



FOUNDATION

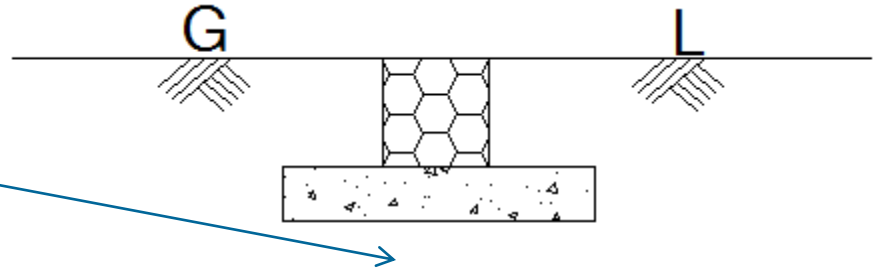
11/13/2018

Definition

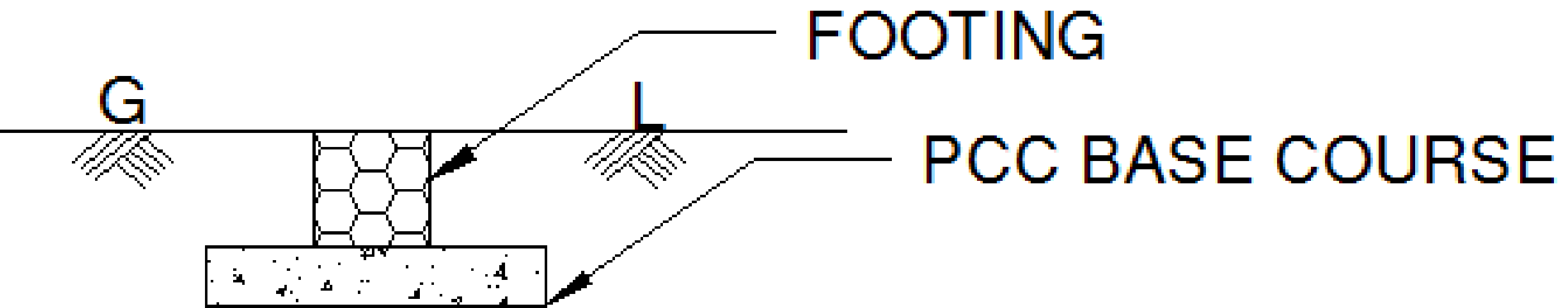
- **Lowermost part of building**
- **Located below GL**
- **Transmits load of superstructure to subsoil**

Sub soil / foundation soil

- **Soil immediately below base of foundation**



Components of Foundation





Essential conditions for design of a foundation

- **Should be safe against ultimate failure**
- **No excessive settlements**

Bearing capacity of soil

- **Gross pressure intensity**

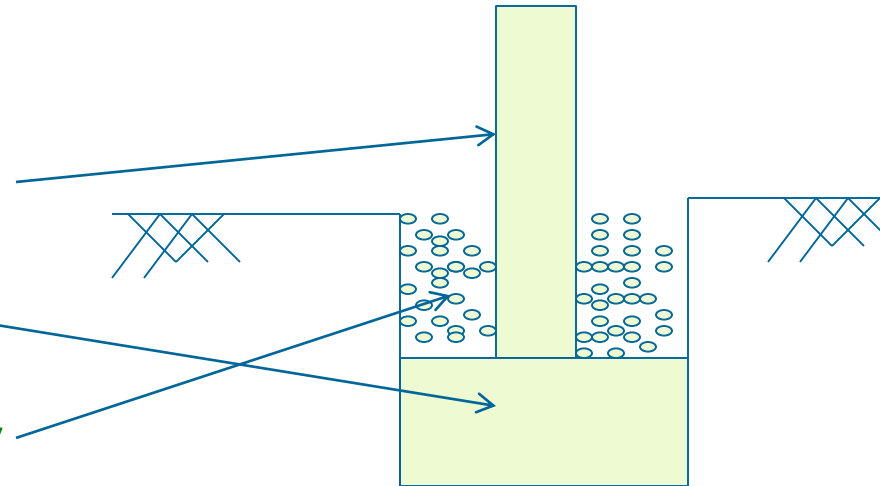
- **Total pressure at the base of the footing**

