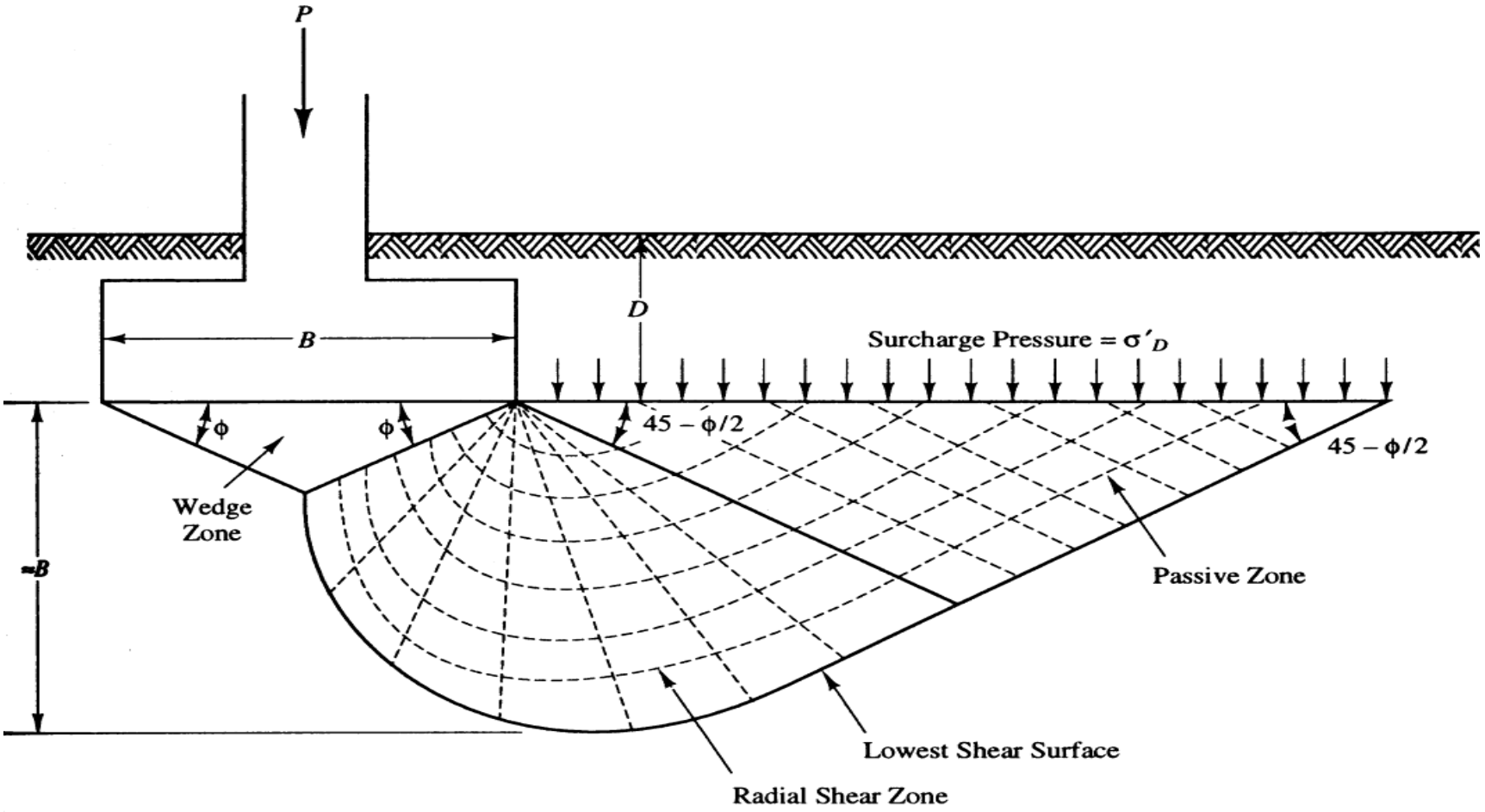
- Effect of water table is neglected.
- Footing carries concentric and vertical loads.
- Footing and ground are horizontal.
- Limit equilibrium is reached simultaneously at all points. Complete shear failure is mobilized at all points at the same time.
- The properties of foundation soil do not change during the shear failure.

Limitations:

1. The theory is applicable to shallow foundations
2. As the soil compresses, Φ increases which is not considered. Hence fully plastic zone may not develop at the assumed Φ.
3. All points need not experience limit equilibrium condition at different
- loads.
4. Method of superstition is not acceptable in plastic conditions as the ground is near failure zone.


