

## A Brief Introduction to Concrete



Concrete is an extremely versatile, strong and durable product. Because it can be made into almost any shape by building up, molding or casting, it can be used for both underground and above ground applications and is used throughout the construction industry for roads, dams, bridges, tunnels, runways, high rise buildings, houses, floors and even slender high stressed structures.

Concrete can be cast to form concrete blocks and bricks, paving slabs, lintels, beams, columns cladding panels, roofing tiles, pipes and ducts as well as more ornate features such as balustrades, coping stones and ornamental features.

It can also be used for some thin walled items, such as roofing sheets and rainwater goods, however some of these involve binding the cement with fibrous solids or even gas bubbles and are better suited to specialist factory manufacturers using more specialist plant and equipment.



Example of Precast concrete sections used to form the deck and arches of bridges.



By using formwork and shuttering complicated shapes and angles be formed.

Essentially concrete is an artificial (man made) stone consisting of cement and graded aggregates. When mixed with water, the cement reacts exothermically (chemical reaction accompanied by heat) to form hard strong masses with extremely low solubility. This chemical reaction is known as the hydration process and causes calcium-hydroxide to be formed from the cement. It is this calcium-hydroxide that binds all the aggregates together into the single mass we know as concrete.

Concrete has the ability to accept very high compressive stresses, but is poor when tensile stresses are applied. Because of this, steel reinforcement is introduced. The thermal expansion coefficient of concrete and steel react similarly making the combination a versatile and durable structural material.



Concrete poured into pre formed moulds is used to form more ornate items such as these balustrades.

Continuous development and the experience gained from the practical use of concrete technology combined with the constant advancements in modern manufacturing give Architects and Design Engineers ever increasing scope for new design and techniques.