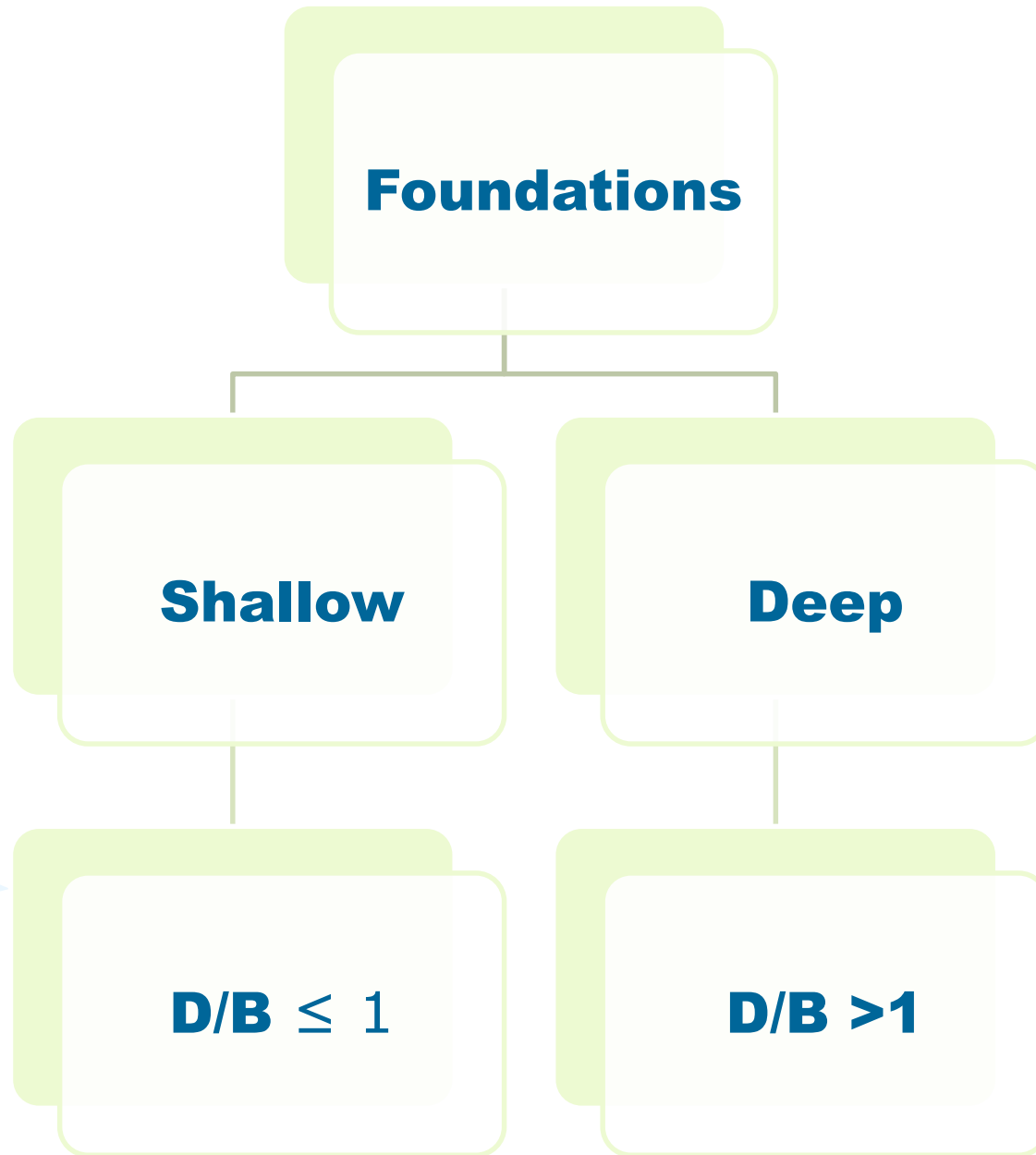


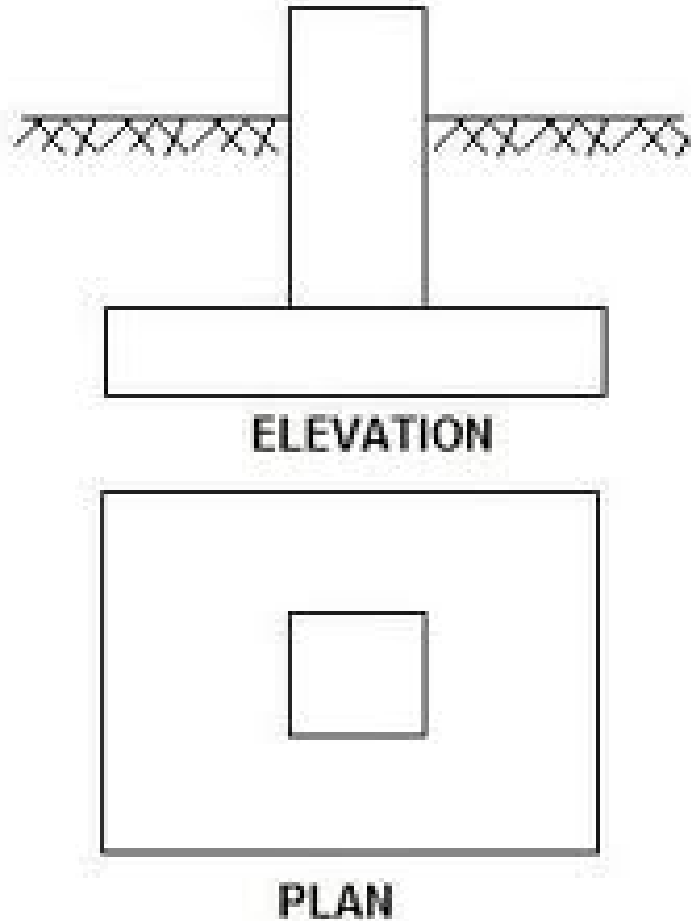


# **Types of foundations**

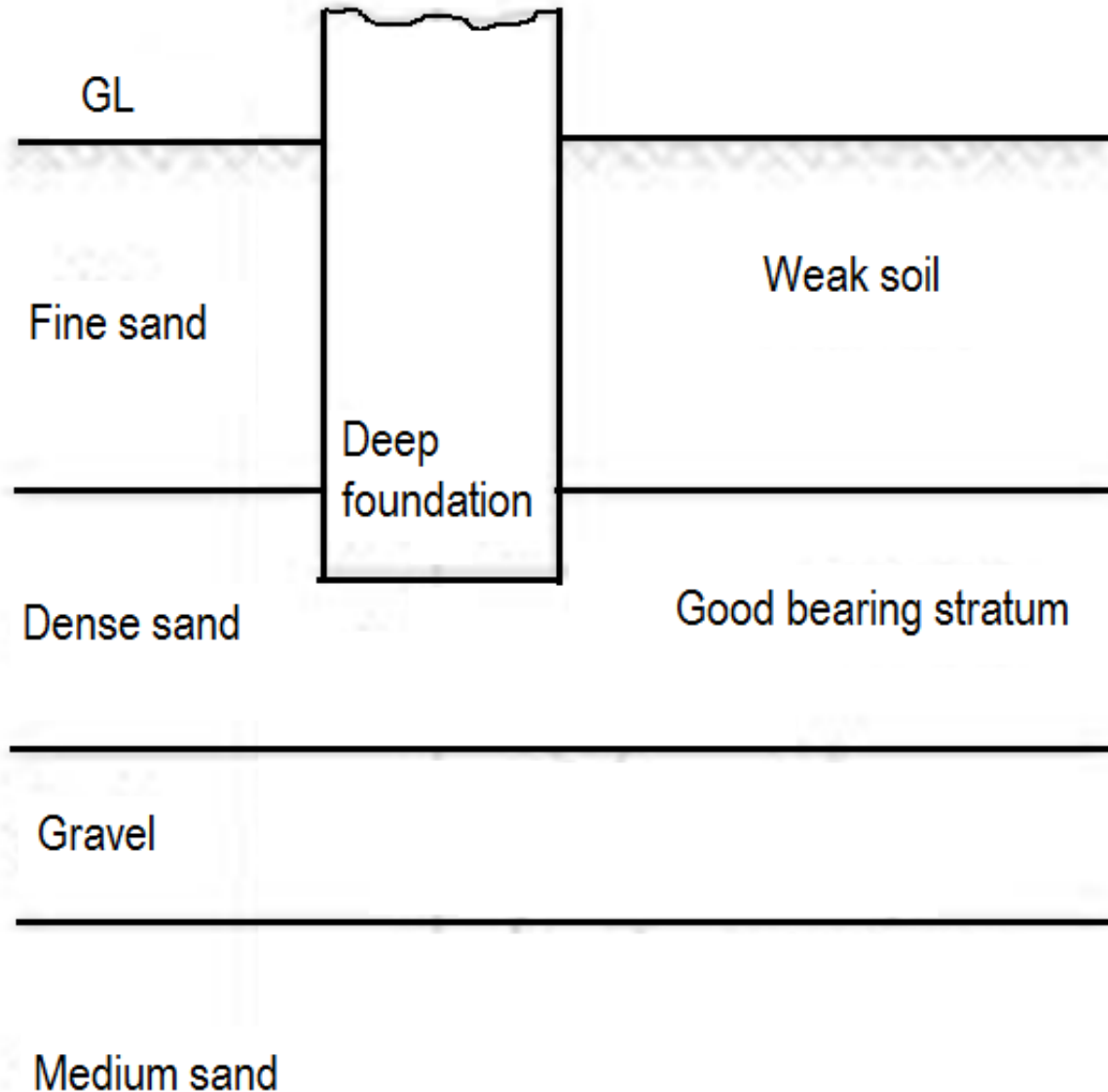
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# Shallow foundation



# Deep foundation





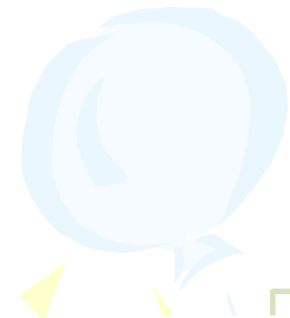
# **Shallow foundation**

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# **Spread footing**

