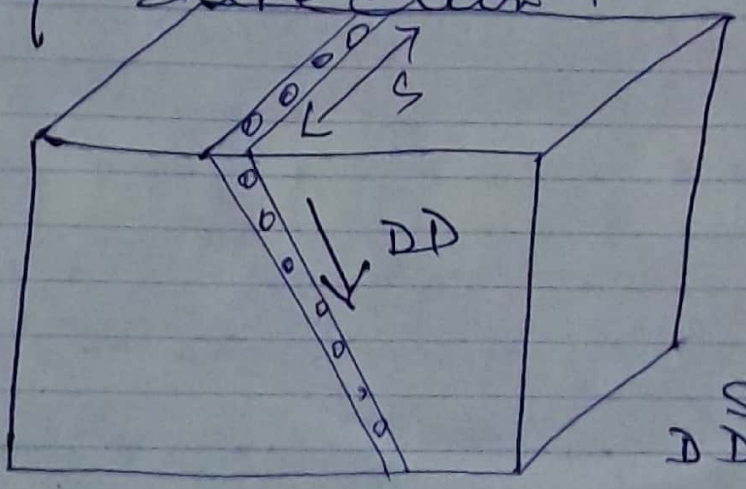

Fig-6 - Strike of a bed.
S - Strike
DD - Dip direction

(Strike of parallel beds are the same)

S ⊥ D.D

(c) Dip - Dip is the angle between a plane and the maybe horizontal plane. It is always (0) zero upto 90°. If dip 90° it is vertical or upright bed. If dip is 0° it is horizontal bed. For inclined bed it varies between more than zero to Ninety degree. Dips may be divided into two types -

(i) True dip
(ii) Apparent dip.

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Books recommended —

1. Structural Geology
   - M.P. Billings
2. Structural Geology
   - Hills
3. A Text Book of Geology
   - P.K. Mukherjee
4. Engineering Geology
   - Prabin Singh
5. Geology - Malapabro

(For query you may contact on 7992363530 between 2 to 5 pm or send mail on At — ccdcnpu09@gmail.com)

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Dip measured at right-angle to strike is true dip and in any other direction to strike are apparent dip.

True dip is always maximum and greater than the apparent dip.

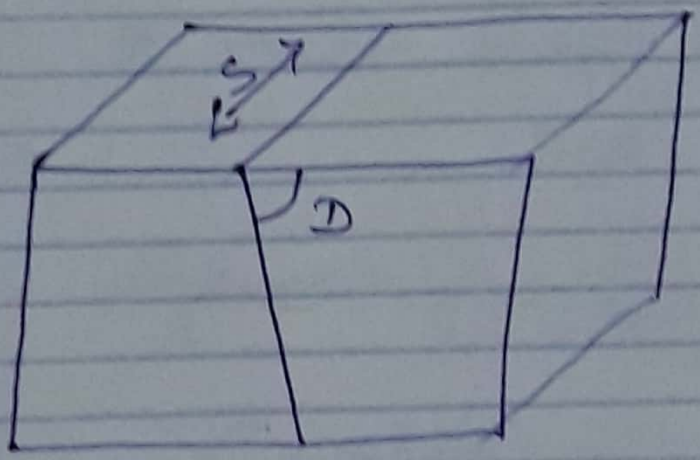

Fig:- 7 - Dip and Strike.
D - Dip
S - Strike

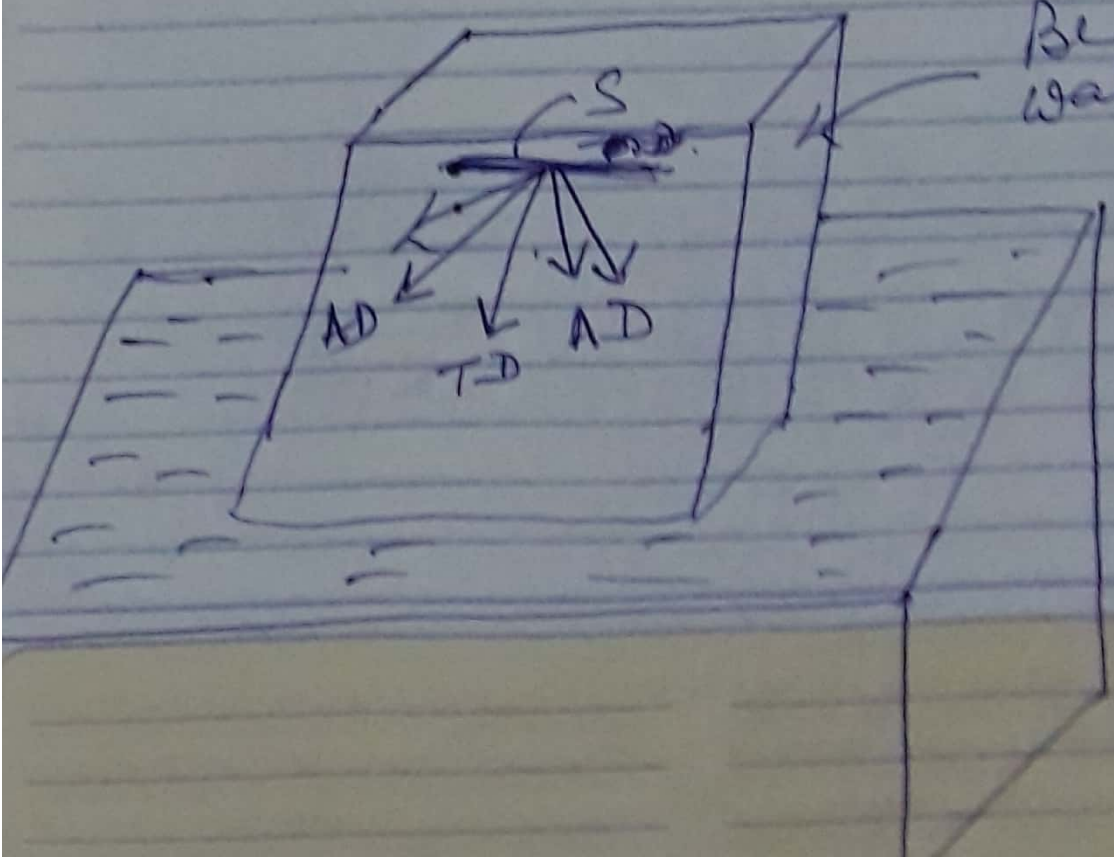

Fig:- 8 - True dip and Apparent Dip.
S - Strike
T.D. - True dip
A.D. - Apparent dip.

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