

# History of Concrete

## Concrete — The Building Material with Real Lasting Power

If you want something to last, make it out of concrete. Just ask the ancient Egyptians, Greeks and Romans. After thousands of years, countless temples, palaces, roads and bridges they built still stand.

Concrete is made of aggregates — particularly sand and gravel — bonded together permanently with powdered cement, water and a bit of air to make a durable, compact, fire-resistant and watertight building material requiring little or no maintenance.

As cement is mixed with water, cement compounds react and completely cover each particle and fill the spaces between them. The setting cement binds these aggregates into a solid mass. Over time, concrete actually grows stronger.

Concrete is the only major building product arriving at the job site in a plastic state that can be molded into nearly any shape before it hardens into an extremely strong, long-lasting material. This economical, easy-to-make product ranks as the world's most widely used building material. In fact, it serves as the foundation for nearly all of the skyscrapers, factories, dams, bridges and overpasses built today.

## Through The Ages

The Egyptians first put calcinated gypsum — the forerunner of concrete — on stone or brick to create a smooth coating. Ancient Greeks similarly utilized calcinated limestone, while the Romans made the first concrete out of broken bricks, mixed lime putty and brick dust or volcanic ash. They used it with stone to construct roadways, buildings and even the Appian Way aqueduct system which remains today.



After that, little concrete was used until advances furthering the development of cement occurred in England. In 1756, John Smeaton discovered that burned and slaked limestone hardened in the air and under water. Forty years later, James Parker improved cement by grinding it into a powder. In 1824, Joseph Aspdin patented a calcinated limestone and clay powder mixture and named it portland cement because, when made into concrete, it resembled stone from the isle of Portland.

Portland cement has remained the name of common structural cements, which are mixtures of dicalcium silicate, tricalcium silicate and tricalcium aluminate with small amounts of magnesium and iron from limestone, clays, shale and blast-furnace slag.

## Landmark Dates in Concrete Use

In 1816, the first concrete bridge was built in Souillac, France, and in 1825, the first modern concrete produced in the United States was used to build the Erie Canal, featuring cement from lime deposits in central New York.



The turn of the century brought rapid and dramatic advancements in concrete technology. Forms were being used to mold wet concrete into certain shapes, such as walls. Plus, metal began to be used to reinforce concrete in structural applications.

In 1902, August Perret designed and built a Paris apartment building using reinforced concrete. In 1905, Frank Lloyd Wright began building the Unity Temple in Oak Park, IL, with four identical sides, so his formwork could be used multiple times. In 1908, Thomas Alva Edison built 11 cast-in-place concrete homes in Union, New Jersey, that are still in use, and laid the first mile of concrete road.

## Ready-Mixed Concrete Introduced

In 1913, the first load of ready-mixed concrete was delivered in Baltimore, MD. This concrete was processed at a central mixing plant and hauled to the construction site in a dump truck. In 1914, the Panama Canal opened, with three pairs of concrete locks having floors up to 20 feet thick and walls up to 60 feet thick at the base.

Two years later, Stephen Stepanian of Columbus, OH, applied for a patent for the first truck mixer. He failed to get the patent because the prototype truck was too heavy to carry a load of concrete. In 1921, the large concrete parabolic airship hangars at Orly Airport in Paris were completed.

Within the next decade, trucking technology improved and ready-mixed concrete was being delivered in at least 25 cities across the United States. Some of these companies also supplied centrally mixed concrete that was delivered in dump trucks. By 1923, two of the Western Paving Company's concrete plants in Oklahoma City each produced up to 1,000 cubic yards of concrete a day.

## Mixers Carried A Cubic Yard

Early truck mixers could each carry only one cubic yard of concrete apiece, although over the years capacity gradually increased to three yards per truck. (Compare this to 10 to 12 yards per truck today.) Revolving drum agitator units were introduced for truck mixers. In Seattle, the first horizontal drum truck mixer — the Paris Transit Mixer — debuted in 1927, and became popular across the country.

At the same time, manufacturers were rapidly improving concrete production equipment. In 1927, the Erie Steel Construction Company of Erie, PA, developed the Aggremeter hopper which weighed and measured concrete ingredients by volume.

In 1928, Kuhlman Corporation purchased its first mixer trucks—two Barrymore concrete mixers mounted on White truck chassis. The cost was \$8,391 per unit.

In 1930, horizontal-axis revolving-drum mixer trucks — similar to today's concrete mixers — were introduced by three American manufacturers. Despite the Depression, the ready-mix concrete industry took off and the National Ready Mixed Concrete Association was formed that year. By 1941, more than 700 ready-mix plants were in operation in 442 U.S. communities. Ten years later, there were an estimated 1,700 ready mix plants in over 1,300 towns and cities.

## Advancements Continue

This period also brought incredible advancements to the concrete industry in the form of automatic features; electrical, air and hydraulic controls; high-discharge equipment; materials measurement and handling; plus scale operations. High-strength concretes also were being developed, in addition to heated concrete.

Rapid developments have continued. Today, Kuhlman Corporation and other major concrete producers make a science out of developing just the right concrete for a particular job. They have concrete laboratories, certified quality assurance specialists, a wide range of admixtures to chose from depending upon the job's requirements, plus the latest in computerized batching and dispatching equipment.



*When you need a building material with real lasting power, remember to choose Kuhlman concrete.*