P
D
B
Surcharge Pressure = σ′D
ϕ
ϕ
45 – ϕ/2
45 – ϕ/2
Wedge
Zone
~B
Passive Zone
Lowest Shear Surface
Radial Shear Zone

- Failure ultimate mechanism for determining the bearing capacity (general shear failure) for a rough strip footing located at a depth D is shown in Figure-2.

- Zone I- The soil wedge ABJ is an elastic zone. Both AJ and BJ make an angle Φ with the horizontal.

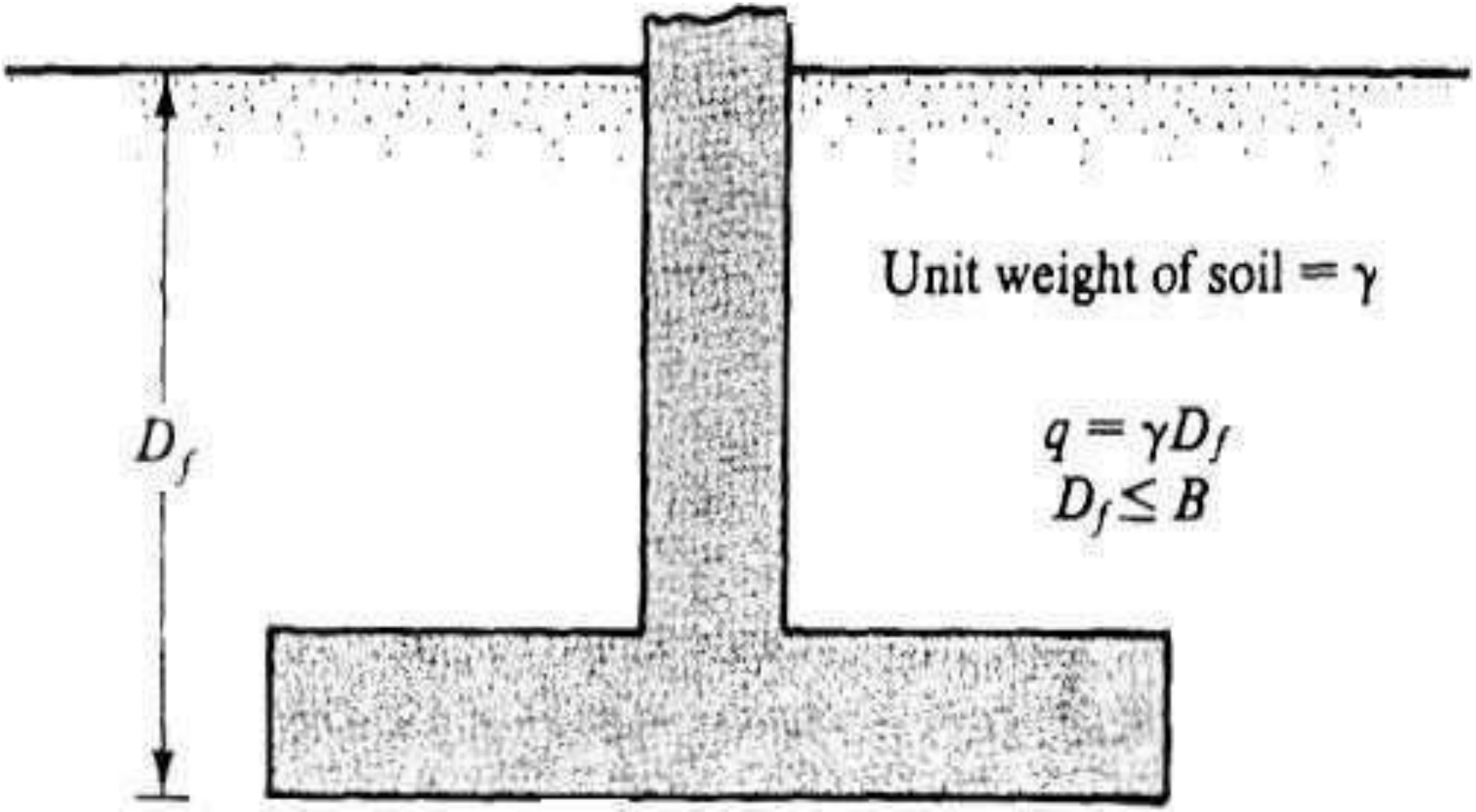
- Zones II- The zones AJE and BJD are the radial shear zones, Zones III- The zones AGE and BFD are the passive zones.