- **Due to**

- ❖ **Weight of superstructure**

- ❖ **Self weight of footing**

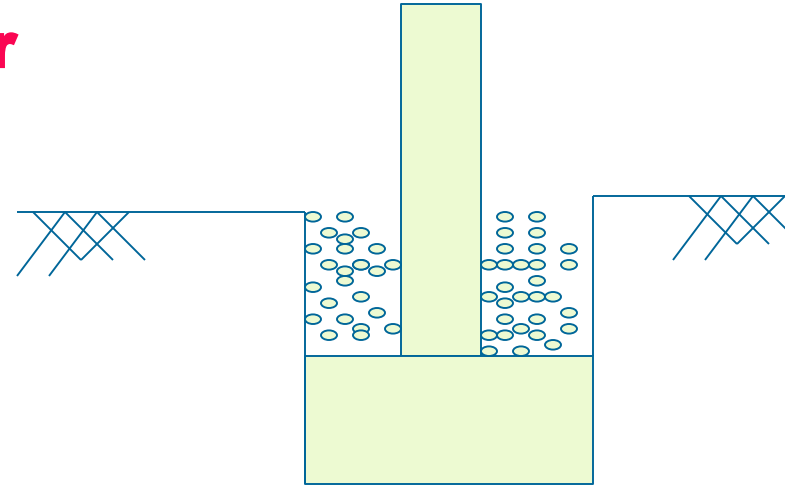
- ❖ **Weight of earth fill, if any**



Bearing capacity of soil

- **Ultimate bearing capacity**

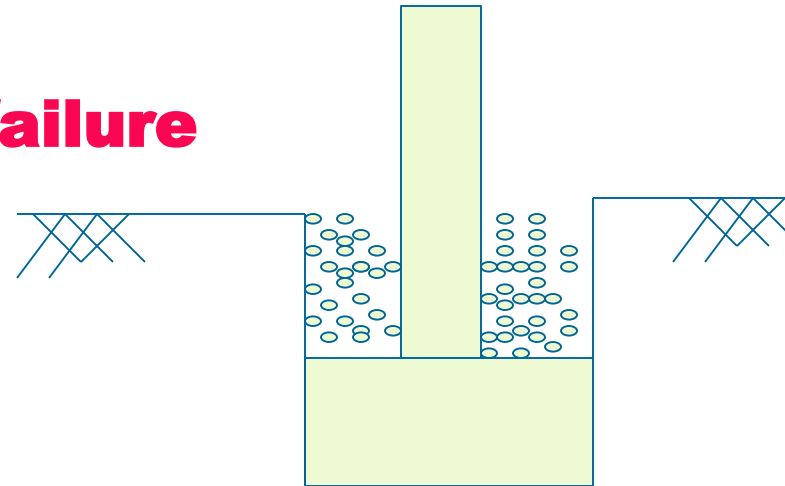
- **Maximum pressure at the base of the footing**
- **At which soil fails in shear**



