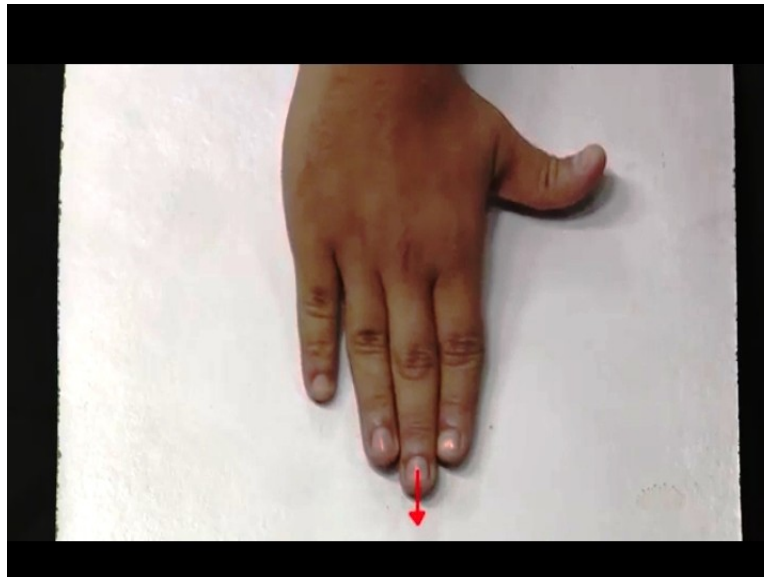


Structural Geology
Professor Santanu Misra
Department of Earth Sciences
Indian Institute of Technology Kanpur

Lecture 3
How to measure strike-dip-pitch/rake plunge

Hello everyone, welcome once again to NPTEL course on structural geology. I am Manab Mukherjee, one of the teaching assistants of this course and along with the help of one of my co-teaching assistants Saqib Abdullah, in this video demonstration, we will deal with how to measure strike, dip, pitch, plunge of a planar and linear features in deformed rock. Now we will straight get started.

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Let us consider this white board as a planar structural feature is a deformed rock. Now we will measure the attitude of strike and deep of this planar feature. We will follow the convention of right-hand rule. The convention of right-hand rule goes in this way. We will place our hand over the plane and our index finger will point down dip direction and our thumb will point to a certain direction.

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Now to measure the strike we place this basal edge of this compass against the plane we want to measure.

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Once we do this, we have to make sure that the compass is in horizontal position.

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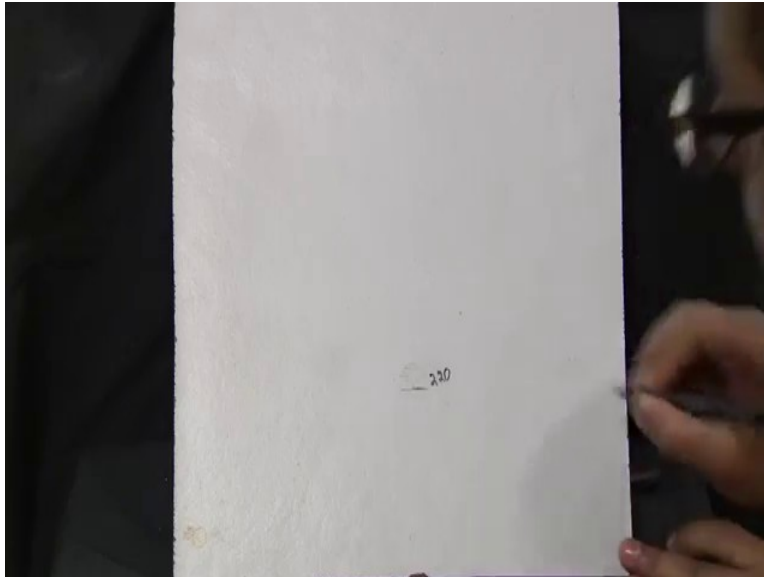
The horizontality of the compass is ensured when we know that the bubble in the circular level is in the centre which is now the case. In order to note the reading, it has to be carefully kept in mind that the, we would take the reading of the northern end of the magnetic needle to which it is pointing in the 360-degree graduated scale. When the pointed arm is pointing towards the direction towards which our thumb was pointing.

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So, when everything is ready bubble is in centre, the northern end of the magnetic needle reads 220 degree when the pointed arm is pointing towards the direction in which the thumb was pointing. So, the strike in this present case is 220 degree.

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Now we draw the strike line along the basal edge of this compass so the position we were holding. So, this comes out to be our strike line and this end of the strike line is the 220 degree end so we mark this as the 220 degree end.

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Now, we place the compass perpendicular to the previous position so that this plane is perpendicular to this line. When we ensure this plane is perpendicular to this line this position is sure, the pointed arm will point towards the down dip direction of this bed. Then we will adjust the back lever of the compass so that the bubble in the elongated level comes in the centre.

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When the bubble in the elongated level have come in the centre, the dip value is the value with which the 0 mark in the vernier coincides with the 180-degree graduated scale and in our case the dip is 55 degrees.