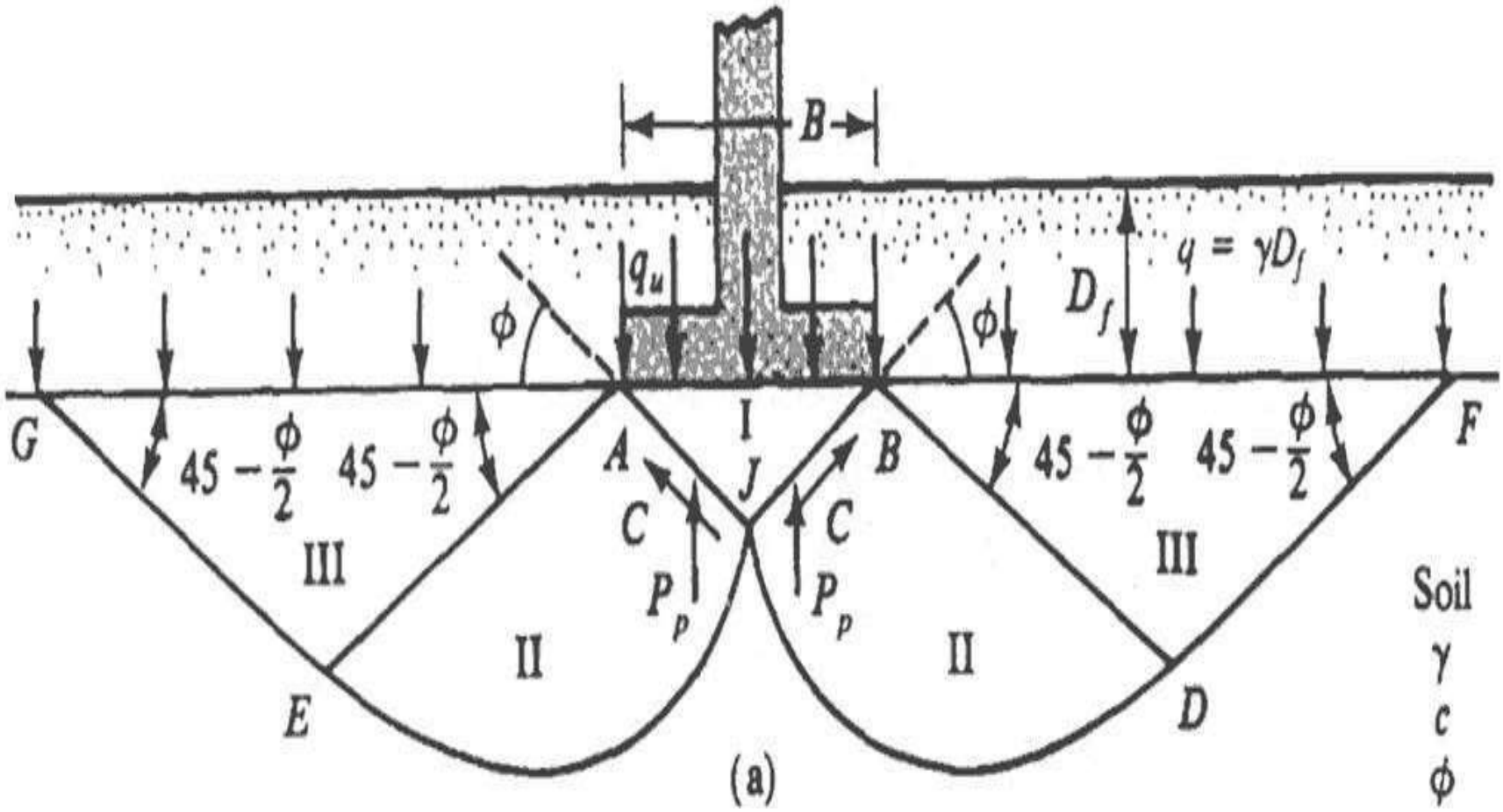
- The rupture curves JD and JE are arcs of a logarithmic spiral, and DF and
- EG are straight lines.