Bearing capacity of soil

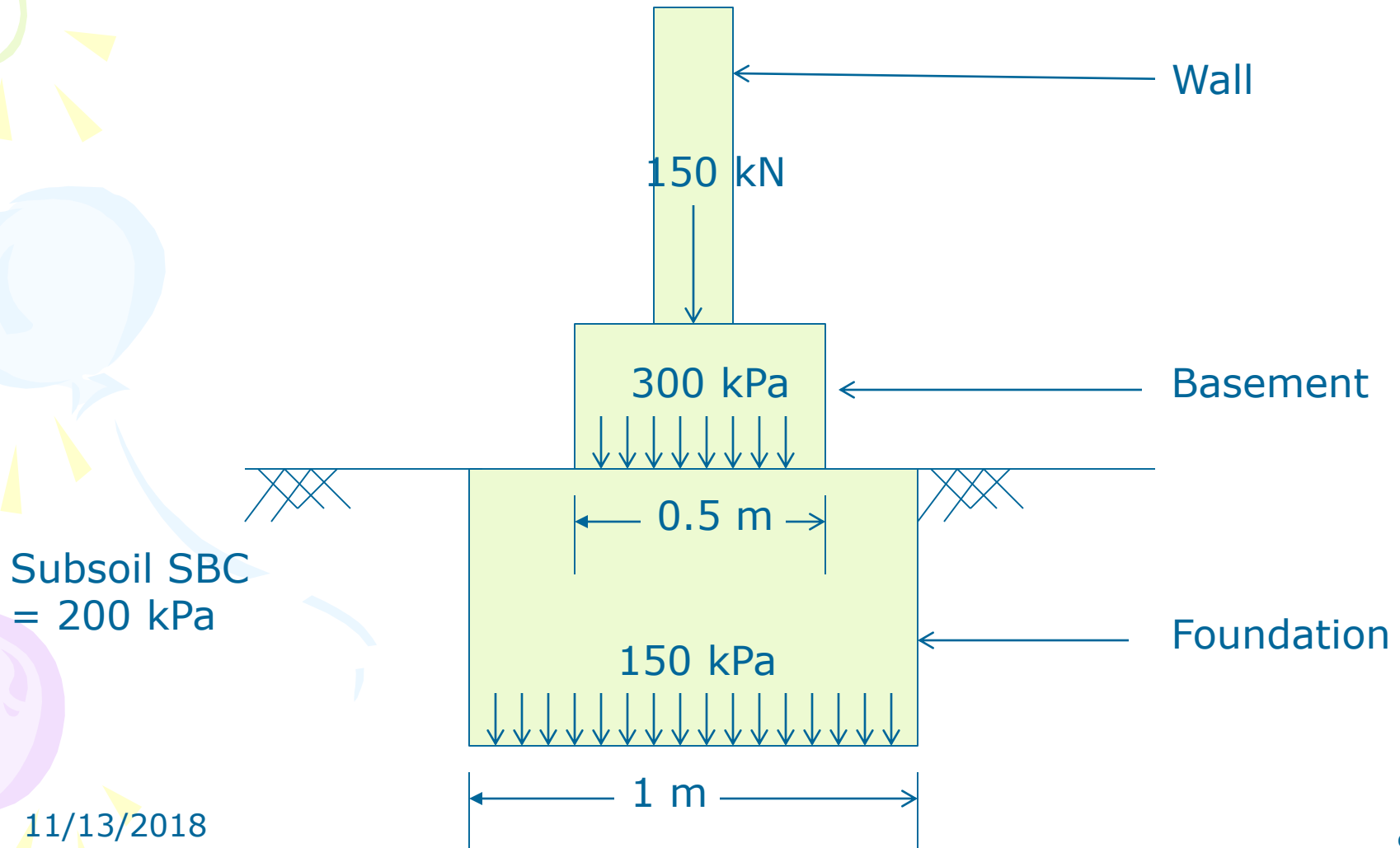
- **Safe bearing capacity**

- **Maximum pressure which the soil can carry safely**
- **Without the risk of shear failure**
- **$SBC = UBC / FoS$**