- **Spread the super imposed load over a large area**
- **Support a column / wall**
- **Different types**



# **Spread footings**

## **Isolated / column footing**

## **Wall footing**

**Single column footing**

**Stepped column footing**

**Sloped column footing**

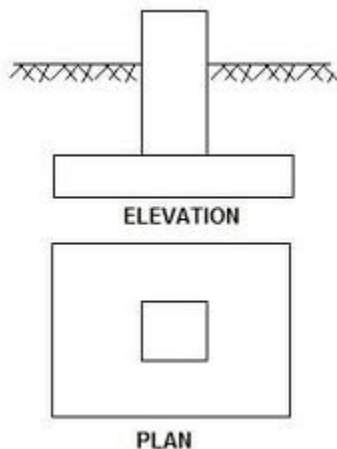
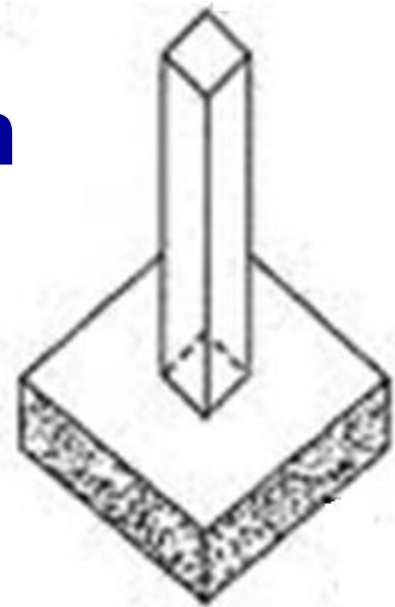
**Single wall footing**

