

Anderson's Theory of Faulting

Theoretical explanation for 3 major types of faults.

- 1) Normal faults
- 2) Thrust / Reverse faults
- 3) Strike-slip faults

Mohr-Coulomb theory:

- Shear fractures contain the direction of intermediate principle stress ($\sigma_2, \underline{v}_2$)
- Fracture plane is at an angle less than 45° from direction of max principle stress, $\underline{v}_1$ (lets assume 30° angle)

Earth surface supports no shear stress:

$\Rightarrow$ must be a principal direction

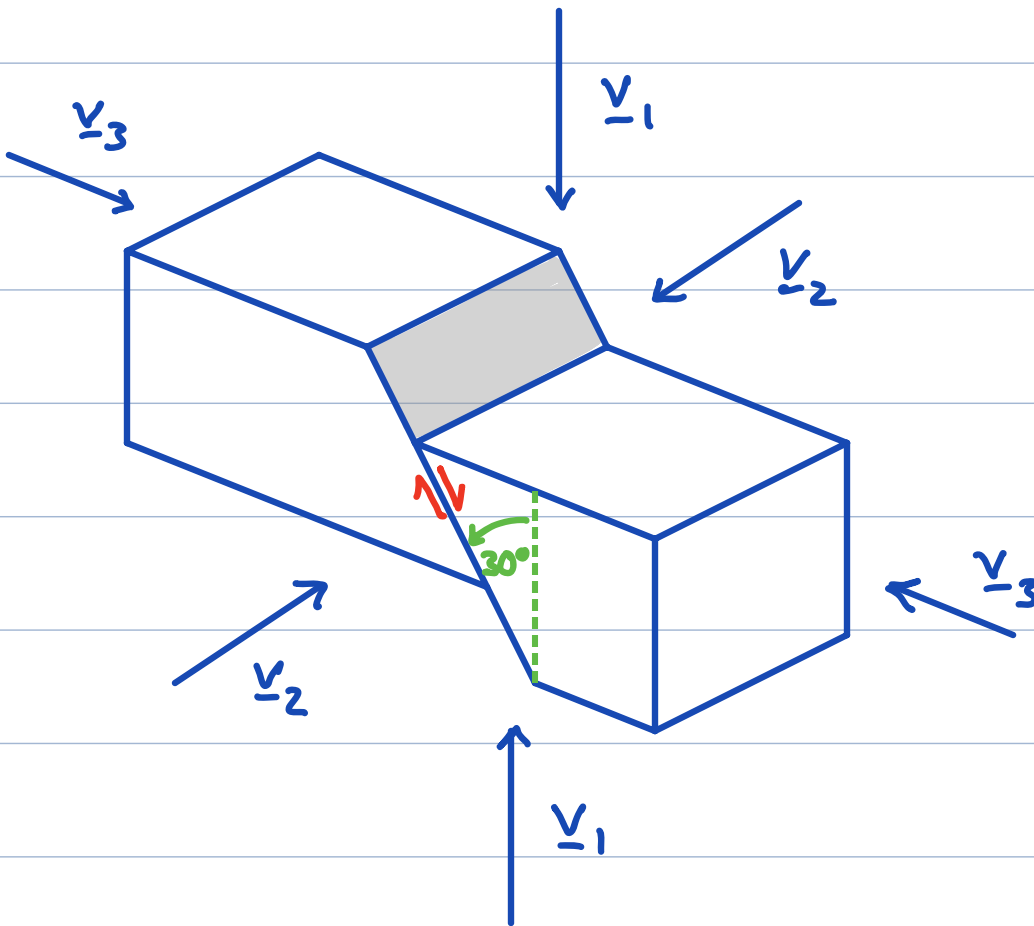
σ_v = vertical (normal) stress

σ_H = horizontal maximum (normal) stress

σ_h = horizontal minimum (normal) stress

1) Normal faults

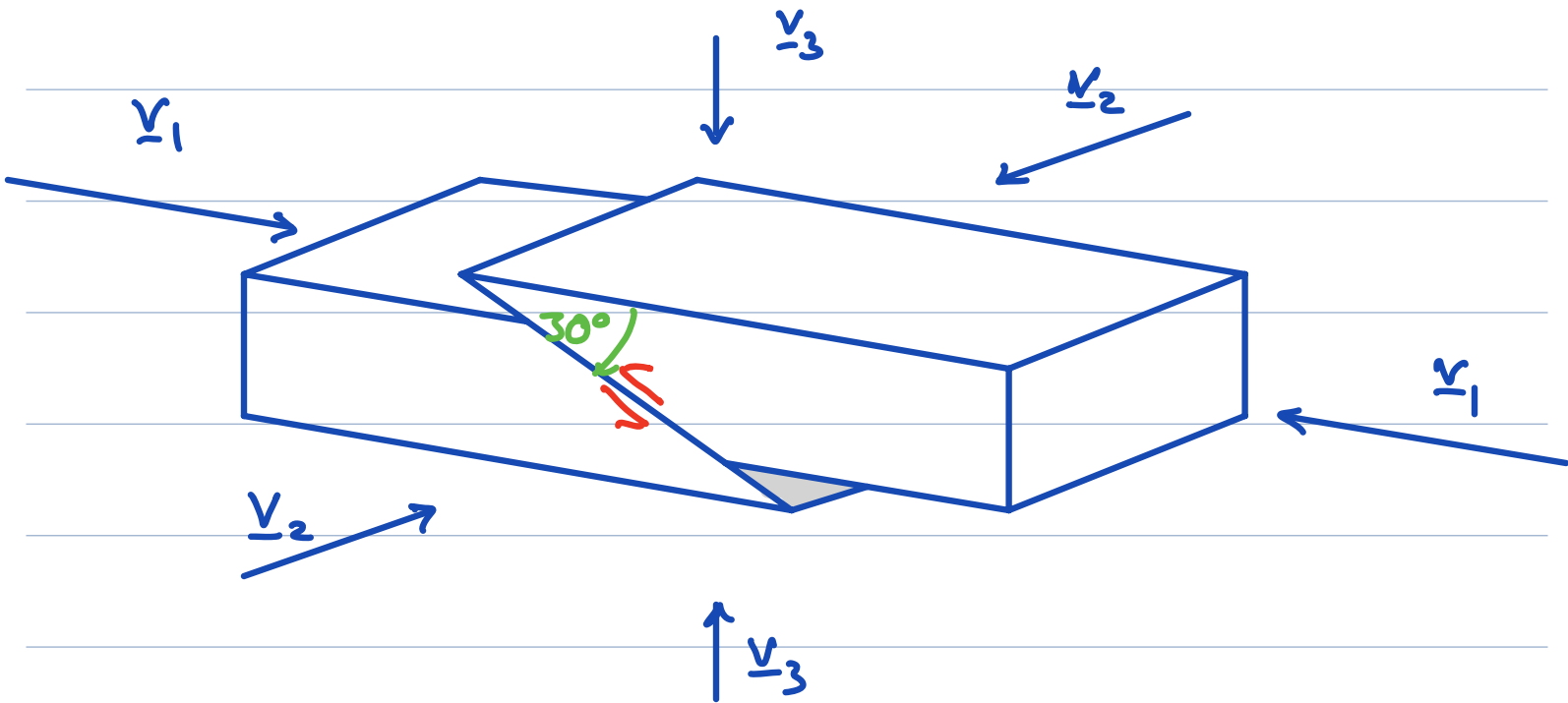
$(\underline{v}_1, \sigma_1)$ is vertical



Direction of max principal stress is vertical.