Functions of a foundation

- **Reduction of load intensity**



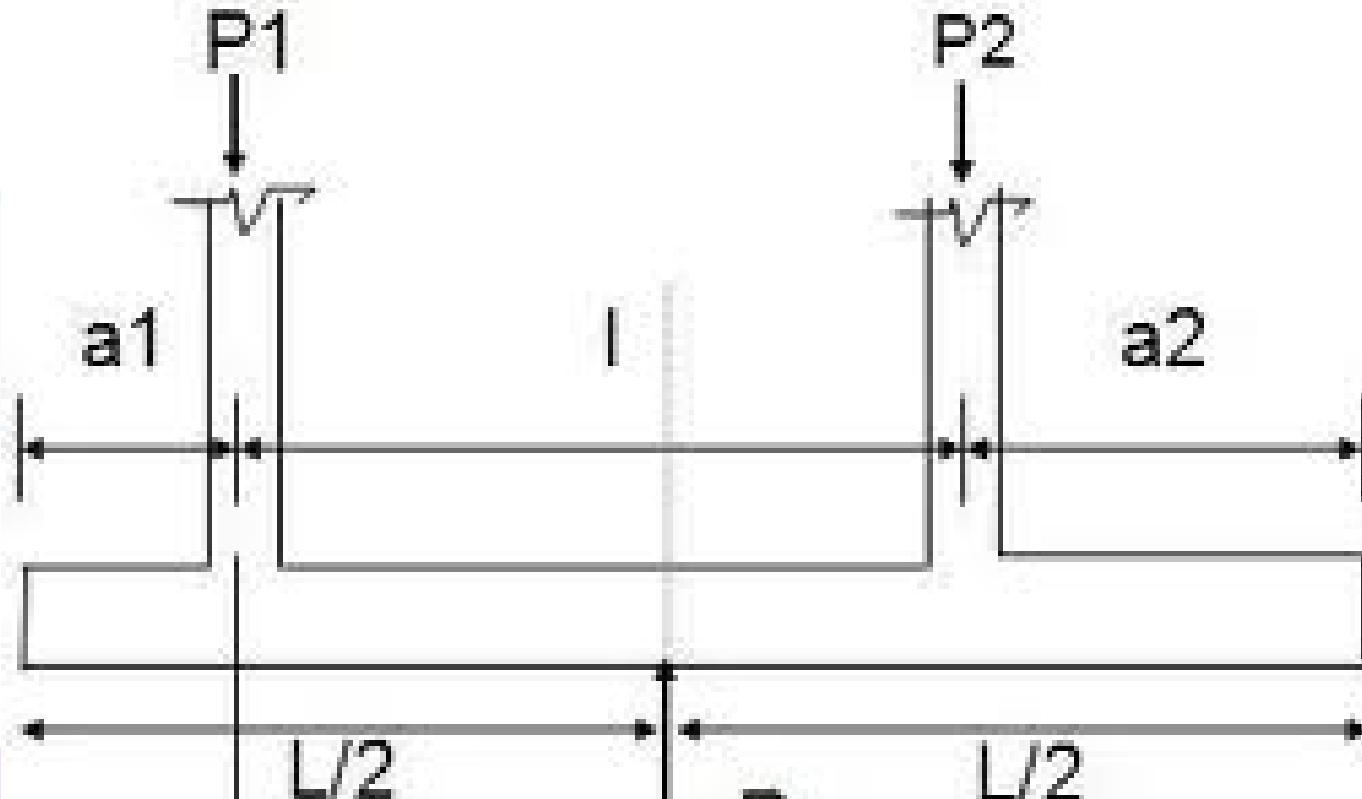
Functions of a foundation

- **Reduction of load intensity**

- **Distribute loads to a larger area**
- **Intensity of load at base $<$ SBC**

Functions of a foundation

- **Even distribution of load**



- **$(P_1 + P_2)/(BL)$**

Functions of a foundation

- **Even distribution of load**

- **Non uniform loads distributed uniformly to subsoil**

- **Example**

- ❖ **Two columns carrying unequal loads**

- ❖ **Can have a combined footing**

