

HISTORIC CIVIL ENGINEERING LANDMARKS

PROJECT NAME

YEAR DESIGNATED

[If a project is part of the Heritage Knowledgebase Database, its name is linked directly to that particular Web page. * Projects documented by Historic American Engineering Record (HAER). † Projects designated by the National Park Service as a National Historic Landmark or part of such a landmark.]

7th Street Improvement Arches, Minnesota

2000

The 7th Street Improvement Arches celebrate engineers application of mathematics to improve living conditions for civilization. The skewed, helicoidal, stone arch design has been described as “the most important piece of masonry in the city”, by *Associations of Engineering Societies Journal*, 1909. It is currently one of the only documented examples of helicoidal arch construction in the United States and the only known example in the State of Minnesota.

[Acequias of San Antonio, Texas](#)

1968

One of the earliest uses of engineered water supply and irrigation systems in the United States.

[Acquedotto Traiano-Paolo, Italy](#)

1992

The original aqueduct built by the Emperor Trajan, circa 110 AD, was a symbol of the advanced infrastructure of ancient Rome. Largely rebuilt in the 17th Century, it continues to provide water for the fountains of Rome as well as fulfills a partial need of the modern city.

[Acueducto de Segovia, Spain](#)

1999

One of the best preserved Roman constructions, the Roman Aqueduct at Segovia was still in use as recently as 50 years ago. Constructed around 50 AD, during the reign of the Roman Emperor Trajan, out of some 200,400 granite blocks, the aqueduct was made without concrete and stands due to equilibrium of forces.

Alaska Highway, Canada/United States

1995

The Alaska Highway, extending from Dawson Creek, British Columbia, to Delta Junction, Alaska, built in 1942 in just eight months. This 2500-km highway provided an essential transportation link for troops and equipment to Alaska and Northwest Canada during World War II.

[Allegheny Portage Railroad, Pennsylvania](#)

1987

Opened in 1834, this railroad was designed to carry fully loaded canal boats over the Allegheny Mountains (summit of railroad 2291 feet above sea level). The 36-mile project included the first railroad tunnel in the United States, 10 double-track inclined planes and 4 viaducts. In 1844, John A. Roebling replaced the hemp rope with wire rope, the first such use in the United States.*†

Alvord Lake Bridge, California

1969

Built in 1889 by Ernest L. Ransome, this bridge, located in San Francisco's Golden Gate Park, is the oldest (and first to be constructed in the United States) concrete arch bridge with steel reinforcing bars.*

Armour-Swift-Burlington Bridge, Missouri

1996

A unique, telescoping vertical-lift, steel-truss bridge spanning the Missouri River at Kansas City since 1912, is representative of the innovative moveable bridges designed by former ASCE President and leading bridge engineer, John Alexander Low Waddell. It was originally designed with a movable lower span to carry the rail traffic while the upper span carried uninterrupted highway traffic. Recent renovation has closed the bridge to highway traffic.

Arroyo Seco Parkway, California

1999

This 6.7-mile parkway was the first freeway built as a state highway in the United States and the first freeway west of the Mississippi.

Ascutney Mill Dam, Vermont

1970

Built in 1834 and still in service today, it is among the very earliest masonry dams of significant size. Made of granite and measuring 120 feet in length with a crest 42 feet above tailwater, it is the structural precursor of today's concrete gravity dams.

Atlantic City Convention Hall, New Jersey

1983

When completed in 1929, this hall was the world's largest auditorium and the greatest permanent span three-hinged roof arch system ever built. This bold feat of structural engineering remains in service today.

Bailey Island Bridge, Maine

1983

Completed in 1928, the Bailey Island Bridge traverse is an 1150-foot stretch of high tidal water with swift currents, severe saltwater exposure, and heavy winter ice floes. The bridge is an innovative split-stone open crib construction carrying the concrete deck; a concrete span crosses the navigation channel. The bridge continues to serve its function without impeding tidal flow, an exceptional example of an engineering solution to extremely unusual conditions.*

Baltimore & Ohio Roundhouse & Shop Complex, West Virginia

2001

The Roundhouse is the sole surviving cast-iron framed roundhouse and an important example of mid-19th century industrial building design. Designed by Albert Fink, in collaboration with Benjamin H. Latrobe, it represents an early use of standardized, prefabricated iron structural elements to create an efficient and fire-resistant building.

Bayonne Bridge, New Jersey

1985

Completed in 1931, this steel arch bridge, designed principally by Othmar Ammann (Hon.M.ASCE), was the greatest span (1675 feet) of its type in the world and remained so until the New River Gorge Bridge at West Virginia exceeded it by 25 feet in 1977. It was the first major bridge to use manganese steel for its main structural members. The bridge was on an innovative system of falsework, developed to preclude the need for heavy anchorages.*

Belle Fourche Dam, South Dakota

1988

A key element in the Belle Fourche reclamation project, this was the largest homogeneous rolled-earth fill dam in the world when completed in 1911. The project's engineers developed many of the quality standards that became the practice for later major compacted-soil structures.