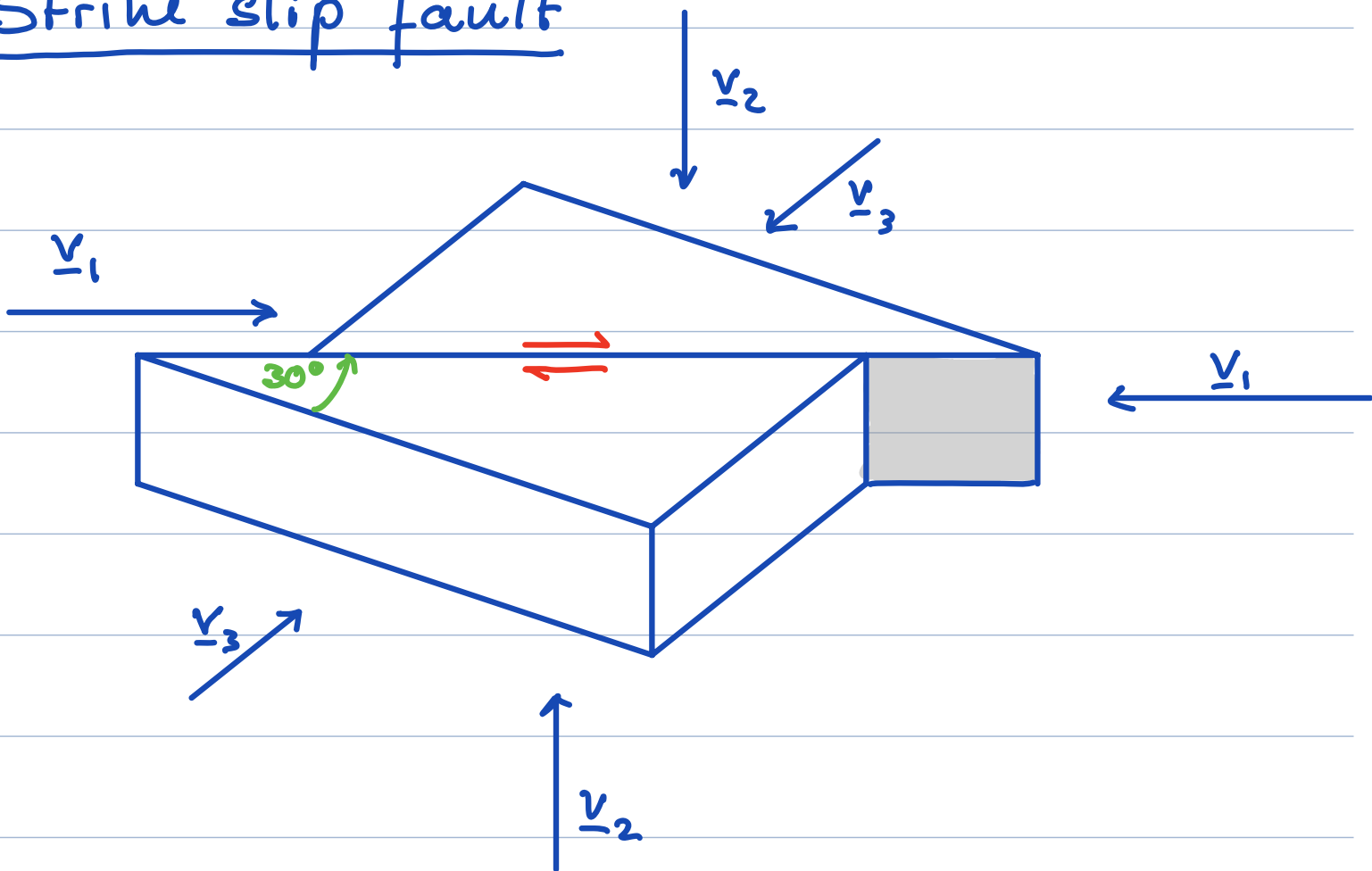
$$\sigma_1 = \sigma_v, \quad \sigma_2 = \sigma_H, \quad \sigma_3 = \sigma_h$$

2) Reverse/Thrust faults



Direction of minimum principal stress
is vertical: $\sigma_1 = \sigma_H$, $\sigma_2 = \sigma_h$, $\sigma_3 = \sigma_v$

Strike slip fault



Direction of the intermediate principal stress is vertical: $\sigma_v = \sigma_2$, $\sigma_H = \sigma_1$, $\sigma_h = \sigma_3$