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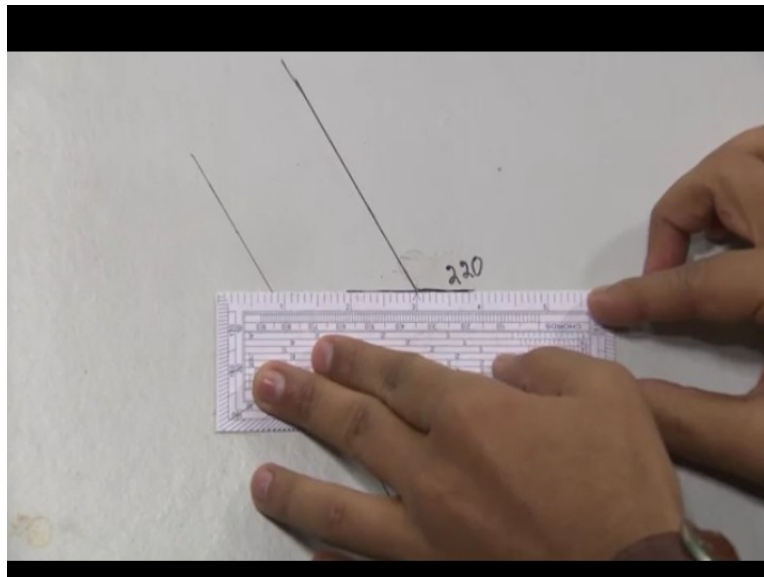
So now put this edge to measure the dip direction against this plane and in the strike line. So the edge is placed against the strike line and now we measure the dip direction. As we know from right hand rule the dip direction would be $220 + 90$ so 310 degrees. But we still would confirm it. So, in order to confirm it, the compass position is this and now we will make it horizontal.

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Once we have achieved the horizontal position in the compass, we would take the note of the northern end of the magnetic needle. So, we now see the circular bubble in the circular level is in the centre and our pointed arm is pointing towards the down dip direction and the northern end of the magnetic needle is pointing towards 310 degree in the 360-degree graduated scale. So, the dip direction of this planar feature is 310 degrees.

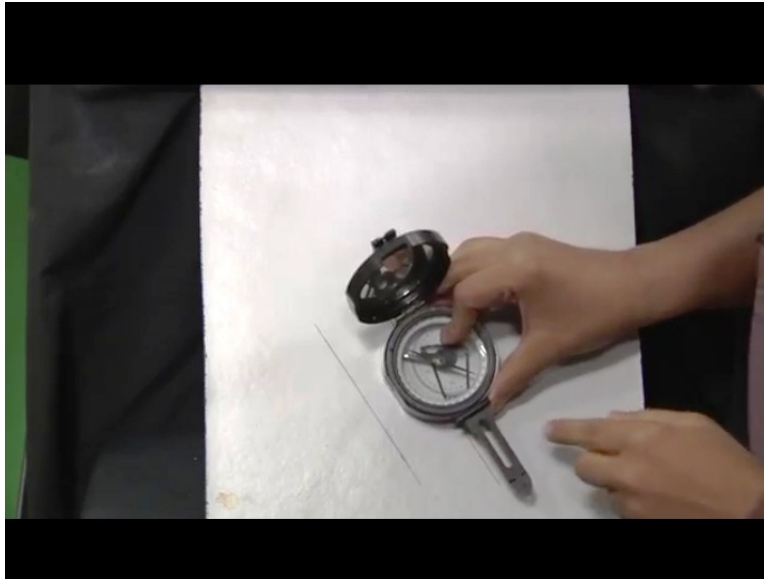
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Now we will measure the pitch of the lineation. Consider this line on the white board as linear elements in the deformed rock. The pitch is basically the acute angle of the lineations with the strike line on the plane containing the lineation itself. So, this is our acute angle in the plane containing the lineation, of the lineation with the strike line. Now in order to measure this acute angle we will help use of a field tool called a diagonal scale which almost same as a conventional protractor. The pointed arrow in the diagonal scale corresponds to the zero mark in the protractor.

We will place this pointed arrow in the intersection of the strike line and the lineation and the edge of the diagonal scale will be parallel to the strike line. So, once we obtain this position, we will compute the value of pitch; the acute angle, which in our case is 10, 20, 30, 40, 50, 55, 56 degree from the 220-degree end of the strike. It is always worthwhile to note from which end of the strike line we are measuring the pitch.

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Now we will measure the plunge direction or trend of the lineation. In order to measure it the pointed arm will remain parallel to the lineation and we will hold the compass in this way and with the see-through arm we will make sure that the pointed arm is parallel to the lineation. Now, from this position we will rotate the Brunton compass in a horizontal position making sure the pointed arm is parallel to the lineation and then the bubble in circular level should come in the centre.

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Once we achieve this position, we take the reading which is the value with which the northern end of the magnetic needle points in the 360-degree graduated scale. In our case the value comes out to be around 270 degrees.

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When we measure the plunge of a lineation, we will have to place the compass vertically. So, we will place this edge of the compass along the lineation and this edge will be elevated at a certain height so that the compass remains in the vertical plane. The pointed arm will point towards the down plunging direction of the lineation.

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So, once we achieve this position, we will rotate the back lever so that the bubble in the elongated level comes in the centre.

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When the bubble in the elongated level will come in the centre we will note the value of plunge in the 180-degree graduated scale to which the zero mark of the vernier will coincide and in our case the amount of plunge is 44 degree. So, thank you all for watching this video and please stay tuned for further videos.