Bethlehem Waterworks, Pennsylvania

1971

This is the first known pumping system providing drinking and wash water in the North American Colonies. The existing building is dated 1761, but it was preceded by an experimental frame building dated 1754. A wooden waterwheel, driven by the flow of Monocacy Creek, drove wooden pumps lifting the water through wooden pipes to the top of the hill where water was distributed by gravity.†

Bidwell Bar Suspension Bridge, California

1967

An example of the typical suspension bridges constructed during California gold rush days, the Bidwell Bar Suspension Bridge was built in 1856 over the Feather River approximately 10 miles northeast of Oroville. The bridge has been reconstructed at a historical park about a mile from its original site and it is the only remaining suspension bridge of its time in the West.*

Blenheim Bridge, New York

1983

Constructed in 1855, this covered wooden truss bridge designed and built by Nicholas Powers is the longest (210 feet) bridge of its kind in the world. This record clear span was achieved by an ingenious interlocking of truss and arch action and remains today as a tribute to American engineering. This bridge is one of the few bridges on the Register of National Historic Landmarks of the National Park System.†

Blimp Hangars, California

1993

These blimp hangars constructed in 1943 remain the largest clear span wooden structures in the world. They demonstrate civil engineering ingenuity in response to a wartime shortage of typical building materials.

Blue Ridge Parkway, Virginia-North Carolina

1999

Begun in 1935, this 469-mile scenic highway was, at the time, the longest road ever planned as a single unit in the United States. The Parkway includes numerous engineering accomplishments over a wide variety of terrains, and includes the first segmental structure in North America built using progressive placement (Linn Cove Viaduct). The Parkway was designed to provide scenic variety, including road routing along mountainsides, plateaus, streams, and broad river valleys, providing motorists with one of the most diversified experiences in the world.

Bollman Truss Bridge, Maryland

1966

The noted Baltimore bridge engineer Wendel Bollman built this 80-foot double truss span in 1869. It is the only remaining example of a patented design that was used extensively on the Baltimore & Ohio and other railroads.*†

Bonneville Dam, Columbia River System, Oregon

1987

This dam, put on stream in 1937, was the first Federal dam of 55 major hydroelectric projects on the Columbia River. They constitute the largest hydroelectric system in the world and have contributed immeasurably to the development of the Pacific Northwest and the nation.†

Borden Base Line, Massachusetts

1980

Completed in 1831 the Borden Base Line of over 39,000 feet remains today, an outstanding achievement in precision measurements made possible by the inventiveness of the American civil engineer, Simeon Borden. Through this work, American skill in geodetic engineering attained international acclaim.

Boston Subway, Massachusetts

1978

Open for service in 1897, this subway was the first in North America and, as an engineering innovation, became the prototype for other urban mass transit subway systems in the United States.†

Bridgeport Covered Bridge, California

1970

Built in 1862, this bridge is the longest single span (230 feet) covered bridge west of the Mississippi River. The design is best described as a Burr truss. The bridge, which originally carried heavy freight between Marysville, California and Virginia City, Nevada, remains in service.

Bridges of Keeseville, New York

1987

Keeseville has three remarkable operational 19th century bridges of different types all within 500 yard of each other: a 100-foot span stone arch (1843); a wrought iron Pratt truss (1878); and a twisted wire cable suspension bridge (1888). The evolution of civil engineering materials, analysis, and design, are clearly illustrated by these structures, all of which remain in service.

Bridges of Niagara, Canada/United States

1992

The Niagara River gorge has been the site of a number of historically significant bridges. Ellet's suspension bridge of 1849, Roebling's railroad suspension bridge of 1851, C.C. Schneider's railroad cantilever of 1883, L.L. Buck's two arch bridges (1897—1898), and Shortridge Hardestry's Rainbow (1941) all influenced the development of long-span bridge design and construction.

Brooklyn Bridge, New York

1972

When completed in 1883, the Brooklyn Bridge was the longest suspension bridge in the world and the first to use steel cables and trusses. Designed by John A. Roebling, the bridge was built under the supervision of his son Washington. *†

Brooks AFB, Old Hangar 9, Texas

1998

In 1918, during its first year of operation, Brooks Field consisted of 16 hangars with extensive support facilities. Of these early buildings, Hangar 9, dedicated to the memory of Edward H. White II is the only structure still in existence.