**Stepped wall footing**

# Isolated footing

- **Single footing for a column**

- **Loaded area of column of size  $b \times b$**
- **Spread to a larger area  $B \times B$**
- **Through a single spread**



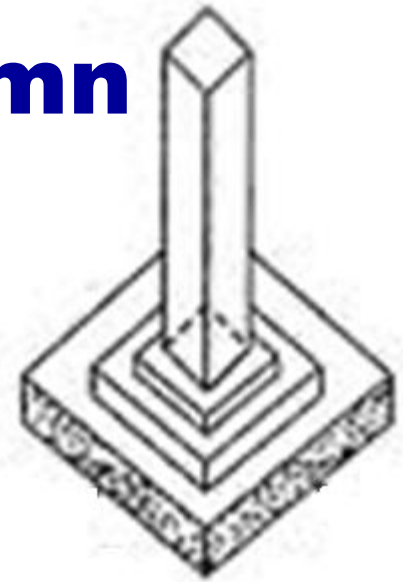
# Isolated footing



# Isolated footing

- **Stepped footing for a column**

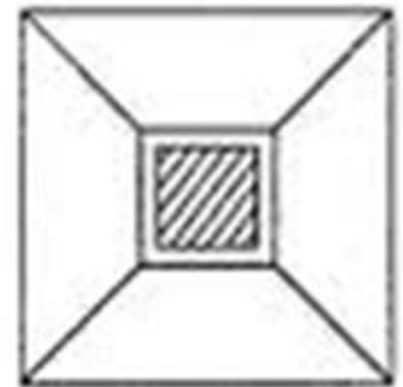
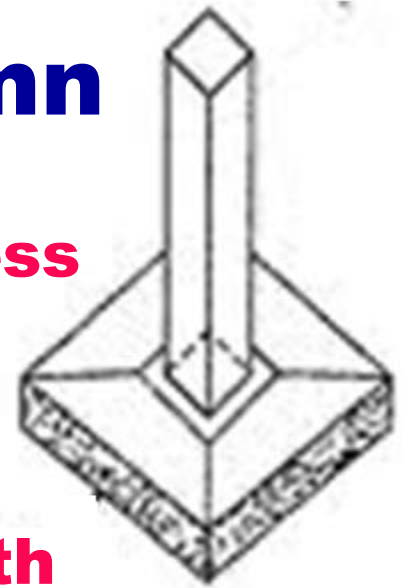
- **For heavily loaded column**
- **Requires greater spread**
- **Intensity gradually decreased by provision of steps**



# Isolated footing

- **Sloped footing for a column**

- **Base does not have uniform thickness**
- **Base is sloped**
- **Greater thickness at its junction with column**
- **Small thickness at ends**