- ❖ **Distributes loads evenly to subsoil**

Functions of a foundation

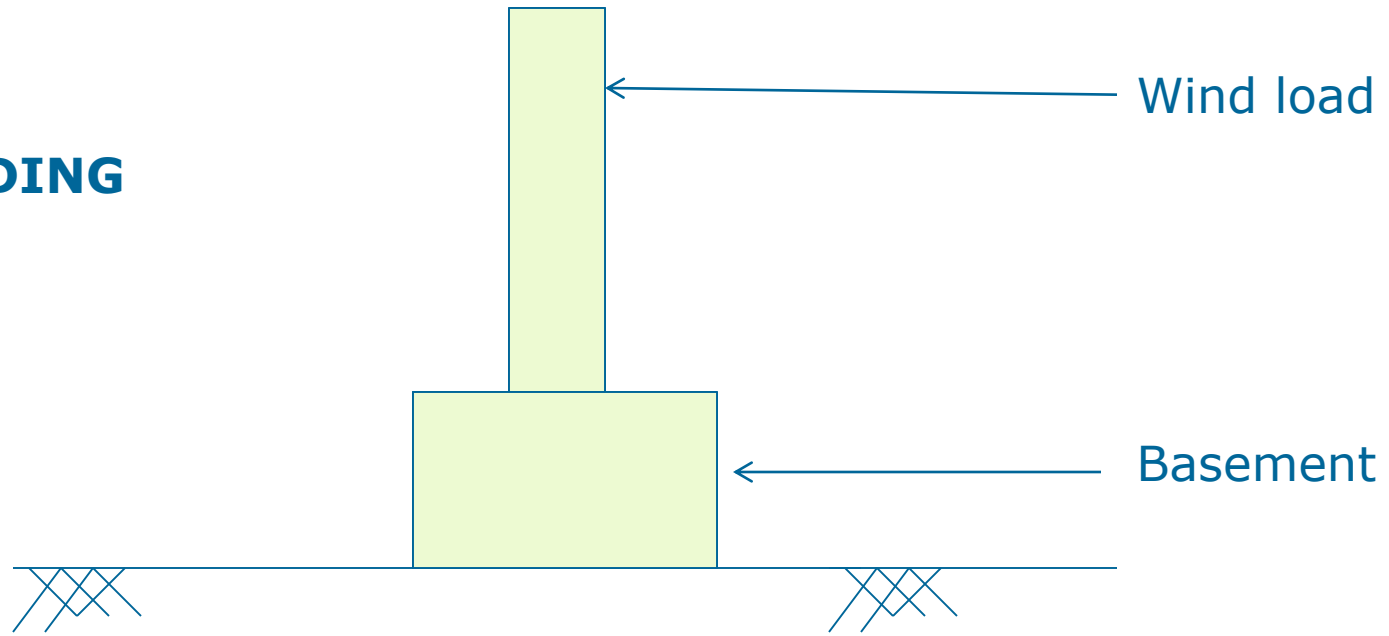
- **Provision of level surface**

- **Provides a level and hard surface over which superstructure can be built**

Functions of a foundation

- **Provision of lateral stability**

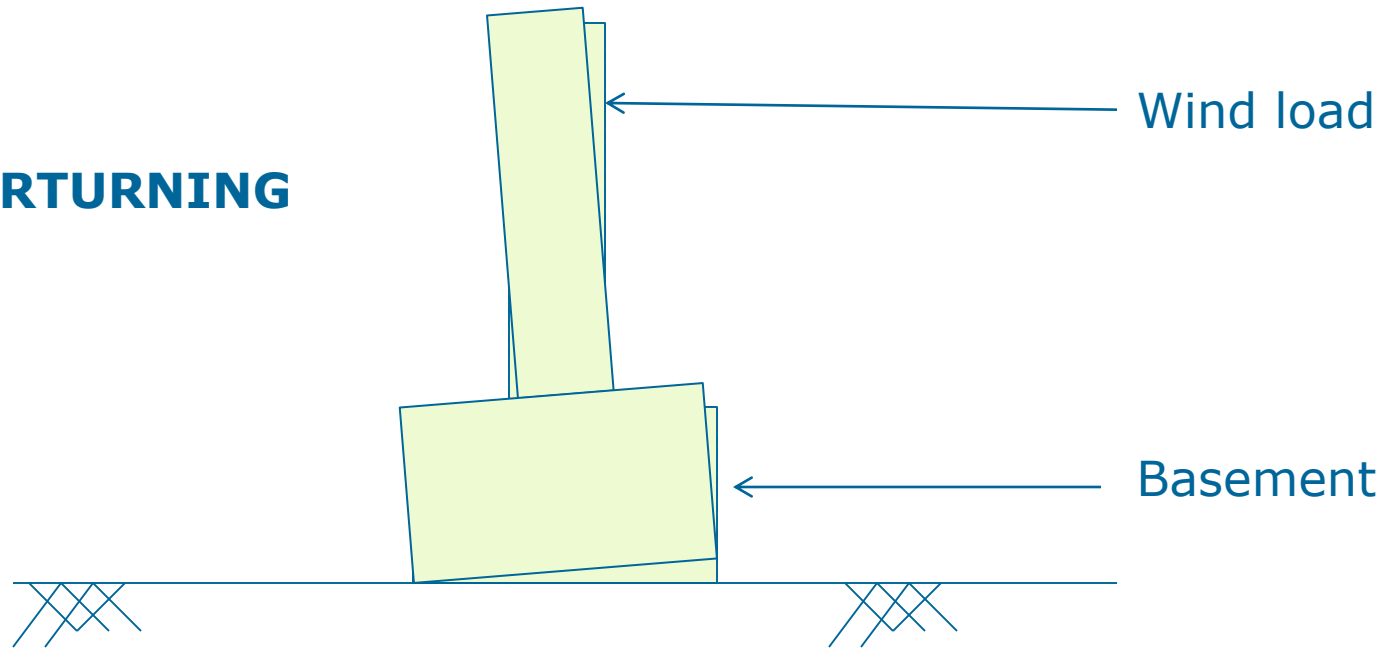
SLIDING



Functions of a foundation

- **Provision of lateral stability**

OVERTURNING



Functions of a foundation

- **Provision of lateral stability**

- **Anchors superstructure to ground**
- **Provides stability against sliding and overturning**