Buffalo Bill Dam, Wyoming

1973

When completed in 1910, the dam was the highest in the world, and the only one with a height/width ratio greater than one. This was the first major concrete arch dam designed and built using trial-load analysis techniques.*

Bunker Hill Covered Bridge, North Carolina

2001

Bunker Hill Covered Bridge, constructed in 1895 and restored in 1994, is the only remaining example of the improved lattice-truss timber bridge patented by Herman Haupt in 1839. Haupt, in charge of railroad engineering for the Union Army during the Civil War, evolved the design while developing a rational method for truss analysis as outlined in his 1851 book, "General Theory of Bridge Construction," one of the earliest American books on bridge engineering.

Cabin John Aqueduct, Maryland

1972

Built from 1857-1863 under the direction of Capt. Montgomery C. Meigs, this was the longest span stone masonry arch in the world until 1903. This structure is still serving the basic purpose for which it was built, providing water to Washington, DC, as well as carrying the traffic loads.*†

Canton Viaduct, Massachusetts

1998

Since its opening in 1835, the Canton Viaduct has been a continuous service to high-speed rail. This 21-arch granite masonry bridge was uniquely designed with hollow spaces between walls, connected by solid buttresses between arches. The slightly curved, functional bridge is 615 feet long, 70 feet high and 22 feet wide.*

Cape Cod Canal, Massachusetts

1985

Under Chief Engineer William Barclay Parsons (Hon.M.ASCE), this sea-level canal's 17-mile length opened in 1914 after being designed to cope with a tidal differential of 4.5 feet coupled with a three-hour out-of-phase tidal cycle without the use of locks. The canal has since been improved and is now maintained by the U.S. Army Corps of Engineers.

Cape Hatteras Lighthouse, North Carolina

1999

Constructed in 1870, this lighthouse, at 198 feet, is the tallest in the United States and the second tallest brick light tower in the world. As part of an integrated system of navigational aids, providing safer maritime travel along the mid-Atlantic coastline, the lighthouse warned mariners of the treacherous "diamond shoals" located just off Cape Hatteras.

Carrollton Viaduct, Maryland

1982

Designed and built by Casper Weaver, the viaduct was the first major structure on an American railroad. Completed in 1829, this two-span masonry arch remains in full service, a monument to our civil engineering heritage.*†

Castillo de San Marcos, Florida

1975

This is a unique link between medieval European military engineering and modern American civil engineering. It is the oldest (1695) major engineered structure in the United States.*

Cedar Falls Water Supply, Seattle, Washington

2000

This is first municipally owned hydroelectric project in the United States and the forerunner of the public power movement.

Central Pacific Railroad, California

1968

America's first transcontinental railroad began in Sacramento in 1863, and was completed in 1869 at Promontory, Utah. The railroad was organized and located over the Sierra Nevada Mountains by Theodore Judah.*

Chain of Rocks Water Purification Plant, Missouri

1981

At this plant, a civil engineer and a chemist cooperated in the spring of 1904 on an innovative process of chemical coagulation (ferrous sulfate/lime) to purify the highly turbid water of the Mississippi River. This pioneering effort was recognized internationally as an outstanding success in the field of municipal water supply.

Charles River Basin Project, Massachusetts

1981

In 1910, this environmental engineering project converted 675 acres of estuarial muck into a freshwater basin of beauty and recreational value. John R. Freeman, (1922 ASCE President), was Chief Engineer for the study committee, and Frederic P. Stearns, (1906 ASCE President), was consulting engineer for the construction. This project has served as an international model in environmental engineering, landscape architecture, and urban planning.

Charleston-Hamburg Railroad, South Carolina

1969

At the time of its construction in 1833, the Charleston-Hamburg Railroad was the world's longest railroad (136 miles). Designed and constructed by Horatio Allen, (1873 ASCE President), it was the first to operate passenger trains on an established schedule, the first to use a steam locomotive built in the United States, the first railroad to be completely locomotive powered, and the first to carry mail.

Charlestown Naval Dry Dock, Massachusetts

1977

Built between 1827 and 1833 the Charlestown Naval Dry Dock, Boston, Massachusetts, and the Gosport Naval Dry Dock, Norfolk, Virginia are two of the earliest major structures of their type in the United States. Despite the lack of scientific knowledge of hydraulics and geotechnology at the time, Loammi Baldwin II and his associated engineers successfully completed these projects which served the U.S. Navy for well over a century.*†

Cheesman Dam, Colorado

1973

When completed in 1905, the Cheesman Dam was the world's highest gravity stone arch masonry dam. It was the first major dam in the United States to incorporate the gravity arch concept in its design. As the key structure in the Denver water supply system, the dam provided the first continual on-stream storage of water for municipal use in the semi-arid west.

