Map Patterns of Uniformly Dipping Beds

Where do beds outcrop?

Topographic contour lines

Structural contour lines

Where ground is higher than the bed $(H_T > H_S)$, the bed is buried.

Where ground is lower than the bed $(H_T < H_S)$, the bed is eroded.

Where ground is the same elevation as the bed ($H_T = H_S$), the bed OUTCROPS.

- A geological surface crops out at points where it has the same height as the ground surface.
- All the outcrop-points define the line of outcrop of a geological surface.
- To find out the outcrop-points is to find out points where ground height (topographic contour height) matches the structural contour height.

A geological surface outcrops where it intersects the ground

surface



C D Fig. 2.9 The concept of outcrop of a geological contact.

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Three-point problem



Let's predict the outcrop of this thin limestone bed



The predicted outcrop looks like this



B

Structural Contours of Uniformly-dipping Planes

- Parallel lines parallel to the strike
- Spacing between contours
 = contour interval / tan (dipangle)

<u>Using structural contour and</u> <u>topographic contour to predict</u> <u>outcrop patterns (Examples)</u>

V-rules

Uniformly-dipping beds outcrop in V-forms



Bed is horizontal.



Bed dips downstream. Dip greater than stream gradient.



Bed dips upstream.















Uniformly-dipping beds outcrop in V-forms















FIGURE 3.4 Outcrop patterns illustrating the rule of V's: (a) horizontal layer; (b) layer dipping upstream; (c) vertical layer; (d) layer dipping downstream; (e) layer and valley axis with equal inclinations; (f) layer dipping downstream at an angle less than valley gradient.



slope angle: ϕ

slope fraction = rise / run

grade = slope fraction x 100

slope fraction = tan (ϕ) grade = tan (ϕ) x 100