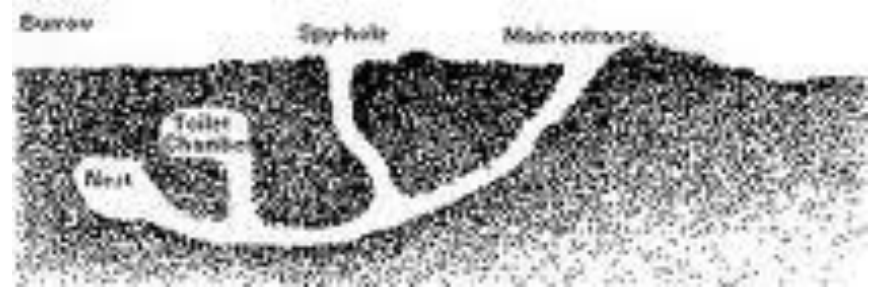
Functions of a foundation

- **Safety against undermining**

- **Can occur due to**

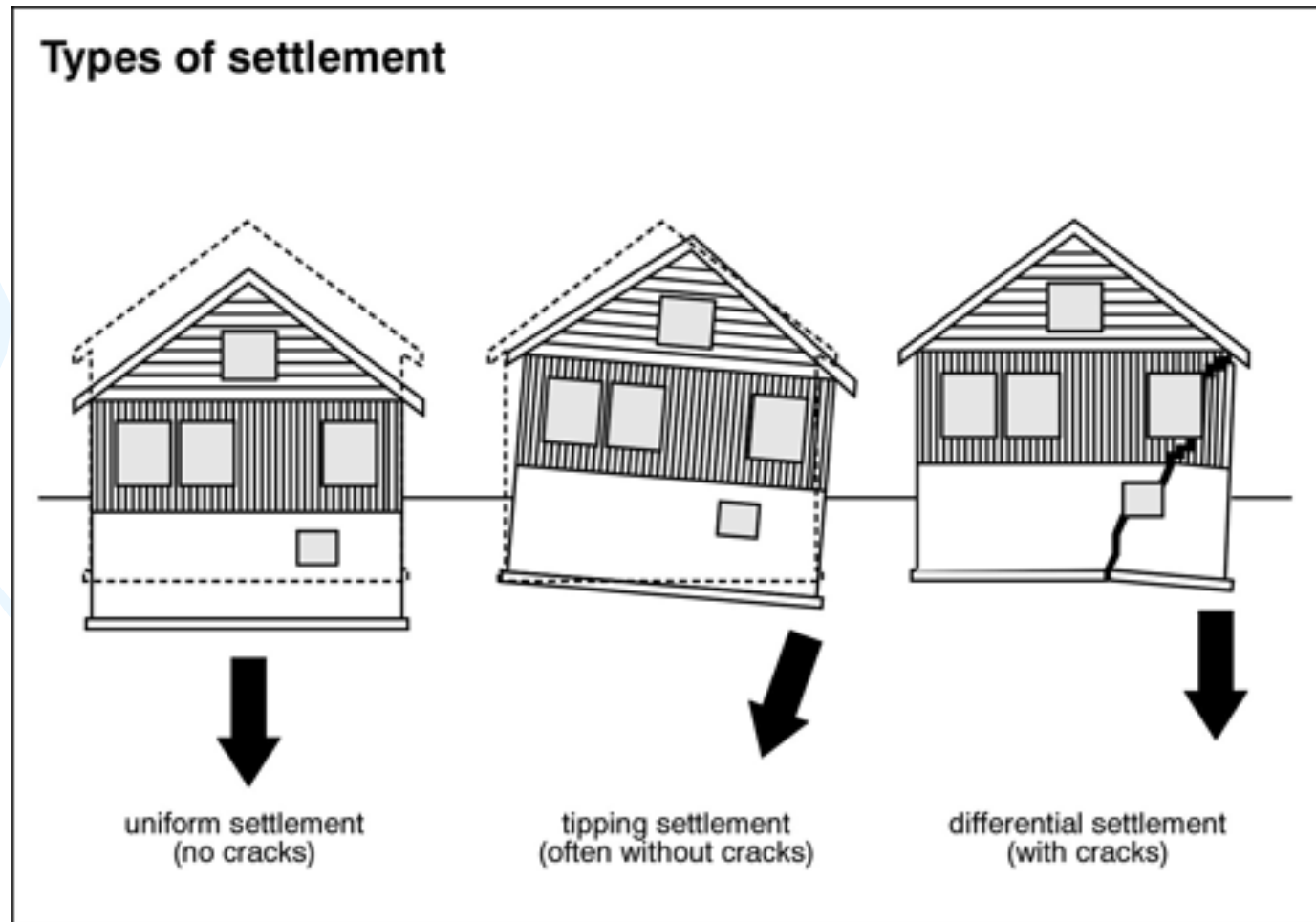
- ❖ **Burrowing animals**

- ❖ **Flood water**



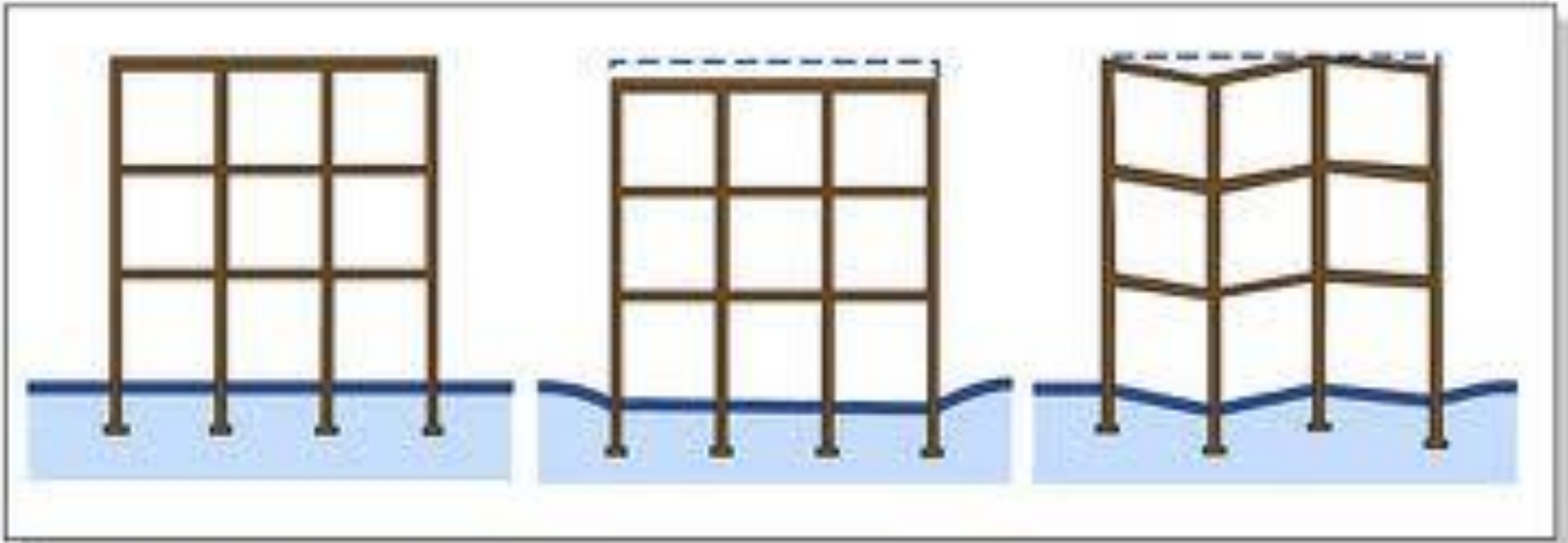
Functions of a foundation

- **Safety against soil movements**



Functions of a foundation

- **Safety against soil movements**



Functions of a foundation

- **Safety against soil movements**



Functions of a foundation

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Functions of a foundation

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Functions of a foundation

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Functions of a foundation

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Functions of a foundation

- **Safety against soil movements**
 - **Minimises distress (cracks) in superstructure**



Requirements of a good foundation

- **Able to sustain DL + LL**
- **Transmit the same to sub soil**
- **Without causing settlement**



Requirements of a good foundation

- **Base should be rigid**

- **To minimise differential settlement**



Requirements of a good foundation

- **Should be sufficiently deep**
 - **To avoid distress caused by subsoil movements**