Chesapeake and Delaware Canal, Delaware

1985

The Chesapeake and Delaware Canal was originally built between 1825-1829 by the Erie Canal civil engineering team of Benjamin Wright (“Father of American Civil Engineering”), Canvas White, and Nathan Roberts. Benjamin H. Latrobe, Sr., had begun the project a few years earlier. A three-mile long, 90-foot deep cut, ingeniously engineered and constructed, was designed to overcome the 14-mile route of hill of unstable earth and tidal marshes. Between 1921 and 1927, the United States Army Corps of Engineers converted the project into a sea-level canal, eliminating its locks, and expanding its width and depth. The canal remains in service today as a major national waterway and a tribute to Albert Gallatin’s original “master transportation plan” of 1808.

Chesbrough’s Water Supply System, Illinois

1972

This famous 1869 water tower and pumping station in Chicago stand as symbols of civil engineering achievement. Comprised of a two-mile tunnel under Lake Michigan with an intake crib to provide a safe potable water supply for the citizens of Chicago, the tunnel was designed to supply 50 gallons of water per capita per day for one million inhabitants. The chief engineer was Ellis Chesbrough, (1878 ASCE President).

City Plan of Philadelphia, Pennsylvania

1996

Dating from 1682, the City Plan of Philadelphia has provided a model that has helped mold the development of cities throughout the country. Key features, many of which were firsts in the United States, include a gridiron street pattern, street widths appropriate to their function, open public squares, a central public square for future public building, and the provision of ample land for future development within the plan.

City Plan of Savannah, Georgia

1977

The Savannah city plan, whose execution began in 1733, is the oldest city plan in the United States to use a repetitive modular grid with mixed residential blocks and multi-purpose public areas. This model has produced a city internationally known for the beauty of its neighborhood squares. It is a notable example of an urban planning concept still emulated by modern civil engineers-planners.†

Cleveland Hopkins Airport, Ohio

1979

Completed in 1925, this Ohio airport is the first major municipal airport to provide an integrated engineered system of paved landing surfaces, floodlit runways, and a terminal complex consisting of both operational buildings and hangars.

Colorado River Aqueduct, California

1994

The 242-miles Colorado River Aqueduct made the large-scale population and economic growth of Southern California possible. Constructed between 1933–1941, this aqueduct was selected in 1955 as one of ASCE’s original Seven Modern Civil Engineering Wonders because of its unprecedented cost, length, pumping rate, lift, severe climate and terrain.*

Columbia River Scenic Highway, Oregon

1984

Built between 1913 - 1922, this is an outstanding example of civil engineering, which blended 74 miles of roadways, tunnels, viaducts, and overlooks into the natural environment harmoniously . Opened early in the automobile era, it was responsible for accelerating the development of the Northwest, while preserving its beauty.*†

Columbia-Wrightsville Bridge, Pennsylvania **1984**

When completed in 1930 this was the longest (one-mile) multiple-arch concrete highway bridge in the world. To achieve this economically, civil engineers developed a unique system of combining a parallel construction railway, track mounted whirly cranes and reusable steel forms. It remains in full service today and is the site of a historic American Covered Bridge, 1812-1833.

Conwy Suspension Bridge, Wales **2002**

A major structure on the strategically important Bangor to Chester road, Conwy Suspension Bridge, Telford's most dramatic creation in the gothic style, was built with the identical technology developed for the larger Menai Bridge and still has its original iron chains.

Conwy Tubular Bridge, Wales **2002**

Built for the Chester-Holyhead Railway, which provided rail access to the sea crossing to Ireland, this bridge was a forerunner to Robert Stephenson's Britannia Bridge over the Menai Strait. Conwy Tubular Bridge was the first railway bridge in which trains ran through the main girders. It represents a pioneering use of wrought iron for bridges and a major advance in the development of box-section girder elements.

Cornish-Windsor Covered Bridge, New Hampshire-Vermont **1970**

This two-span covered bridge, with an overall length of 460 feet, is the longest covered bridge existing in the United States. It is a town lattice timber truss design of a type widely used on many early timber bridges and later in building construction. Rebuilt in 1988, the bridge was originally constructed in 1866.*

Cortland Street Drawbridge, Illinois **1981**

Completed in 1902 and still in use, this trunnion-bascule highway bridge was the first of its kind and became the model for this type of urban transportation structure.

Cranetown Triangulation Site, New Jersey **1986**

Fieldwork begun in 1816 established this triangulation point in 1817 as an essential part of the first precise geodetic survey in the United States. The present Coast and Geodetic Survey, at the request of the History and Heritage Committee, relocated this point, which is a monument to Ferdinand Hassler and other skilled early American civil engineer surveyors.