# Isolated footing

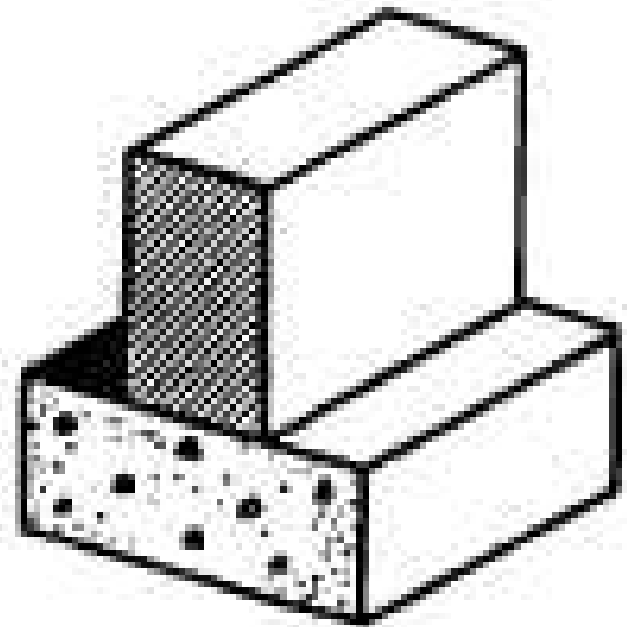


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# Wall footing

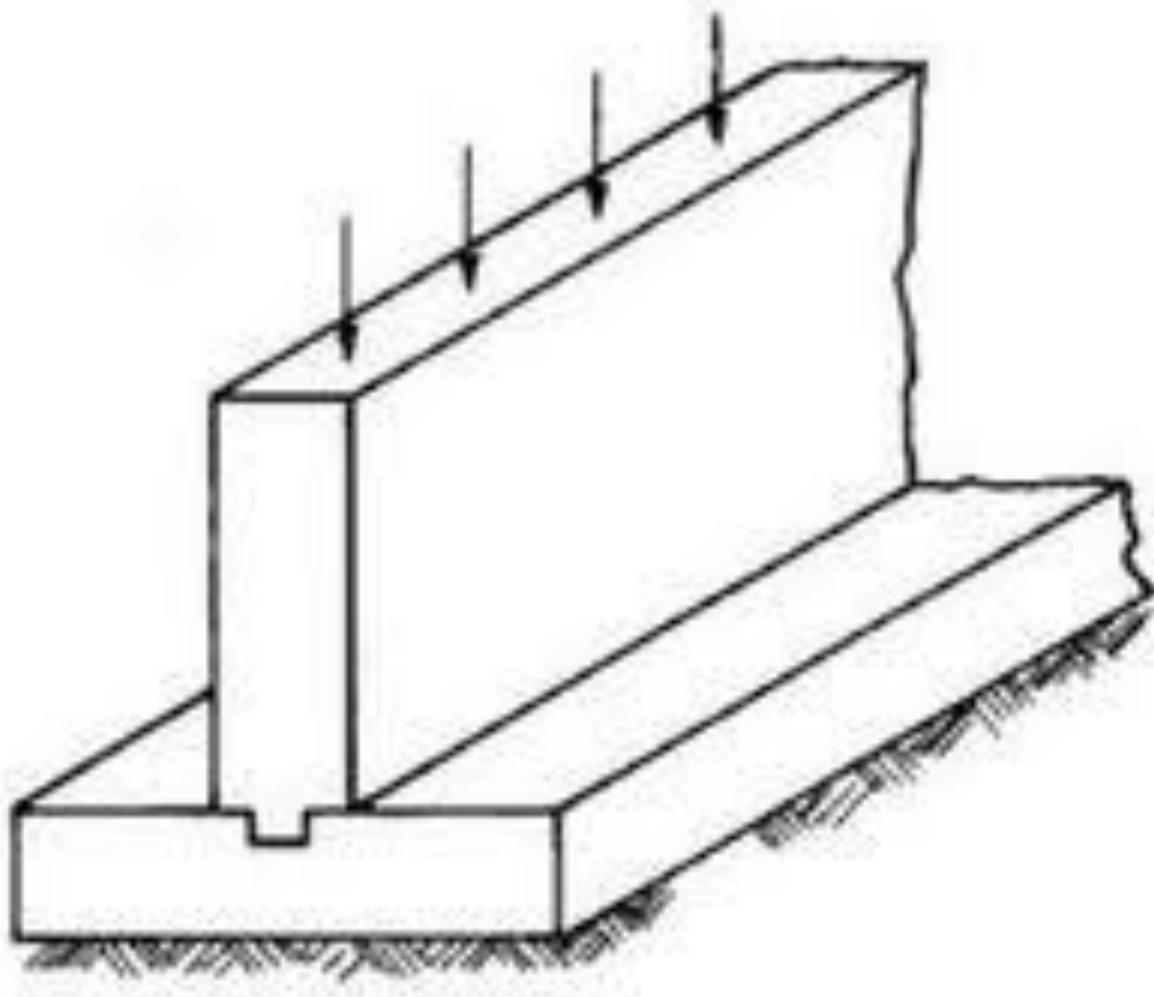
- **Simple footing for a wall**

- **Strip footing**
- **Single footing**
- **No steps**
- **For small loads**



**SIMPLE WALL  
FOOTING**

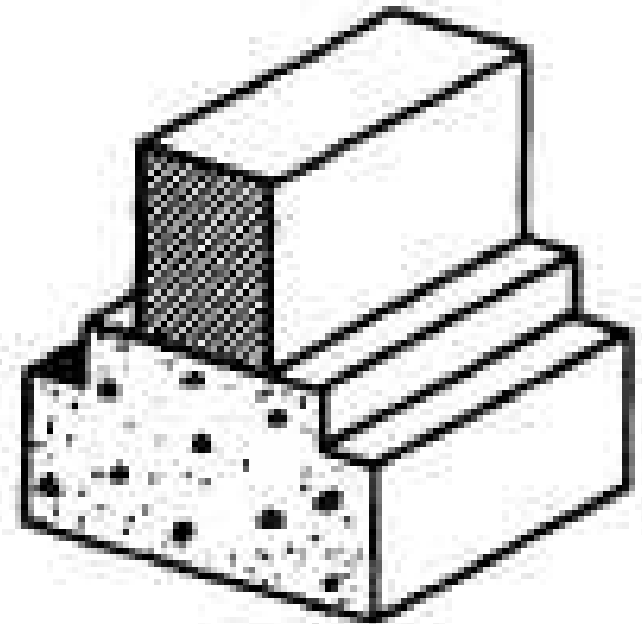
# Simple wall footing



# Wall footing

- **Stepped footing for a wall**

