UNIT II - CONSTRUCTION PRACTICE - SUPER STRUCTURE

Joints in Concrete

Concrete expands and contracts with temperature changes and shrinks as it dries. To avoid cracks due to these movements, **joints** are provided in concrete structures. There are three main types of joints: **Contraction (Control) Joints**, **Construction Joints**, and **Expansion Joints**.

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1. Contraction Joints (Control Joints)

- **Definition**: Contraction joints are provided to control where the concrete cracks as it shrinks. These joints are cut or formed into the slab to allow for controlled cracking.
- **Purpose**: To control and manage the location of cracks caused by the shrinkage of concrete as it cures.

Key Features:

- **Location**: Placed at regular intervals (typically 4.5 to 6 meters apart for slabs).
- **Depth**: The joint is typically cut to a depth of about 25% of the concrete slab's thickness.
- **Tools**: Can be created using saw cuts, formed grooves, or pre-molded inserts.

Importance:

- Prevents random cracking in large concrete surfaces like floors, pavements, and walls.
- Ensures a neat and controlled appearance of cracks by directing them along predefined lines.

Example Applications:

- Driveways, pavements, large slab areas, and sidewalks.

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2. Construction Joints

- **Definition**: Construction joints are placed where concrete pouring stops and resumes, ensuring continuity between the old and new concrete.
- **Purpose**: To allow for the orderly continuation of concrete work when it can't be completed in a single pour.

Key Features:

- **Location**: Positioned where two successive pours of concrete meet (for example, between floors, walls, or different sections of a slab).
- **Reinforcement**: Often dowels or reinforcing bars are placed across construction joints to maintain structural integrity.
- **Types**:
    - **Butt Joint**: A straight joint where two sections meet.
    - **Keyed Joint**: A joint with interlocking keys to improve shear transfer.

Importance:

- Prevents movement or misalignment between adjacent sections of concrete.
- Ensures structural continuity and strength across multiple concrete pours.

Example Applications:

- Large concrete structures such as bridges, high-rise buildings, and long walls.

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3. Expansion Joints

- **Definition**: Expansion joints are designed to accommodate the expansion and contraction of concrete caused by temperature changes or structural movement.
- **Purpose**: To allow for expansion of the concrete due to heat, preventing damage or buckling.

Key Features:

- **Location**: Typically placed between different sections of a building or pavement, where significant movement is expected.
- **Materials Used**: Often filled with flexible materials such as rubber, asphalt, or pre-molded joint fillers to allow movement and seal the gap.
- **Thickness**: The width of expansion joints depends on the expected expansion or contraction, usually around 10-20 mm for most structures.

Importance:

- Prevents cracks and structural damage due to thermal expansion.
- Allows for independent movement of sections, preventing stress build-up.

Example Applications:

- Bridges, highways, large concrete slabs (like airport runways), and between building sections.