Croton Water Supply System, New York **1975**

Completed in 1842 by Chief Engineer John B. Jervis, (Hon. M. ASCE), this system was the most outstanding municipal water supply system in the United States and the prototype for many large-scale projects that followed. Its 40-mile masonry aqueduct, including High Bridge in New York City (still standing), was unprecedented.*†

Crozet's Blue Ridge Tunnel, Virginia **1976**

This 4,270-foot tunnel, completed in 1858, represents the culmination of civil engineering technology based on manual drilling methods. Designed and built by Claude Crozet, it was the longest railroad tunnel in the United States at the time. Through its linkage with the Ohio River basin and Southern ports, it has greatly facilitated the development of ocean borne commerce in the South.*

Cumbres and Toltec Scenic Railway, New Mexico

1976

This railroad constructed between 1879 and 1880 is a conjunctive part of the Denver & Rio Grande Western Railroad. At 64 miles in length, it is now one of the last narrow gauge railroads.

Davis Island Lock and Dam, Pennsylvania

1985

When constructed from 1878 - 1885, this lock facility, the world's first rolling lock gate and the widest lock chamber ever built, represented a full-scale civil engineering experiment of unprecedented size and scope. In use until 1922, it served as the prototype for 50 similar locks in the Ohio River canalization. It was also the largest movable dam built in the 19th century.

Delaware Aqueduct of the D & H Canal, Pennsylvania-New York

1972

This span is John A. Roebling's earliest, still standing, suspension bridge, and perhaps the oldest existing cable suspension bridge in the world (that retains its original principal elements). This bridge is considered one of the nation's most significant engineering relics and the earliest work of Roebling. It was completed in 1848 as an aqueduct bridge to carry the Delaware & Hudson Canal across the Delaware River. It was completely restored by the National Park Service in 1983.*†

Denison Dam, Texas-Oklahoma

1993

This was the largest rolled-earth fill dam in the United States when it was constructed from 1939 - 1943. The civil engineering design and rolled-earth construction techniques implemented in this project were subsequently applied to the US Army Corps of Engineers multiple purpose lake projects that provided flood control, water supply, electric power, recreational and wildlife benefits on the prairie lands of the American West.

Detroit-Windsor Tunnel, Michigan-Ontario

1982

When constructed from 1928-1930, this subaqueous single tube highway tunnel between Michigan and Ontario, Canada, was an exceptional engineering achievement using three distinct tunneling techniques (cut and cover for the land sections, compressed air shield for the channel approaches and trench and sunken tube under the main channel). Of particular note is that the 32-foot diameter main channel section involved sixty-five miles of arc welding, the first major use of arc welding in tunneling history. The helical ramps at the Detroit approach were another engineering innovation.

Dismal Swamp Canal, Virginia

1987

This canal is the oldest surviving artificial waterway in continuous use in the United States. Construction began in 1793 and the canal opened in 1805 utilizing a system of seven locks. Initially dug by hand, this canal still serves as a scenic route along the Intracoastal Waterway.*

Dorton Arena, North Carolina**2002**

The arena was the first permanent use of a cable-supported roof system in the world. Among those who contributed to the project were Matthew Nowicki's (1910-1950) original concept, architect William Deitrick (1895-1974), structural engineer: Fred Severud, P.E., Fellow ASCE (1899-1990), and contractor: William Muirhead Construction. Owned by the State of North Carolina Department of Agriculture and Consumer Services, the arena, is named after the fair manager J.S. Dorton.

Druid Lake Dam, Maryland**1971**

When completed the Druid Lake Dam was the first major earthfill dam to be constructed in the United States. Built between 1864 and 1871, it had a number of unique characteristics. First was the challenge of constructing in a ravine an earth barrier having sufficient height to form a reservoir of sufficient capacity. In addition, there was the additional challenge of using materials to build an economical dam that would be structurally sound and long lasting. It was the forerunner of other United States earthfill dams.

Dublin-Belfast Rail Link, Republic of Ireland/Northern Ireland**1996**

The Dublin-Belfast rail-link, constructed between 1842 and 1855, provided, and continues to provide, a link between Northern Ireland and the Republic of Ireland. It is recognized for the 536m long Boyne Bridge and Viaduct, which represented the first large-scale use of wrought-iron latticed girders and the first full-scale test of continuous beams.

Duck Creek Aqueduct, Indiana**1992**

Constructed in 1846, this 71-foot span is the oldest covered wooden aqueduct in the country. It still carries the Whitewater River Canal over Duck Creek. The aqueduct was reconstructed in 1948 using much of the original material.