- **Has steps**
- **For large loads**
- **Projections - offsets**



**STEPPED WALL  
FOOTING**



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# Combined footing

- **A spread footing**
- **Supports two or more columns**



# **Combined footing**

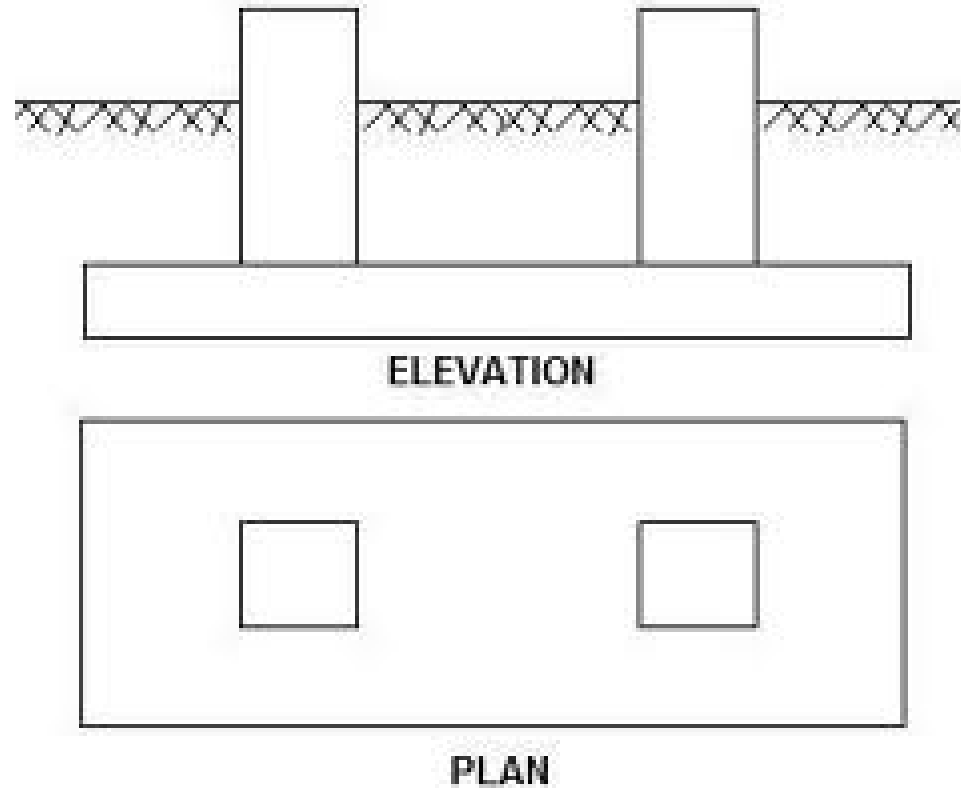
```
graph TD; A[Combined footing] --> B[Rectangular combined footing]; A --> C[Trapezoidal combined footing];
```

