



# STIFFNESS

## Stiffness of Reinforced Concrete Columns

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It is shown that the stiffness of reinforced concrete columns can be estimated by the use of the following equation:

$$K = \frac{1}{\frac{1}{K_c} + \frac{1}{K_s}} \quad (1)$$

where  $K_c$  is the stiffness of the column and  $K_s$  is the stiffness of the support.

- 1. The stiffness of the column is given by the following equation:
$$K_c = \frac{12EI}{L^3} \left( 1 + \frac{e}{L} \right) \quad (2)$$
- 2. The stiffness of the support is given by the following equation:
$$K_s = \frac{12EI}{L^3} \left( 1 + \frac{e}{L} \right) \quad (3)$$
- 3. The stiffness of the column is given by the following equation:
$$K_c = \frac{12EI}{L^3} \left( 1 + \frac{e}{L} \right) \quad (4)$$
- 4. The stiffness of the support is given by the following equation:
$$K_s = \frac{12EI}{L^3} \left( 1 + \frac{e}{L} \right) \quad (5)$$

where  $E$  is the modulus of elasticity of the concrete,  $I$  is the moment of inertia of the column,  $L$  is the length of the column, and  $e$  is the eccentricity of the load.

For a column of length  $L$  and eccentricity  $e$ , the stiffness is given by the following equation:

$$K = \frac{12EI}{L^3} \left( 1 + \frac{e}{L} \right) \quad (6)$$

where  $E$  is the modulus of elasticity of the concrete,  $I$  is the moment of inertia of the column,  $L$  is the length of the column, and  $e$  is the eccentricity of the load.

It is shown that the stiffness of reinforced concrete columns can be estimated by the use of the following equation:

$$K = \frac{1}{\frac{1}{K_c} + \frac{1}{K_s}} \quad (7)$$

where  $K_c$  is the stiffness of the column and  $K_s$  is the stiffness of the support.

The stiffness of the column is given by the following equation:

$$K_c = \frac{12EI}{L^3} \left( 1 + \frac{e}{L} \right) \quad (8)$$

where  $E$  is the modulus of elasticity of the concrete,  $I$  is the moment of inertia of the column,  $L$  is the length of the column, and  $e$  is the eccentricity of the load.

The stiffness of the support is given by the following equation:

$$K_s = \frac{12EI}{L^3} \left( 1 + \frac{e}{L} \right) \quad (9)$$

where  $E$  is the modulus of elasticity of the concrete,  $I$  is the moment of inertia of the column,  $L$  is the length of the column, and  $e$  is the eccentricity of the load.

It is shown that the stiffness of reinforced concrete columns can be estimated by the use of the following equation:

$$K = \frac{1}{\frac{1}{K_c} + \frac{1}{K_s}} \quad (10)$$

where  $K_c$  is the stiffness of the column and  $K_s$  is the stiffness of the support.

The stiffness of the column is given by the following equation:

$$K_c = \frac{12EI}{L^3} \left( 1 + \frac{e}{L} \right) \quad (11)$$

where  $E$  is the modulus of elasticity of the concrete,  $I$  is the moment of inertia of the column,  $L$  is the length of the column, and  $e$  is the eccentricity of the load.

The stiffness of the support is given by the following equation:

$$K_s = \frac{12EI}{L^3} \left( 1 + \frac{e}{L} \right) \quad (12)$$

where  $E$  is the modulus of elasticity of the concrete,  $I$  is the moment of inertia of the column,  $L$  is the length of the column, and  $e$  is the eccentricity of the load.