Dunlap's Creek Bridge, Pennsylvania**1978**

Dunlap's Creek Bridge is the oldest all-metal arch bridge in the United States. Conceived by Captain Richard Delafield in 1830, it was completed in 1839, and it demonstrated the feasibility of cast iron in bridge construction at that time.*

Durango-Silverton Branch of the D&RGW RR, Colorado**1968**

Now used for tourist excursions, this train is one of the last of the narrow gauge railroads, linking the Colorado mining towns of Durango and Silverton. Constructed in 1882, the railroad is an example of the important role that civil engineering played in developing the west.*†

Eads Bridge, Missouri**1971**

This celebrated, bridge completed in 1874, is named for James Buchanan Eads, its designer and builder. To found the mid-river piers on solid rock, Eads used the first large pneumatic caissons in the United States. Their sinking represented the deepest subaqueous construction work in the world at the time. The scale of the structure was unprecedented: the 500-foot span of the center arch exceeded by some 200 feet any arch built previously. The arch ribs were made of steel, its first extensive use in a bridge. An innovation was the cantilever erection of the arches, without falsework, the first instance of this for a major bridge.*†

Eads South Pass Navigation Works, Louisiana

1982

This project enabled the entire Mississippi River basin to have direct deep draught marine access to the oceans of the world. The boldness of its engineer, James B. Eads (1882 ASCE Vice-President) resulted in a monumental work whose success was internationally acclaimed. Completed in 1879, it is today a classic of hydraulic engineering.

East Maui Irrigation System, Hawaii

2002

This pioneer irrigation system was constructed between 1876 and 1923 by private enterprise to irrigate sugar cane plantations. It consists of 74 miles of tunnels, ditches, inverted siphons, and flumes with a capacity of 455 million gallons per day.

Ecole Nationale des Ponts et Chaussees, France

1988

Founded by Trudaine in 1747, and still operating, this is the oldest civil engineering school in the world. Its graduates have had a major impact on the art and science of civil engineering throughout the world.

Eddystone Lighthouse, England

1991

Erected between 1756 - 1759 on the Eddystone Rocks by John Smeaton, the first individual to call himself a civil engineer, it was the first masonry-tower lighthouse to be built at sea. Its form was universally adopted. Removed in 1882 because of erosion of its foundation, the lighthouse was partially reconstructed on the Plymouth Hoe in 1884.

Eiffel Tower, France

1986

When completed in 1889, this world-renowned structure was the highest in the world. Eiffel chose to use wrought iron instead of steel because of its easier workability. This was a joint designation with the Societe des Ingenieurs et Scientifiques de France, the successor organization for the France Society of Civil Engineers, which was founded in 1848, and of which Gustave Eiffel was an early president.

El Camino Real, New Mexico (Historic Civil Work)*

1986

El Camino Real, the Royal Road, was the 1,500-mile route that connected Santa Fe and the rest of New Mexico with Mexico City during Spanish Colonial times. Begun in 1598 when Don Juan de Onate led a group of settlers along it into New Mexico, it continued to be used until the railroad put it out of business in the 1880s.

El Camino Real - The Royal Road - Eastern Branch, Texas

1986

This major Spanish pioneer transportation artery, begun in the 16th century, provided support, defense, and political stability for early colonists. It extended from the present-day Republic of Mexico through Texas, Louisiana, Mississippi, Alabama, and Florida.

Elephant Butte Dam, New Mexico

1976

This dam, completed in 1916, created the largest reservoir in the world at that time and was the first civil engineering water project associated with the international allocation of water.

Ellicott's Stone, Alabama

1968

After the Republic was formed, the government commissioned Andrew Ellicott to establish an International Boundary. This "stone," located a few miles north of Mobile, Alabama, is the key extant monument from the historic survey, which located with remarkable accuracy the 31st parallel between the United States and Spanish West Florida in 1799.

Embudo, New Mexico Stream Gauging Station, New Mexico

1973

The first stream gauging system ever undertaken, this project, established in 1889, led to the development of techniques that have been used extensively to collect essential data for water resources projects, land use, and urban planning. This station remains in use.

Erie Canal, New York

1967

Begun in Rome, New York in 1817, and completed in 1825, this 365-mile long canal cut a swath through New York State from the Hudson River at Albany to the Great Lakes at Buffalo. Called the first practical school of Civil Engineering in America, it was the principal route for emigrants from the East and agricultural products from the West. In its day, it was the world's longest canal and America's greatest engineering feat. Benjamin Wright, the "Father of American Civil Engineering", was Chief Engineer.*†

Fink Deck Truss Bridge, Virginia

1979

A unique survivor of a truss system widely used between 1854 and 1875, this all cast and wrought iron truss system was patented by Albert Fink (1880 ASCE President) in 1854. Constructed in approximately 1870 as a railroad bridge, it was converted to vehicular use in 1893. The truss elements were moved to a park in Lynchburg, Virginia, in 1985, where they serve as a footbridge.

