

# CONCRETE DEFINITION, TYPES, PROPERTIES & THEIR USES

## **Introduction :**

As we know concrete is a basic building material used in the construction.

So it is very important to know definition, types, properties and their uses of concrete.

Concrete is the second most used building material in the world.

This shows the importance of concrete in the construction industry.

## **Definition**

A concrete is a composite material made up of readily available materials like cement, fine Aggregates (sand), Coarse Aggregates mixed with water to form a binding material which hardens with time.

## **Types of concrete PDF**

Based on the proportions of raw materials and properties of concrete there are many different types of concrete.

In this article we will try to explain seven types of concrete each has different properties as well as uses.

They are

### **Normal Strength Concrete**

The concrete in which the basic ingredients are used for the manufacturing of concrete and the properties of concrete are mainly depends on the proportions of raw materials used.

The strength may vary from 10 Mpa to 40Mpa with setting time ranges from 30-90 minutes.

This properties of concrete are mostly depends on weather conditions at the site and also type of cement we are using.

## **Plain or Ordinary Concrete**

It is also known as pcc or plain cement concrete.

Here only concrete is used for the construction process and no reinforcement is used.

So this type of concrete is basically weak in tension but strong in compression.

That's why these are preferred in the construction of roads and as a Bed for footings, flooring, etc.

Unit weight of Plain cement concrete is 2400 kg/ cu.m

This type of concrete fails without showing any cracks or warnings to evacuate the place, So it is very dangerous to use in load bearing structures { beams, columns, Slabs ...}

Normal Grades used in plain cement concrete are –

M5, M7.5, M10, M15 { Here M stands for MIX and number states compressive strength of concrete after 28 days }

## **Reinforced Concrete**

Here the name states it is a reinforced concrete and it is strong in both compression and tension.

Due to load bearing capacity of reinforced concrete it is used and preferred in all types of concrete works.

The Unit weight of reinforced concrete is 2500 kg/ cu.m

As reinforcement is used in concrete it shows cracks and fail after warning

So it is safer than plain concrete and the grades used for the construction of Rcc structure are M20, M25, M30, M35, M40, M45, M50 etc.

## **Pre-stressed Concrete**

The concrete which is stressed before or after placing is known as Pre-stressed concrete.

Pre-stressing is done by two methods

Pre – Tensioning : Here the Tendons are stressed before pouring the concrete.

Post – Tensioning : Here tendons are stressed after pouring the concrete and attaining desired strength.

For detailed study on Pre-stressed concrete, see this video [Click here](#)

## **Precast Concrete**

concrete which is cast and cured at the manufacturing site and transported to actual site then assembled according to the plan is known as precast concrete.

This Type of concrete is good in quality also economical but only care is to be taken is to transport safely.

**Read Also : [What is Prefabrication ? Advantages and Disadvantages ?](#)**

## **Light – Weight Concrete**

Concrete which is lighter in weight and density less than 1920 kg/ cu.m is categorized under light weight concrete.

The factors which influence for density of concrete is Aggregates,

The examples of light weight aggregates are the pumice, perlites, and scoria.

These are used as cover materials for steel and also in the construction of building blocks.

## High-Strength Concrete

Concrete which has high strength greater than 40 Mpa can be termed as high strength concrete, this can be achieved by decreasing water cement ratio to lower than 0.35

But due to decrease in water cement ratio workability decreases that's only the issue.

## Properties of concrete

- Concrete is known by its grade which is designated as M15, M20 etc. in which letter M refers to concrete mix and number 15, 20 denotes the specified compressive strength (fck) of 150mm cube at 28 days, expressed in N/mm<sup>2</sup>.
- M20 and M25 are the most common grades of concrete, and higher grades of concrete should be used for severe, very severe and extreme environments.
- The unit weight of plain and reinforced concrete as specified by IS:456 are 24 and 25 KN/m<sup>3</sup> respectively.
- Water cement ratio for different grades of concrete shall not exceed 0.45 for M20 and above and 0.50 For M10 / M15
- For concrete grades, M20 and above approved admixture shall be used as per mix design requirements.

## Uses of concrete

- Concrete is the second most used building material in the world.
- It is used for building constructions
- marine constructions
- sewers and culverts
- Large constructions like Dams, Reservoirs etc..
- Pavements, Roads and runways
- Bridges etc,.

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