**Rectangular  
combined  
footing**

**Trapezoidal  
combined  
footing**

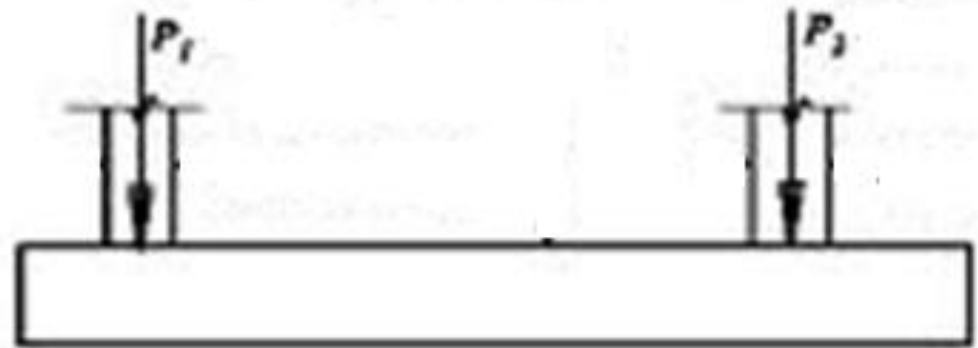
# Rectangular combined footing

- **Rectangular in plan**
- **Adopted when all columns carry equal load**

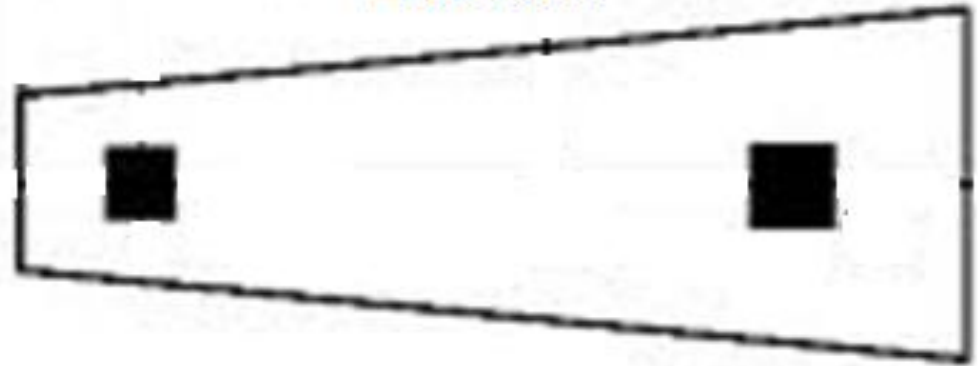


# Trapezoidal combined footing

- Trapezoidal in plan
- Adopted when columns carry unequal loads



Elevation



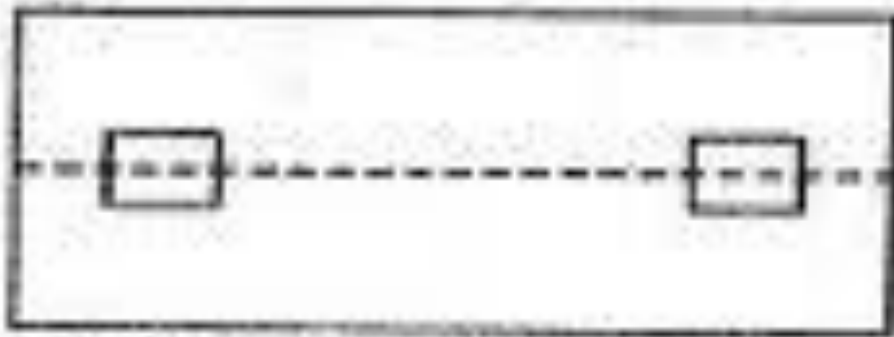
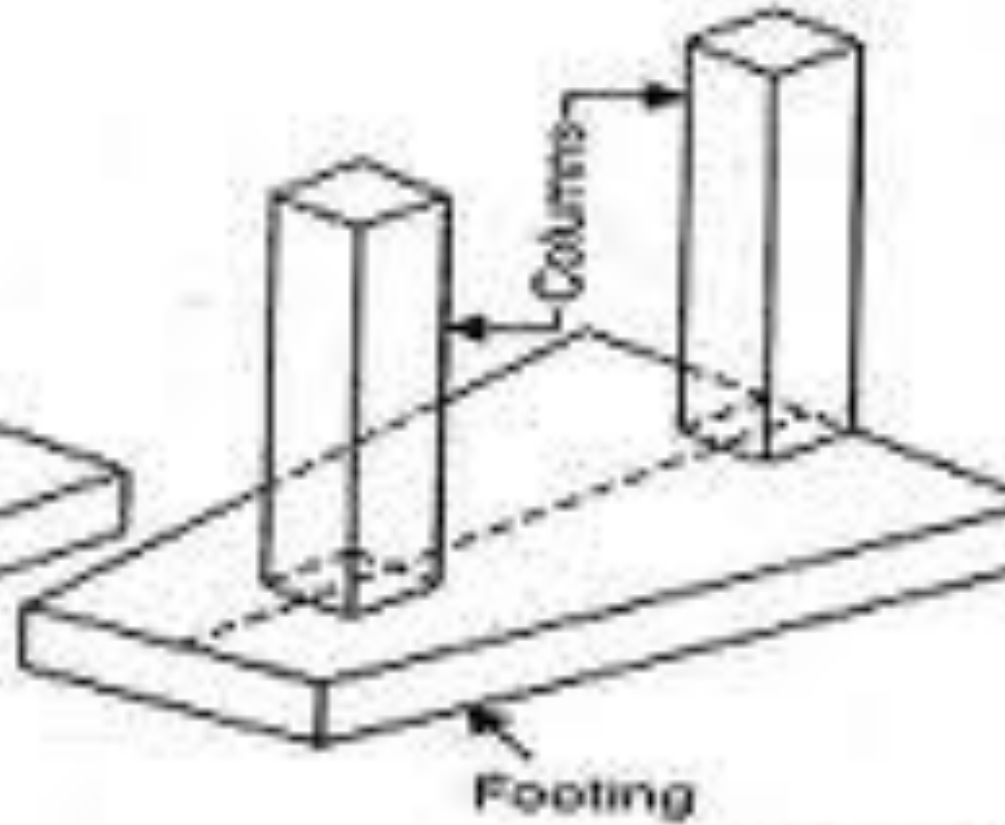
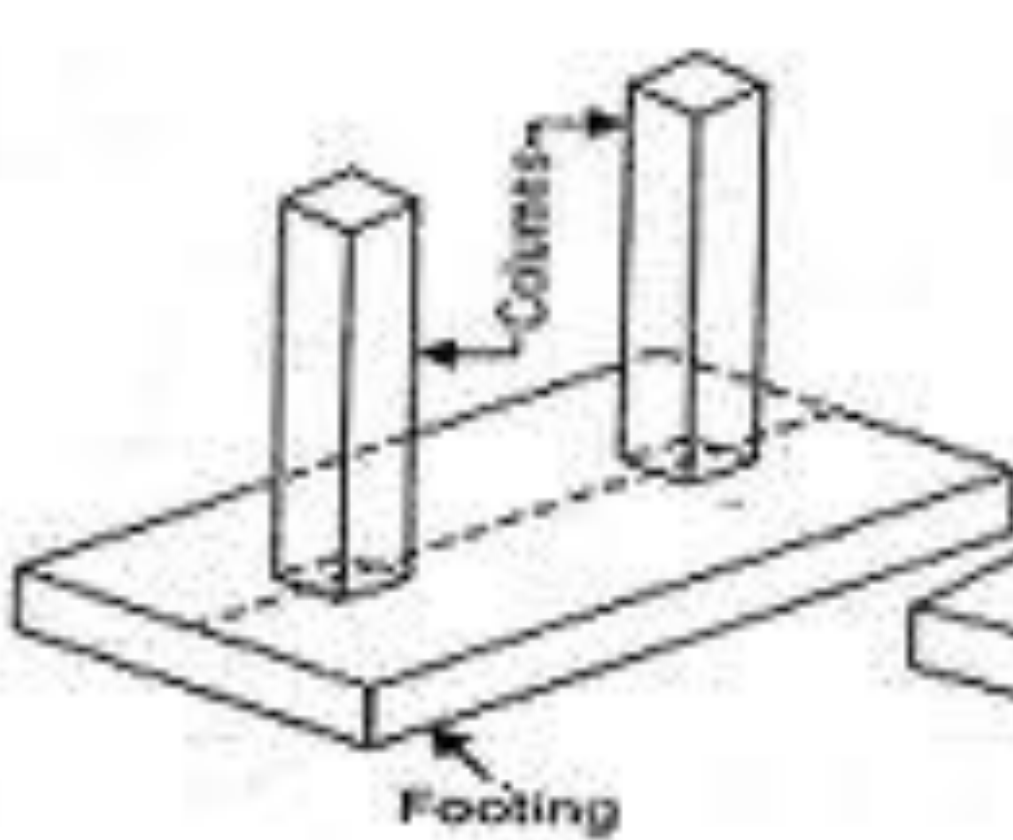
Plan