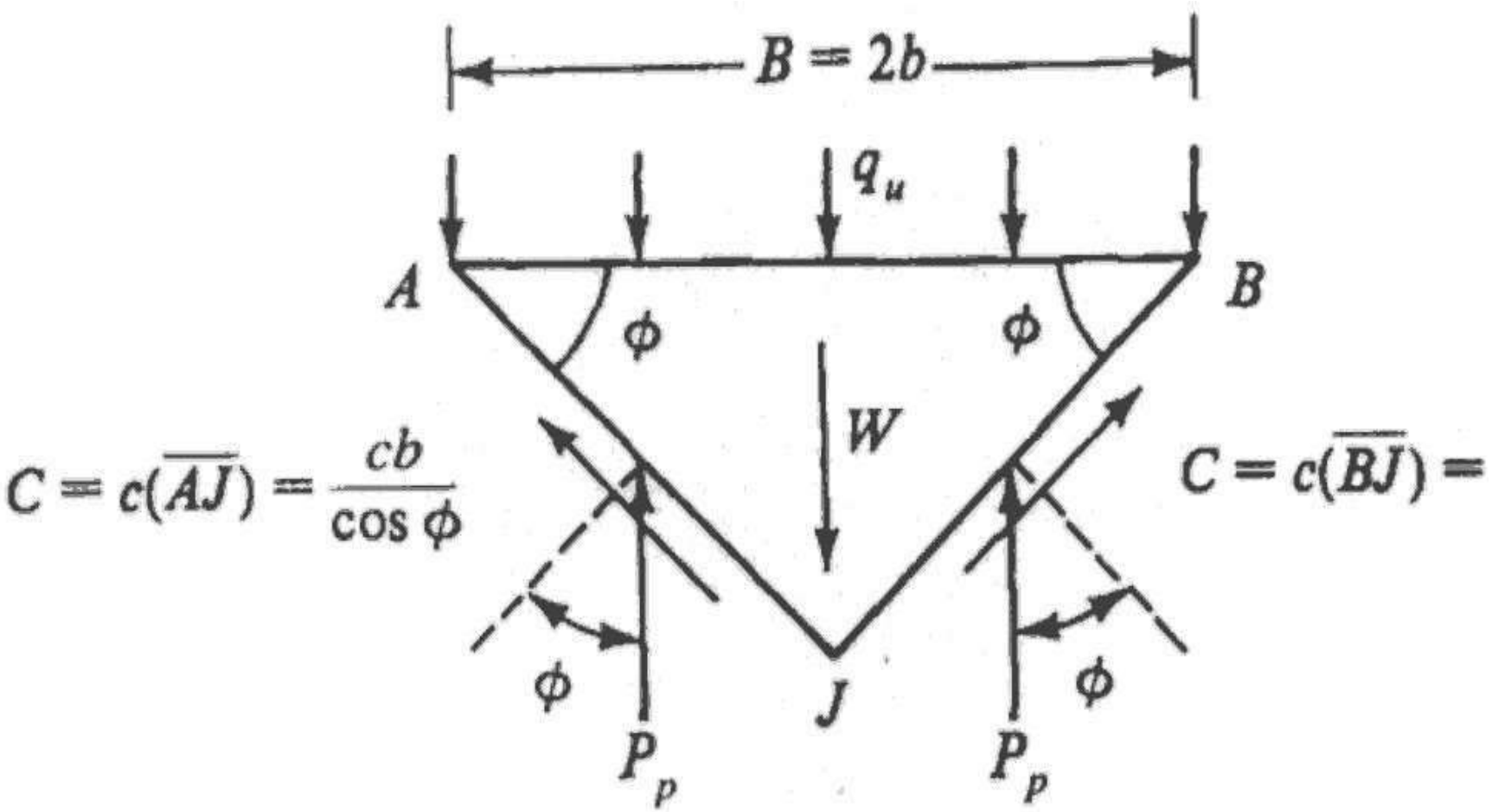
- AE, BD, EG, and DF make angles of 45 - $\Phi/2$ with the horizontal.

- Pressure q_u, is applied to a footing to cause general shear failure
- Passive pressure Pp is acting on each faces of the soil wedge ABJ.
- Imagine AJ and BJ as two walls pushing the soil wedges AJEG & BJDF,
- to cause passive failure.

- Pp is inclined at an angle δ (angle of wall friction) to the perpendicular to the wedge faces (AJ and BJ).
- In this case, $\delta = \Phi$, since AJ is a soil surface not wall.


Unit weight of soil = γ
D_f
$q = \gamma D_f$
$D_f \leq B$


B
q_u
$q = \gamma D_f$
D_f
ϕ
ϕ
G
$45 - \frac{\phi}{2}$
$45 - \frac{\phi}{2}$
A
I
J
B
$45 - \frac{\phi}{2}$
$45 - \frac{\phi}{2}$
F
C
C
III
III
P_p
P_p
II
II
E
D
Soil
γ
c
ϕ
(a)


B = 2b
q_u
A
B
ϕ
ϕ
W
J
ϕ
ϕ
P_p
P_p
$C = c(\overline{AJ}) = \frac{cb}{\cos\phi}$
$C = c(\overline{BJ}) =$