

	combination of silica and alumina with calcium oxide during calcinations.		
Puzzolana cement	It is one of the oldest known cement invented by Romans. It is prepared by mixing and grinding volcanic ash (puzzolana) and slaked lime.	• Possess hydraulic qualities.	• Mixed with Portland cement for different applications
Slag cement	Prepared from hydrated lime and blast furnace slag (mixture of calcium and aluminum silicates).	• Low setting. • Low strength.	• Used for making concrete in bulk construction.

PORTLAND CEMENT

In 1824, Joseph Aspdin, a British (Leeds) stone mason, obtained a patent for a cement he produced in his kitchen. He heated a mixture of finely ground limestone and clay in his kitchen stove and ground the mixture into a powder to create a hydraulic cement. He took patent under the name "Portland Cement" because the concrete made from it looked like Portland stone, a widely-used building stone in England.

Portland cement is a fine mixture of calcium silicates and calcium aluminates of varying composition.

MANUFACTURE OF PORTLAND CEMENT

There are two methods for the manufacture of Portland cement. They are wet and dry process. These processes differ only in the treatment of raw material. In dry process water is not added during grinding.

The manufacture of Portland cement requires following raw materials

- i) Calcareous materials, CaO [such as limestone, chalk, marble etc]
- ii) Argillaceous materials, Al_2O_3 and SiO_2 [such as clay, shale, slate etc]
- iii) Powdered coal or fuel oil
- iv) Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$)