Fink Through Truss Bridge, New Jersey

1979

Possibly the oldest metal truss bridge in the nation, this bridge, completed in 1858, was constructed of cast and wrought iron and demonstrated a major breakthrough in patented railroad bridge design and construction. A car collision in 1978 destroyed this bridge.*

First Concrete Pavement, Ohio

1976

This pavement, laid in 1893 at Bellefontaine, Ohio, represents the first engineering use of Portland cement concrete street pavement in public road construction. It was the forerunner of many thousands of miles of similarly constructed roads in the United States.

First New York Subway, New York

1977

Completed between 1900 and 1904, this project was the first major rapid transit subway system in the United States. Chief Engineer, William Barclay Parsons, (Hon. M. ASCE) was responsible for many innovative practices in cut-and-cover excavation, underground steel bent construction and subaqueous shield tunneling rock tunneling. (Jointly designated a Mechanical Engineering Landmark by the American Society of Mechanical Engineers.)*

First Owens River-Los Angeles Aqueduct, California

1971

This aqueduct system, unprecedented in size and scope at the time of its 1913 completion, was the prototype for the extensive water supply systems needed to support the major urban complexes of today. Begun in 1907, this aqueduct was more than 200 miles long and provided Los Angeles with a flow of 440 cubic feet per second.*

Five Stone Arch Bridges, New Hampshire**2002**

These five bridges, Carr Bridge (mid 1800's), Gleason Falls Bridges (circa 1830), Gleason Falls Road over Beard's Brook (mid 1800's), Second New Hampshire Turnpike Bridge (circa 1864), and Sawyer Bridge (circa 1866), constitute the largest extant cluster of dry-laid stone arch bridges within the U.S. Built by trained masonry craftsmen they continue to demonstrate the durability of such construction.

Folsom Hydroelectric Power System, California**1975**

Completed in 1895, the Folsom Hydroelectric Power system was the second system (Mill Creek No. 1, near Redlands, CA was completed two years earlier) providing long distance high voltage three-voltage transmission for significant municipal and industrial multi-purpose power use.*†

Fort Peck Dam, Montana**1990**

When built between 1933 and 1940 by the U.S. Army Corps of Engineers, Fort Peck Dam was over five times larger than the largest dam in the world at the time, with its crest extending four miles. For thirty years after its construction, Fort Peck Dam was the largest hydraulic-filled dam in the world. During construction, environmental extremes, problematic soil conditions, and the enormous scale of the project required monitoring of site conditions using the latest geotechnical instrumentation, careful selection of materials and many innovations in construction techniques.*

Forth & Clyde and Union Canals, Scotland**2000**

These canals, completed in 1790, are recognized as the world's first civil engineering design and constructed public works, a sea-to-sea ship canal project constructed with no natural waterways included on its route. It is a monument to the civil engineering profession as led by John Smeaton and a significant factor to advancing Scottish industrial revolution.

Forth Railway Bridge, Scotland**1985**

Built between 1882 and 1890, this British railway bridge held for 27 years the world's record for span (521 meters). To achieve this, John Fowler and Benjamin Baker, (Hon. M. ASCE), developed a unique double cantilever profile and utilized mild steel. This structure remains in service today as a link in the British Rail system. The 101-meter tall towers create a shipping clearance of 46 meters. The overall length of the bridge is 2529 meters.

Frankford Avenue Bridge, Pennsylvania**1970**

This three-span stone arch bridge over Philadelphia's Pennypack Creek was built in 1697 and has served as an important roadway ever since. It is the first known stone arch built in this country and probably the oldest bridge in the United States.

Fritz Engineering Laboratory, Pennsylvania**1991**

When constructed in 1909 - 1910 by John Fritz (Hon. M. ASCE), the Fritz Engineering Laboratory at Lehigh University was the largest and best-equipped structural university laboratory in the United States. Tests conducted at the lab were instrumental in the development of skyscrapers and other major structures. The lab served as a prototype for subsequent university and research laboratories.

Galveston Seawall and Grade Raising, Texas

2001

Following the hurricane of 1900, the greatest natural disaster in U.S. history, with the loss of 6,000 lives, civil engineers designed and built a concrete seawall and raised the elevation of Galveston Island, using pioneering materials and methods, so that after almost 100 years and numerous hurricanes, only minimal damage and loss of life have occurred.

George Washington Bridge, New York-New Jersey

1981

This 3,500-foot center span, world-renowned suspension bridge, completed in 1931, was virtually double the span of its largest predecessor. Othmar H. Ammann, (Hon. M. ASCE), directed the planning, design and construction.*

Going-to-the-Sun Road, Montana

1985

When completed in 1932, this was the first major trans-mountain scenic highway in the United States. Crossing the Continental Divide at Logan's Pass, its civil engineers had to overcome diverse and difficult design and construction challenges, and in doing so, established the engineering principles for future roads in national parks as well as principles that included precedents for environmental sensitivity for "roads that lay lightly on the land." These principles have been refined and applied by the Bureau of Public Roads (now Federal Highway Administration) and the National Park Service in many park roads and parkways throughout the United States.*†

Golden Gate Bridge, California

1984

Put in service in 1937, this world-renowned bridge, designated by Joseph Strauss and Charles Ellis, was the longest single span (4,200 feet) in the world at time of construction.