# Combined footing

- **Design criterion**

- **CG of column loads should coincide with centroid of footing**



(a) Rectangular footing

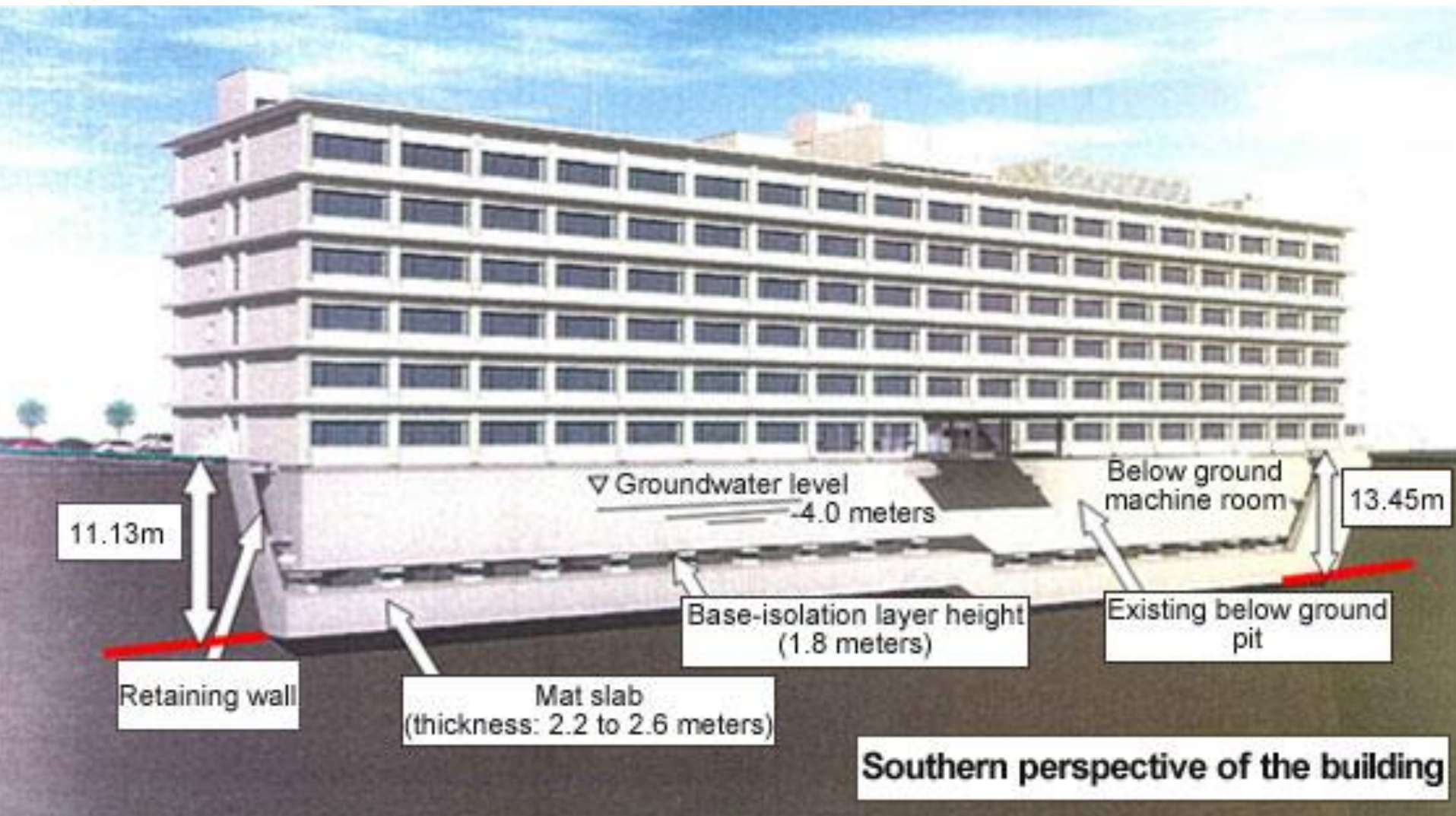


(b) Trapezoidal footing



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# Mat / Raft foundation



# **Mat / Raft foundation**

- **A spread footing**
- **A combined footing**
- **Slab that covers the entire area beneath a structure**
- **Supports all columns and walls in a structure**

# **Mat / Raft foundation**

- **When is it needed?**

- **SBC of soil is low**
- **Building loads are heavy**
- **Use of spread footing covers  $> \frac{1}{2}$  area of building - uneconomical**
- **Non uniform soil – differential settlement**

# Mat / Raft foundation



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# Mat / Raft foundation



# Mat / Raft foundation

- **Floating foundation**

- **Weight of (structure + raft)  $\approx$  weight of excavated soil**

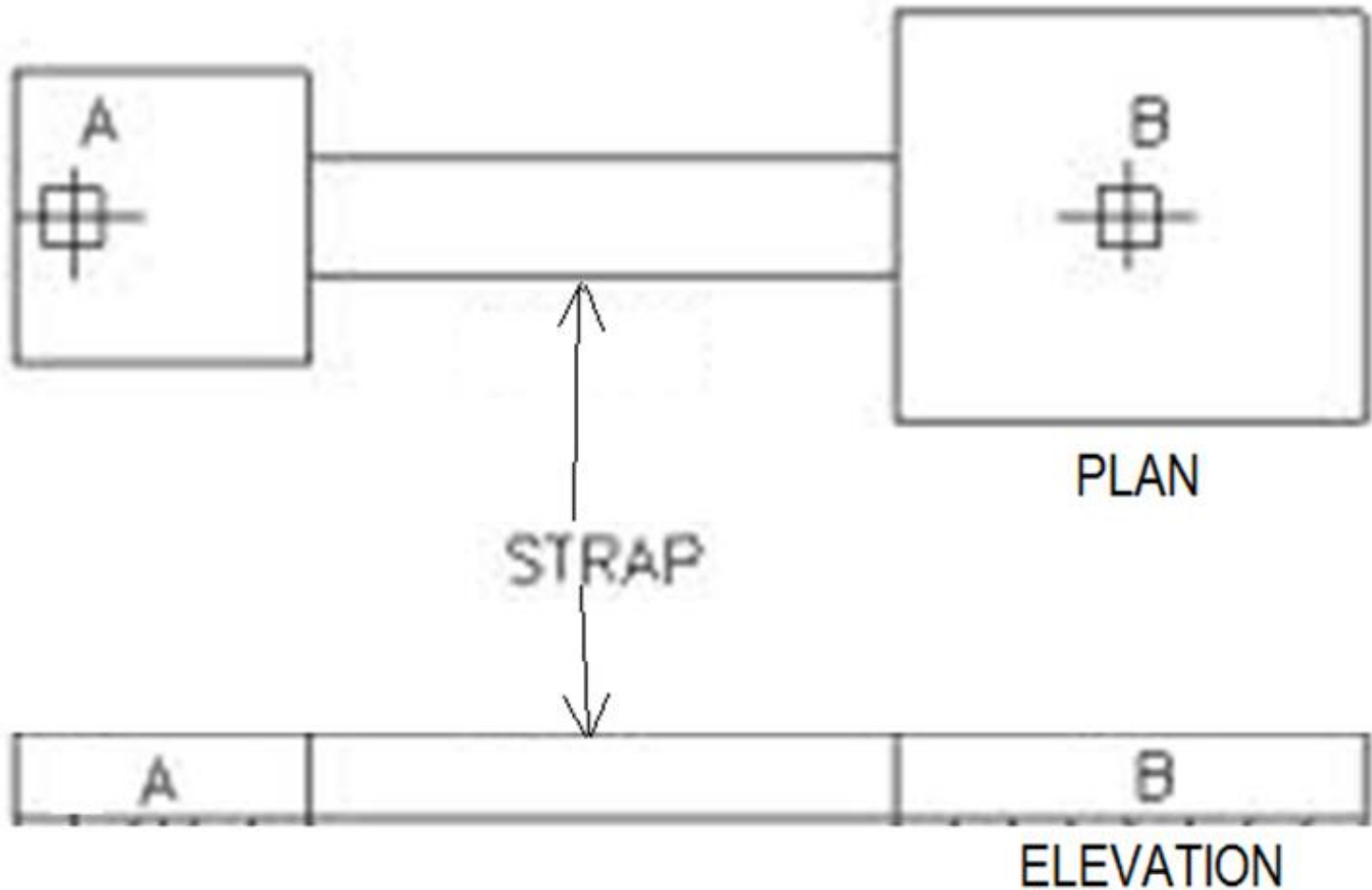
# **Strap footing**

- **Used when it is impossible to place a footing directly beneath a column – due to**

- **Land limitation**

- **Adjacent building nearby**

# Strap footing



# Strap footing

- **Columns connected by strap**
- **Load from exterior column – balanced by load of interior column**

# Strap footing



COMBINED FOOTING

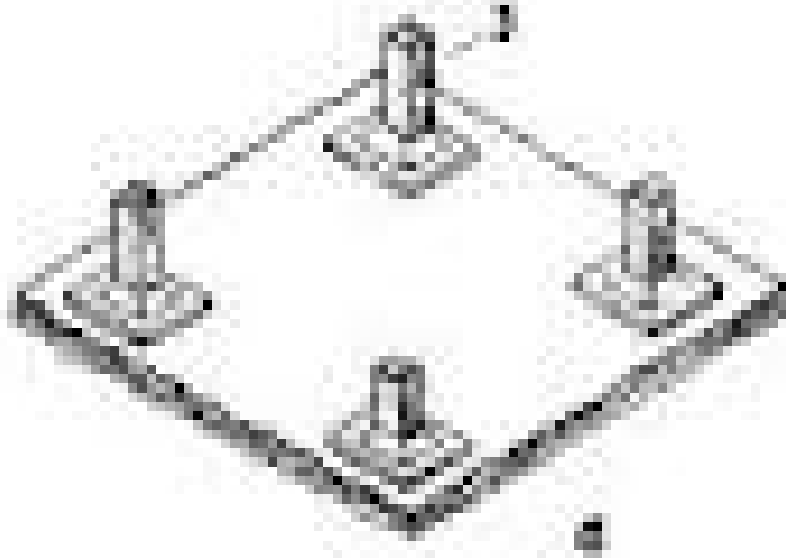


STRAP FOOTING

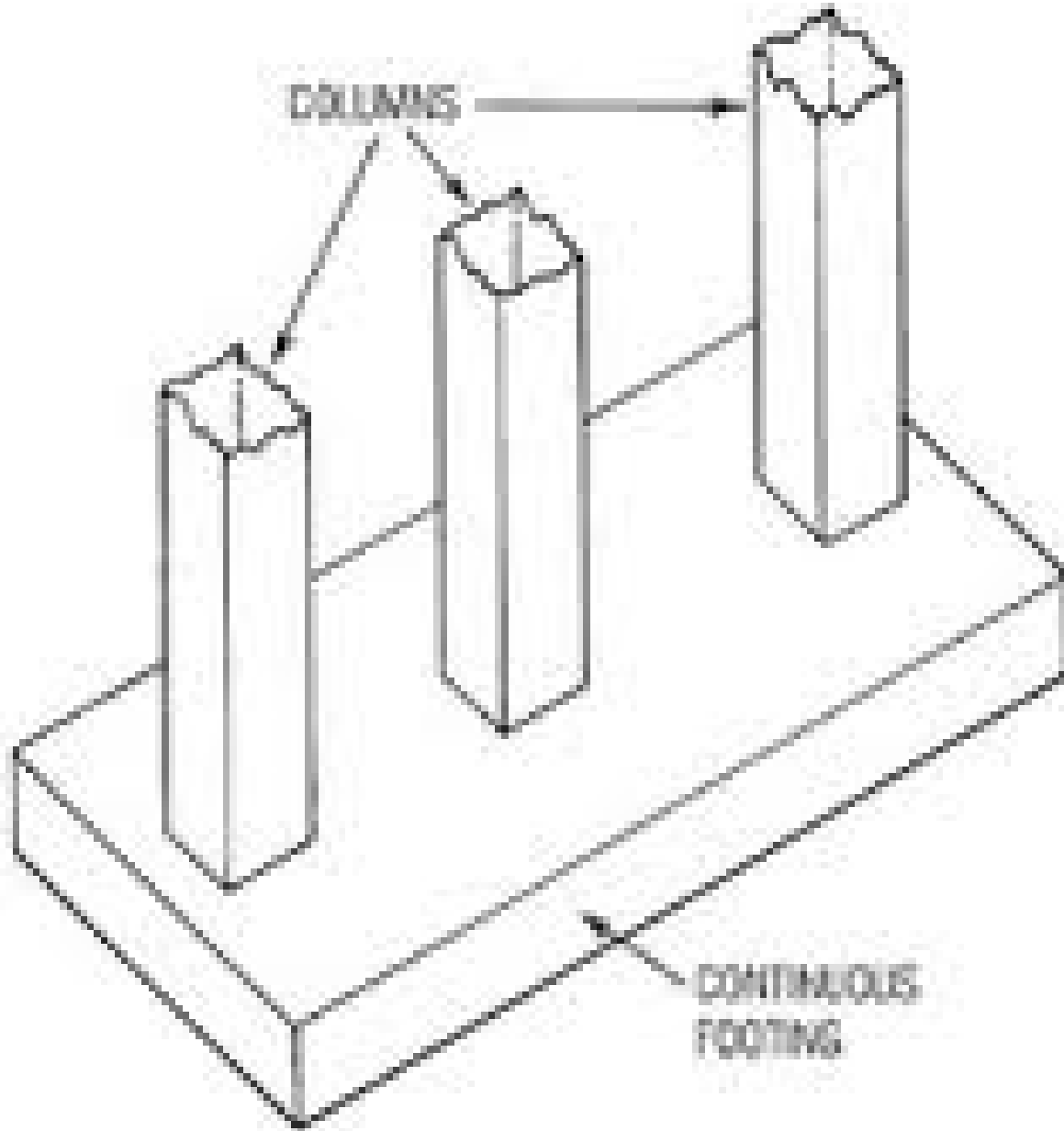
# **Continuous footing**

- **Single slab acts as foundation to 3 or more columns**
- **Safe against differential settlement**

# Continuous footing



# Continuous footing



# Continuous footing



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