Goodyear Airdock, Ohio

1980

Completed in 1929, this unique structure, with a volume of 55,000,000 cubic feet, was the largest building in the world in terms of uninterrupted space. This required pioneering studies in the aerodynamics of buildings as well as application of unusual engineering innovations.*

Gosport Naval Dry Docks, Virginia

1977

Built between 1827 and 1833 the Charlestown Naval Dry Dock, Boston, Massachusetts, and the Gosport Naval Dry Dock, Norfolk, Virginia, are two of the earliest major structures of their type in the United States. Despite the lack of scientific knowledge of hydraulics and geotechnology at the time, Loammi Baldwin II and his associated engineers successfully completed these projects which served the U.S. Navy for well over a century.*†

Gota Canal, Sweden

1998

Directed by Baltzer von Platen, 60,000 workers built the Gota Canal between 1810 and 1832. The transnational canal has 58 locks and 65 bridge spans over the 190 kilometer "Blue Ribbon" waterway. Baltzer von Platen used Thomas Telford, the first president of the Institution of Civil Engineers in London, as an advisor.

Grand Coulee Dam, Washington

1997

Completed in 1941, this concrete gravity dam is the largest concrete structure and hydroelectric facility in the United States. This project also provides primary flood control for the entire Columbia River basin, and offers significant irrigation and recreation benefits.*

Granite Railway, Massachusetts

1975

This unique project, completed in 1826 before the advent of steam locomotives, first demonstrated the engineering advantages of rail transport in America, and introduced many technical features such as switches, the turntable and the double-truck railway car.*

Great Falls Raceway and Power System, New Jersey

1977

The basis of the oldest (circa 1800) American integrated waterpower, industrial development, and urban planning system. (Jointly designated with the American Society of Mechanical Engineers in 1977.)*†

Gunnison Tunnel, Colorado

1972

The tunnel was the key to the first major trans-mountain irrigation system in the United States. When completed in 1909, it was the longest irrigation tunnel in America. The 30,582-foot tunnel initially supplied irrigation water to 146,000 acres of cropland.

Hagia Sophia, Istanbul, Turkey

2000

Built under Justinian's direction from 532-537 and named the Church of the Holy Wisdom, the Hagia Sophia has four massive piers for east/west arches 19.8 m high with north/south buttresses to support the 30.5 m diameter dome. The dome is among the largest in the world.

Hanford B Reactor, Washington

1993

Designed and built as a part of the Manhattan Project during World War II, this reactor was the world's first full scale nuclear production facility. Built in only 15 months during 1943-44, its design and construction required a team of nuclear physicists, chemical engineers, mechanical engineers, and civil engineers working together to overcome the many problems associated with a new and untried technology. The teamwork developed during this project served as a model for many future projects, such as the peaceful development of nuclear power and the space program.†

Hemlock Bridge, Maine

2001

One of Maine's few remaining covered bridges, it is a 109-foot Paddleford truss strengthened with laminated wooden arches.

High Bridge, Kentucky

1985

Known as the first major cantilever bridge in the United States, this span was built between 1876 and 1877 by Charles Schaler Smith, and was the highest (275-feet) and longest span cantilever (three 375-foot spans) in the world at that time. The structure utilized portions of an earlier uncompleted bridge designed by John A. Roebling. High Bridge was replaced, because of increases in trainloads, by a bridge of similar construction in 1911 by Gustav Lindenthal, (Hon.MASCE). The 1911 bridge is still in service for the Norfolk Southern Railway.*

Hohokam Canal System, Arizona (Historic Civil Work)* **1992**

The Hohokam canal system is a significant pre-Columbian example of modification of the environment for beneficial use by Native Americans. This extensive irrigation system, constructed and utilized by the Hohokam Indians between 600 - 1450 A.D., foreshadowed by several centuries the important role that modern civil engineering was to play in the agricultural development of the western United States.*

Holland Tunnel, New York-New Jersey **1982**

When completed in 1927, the 29-foot diameter tubes were shield driven through extremely difficult river bottom conditions that were overcome by the ingenuity and determination of its engineers, Clifford M. Holland, Milton H. Freeman, and Ole Singstad. This twin-tube subaqueous highway tunnel, with its unprecedented length of 8,500 feet, was a bold step forward in navigable waterway crossings.

Hoosac Tunnel, Massachusetts **1975**

When completed in 1875, the Hoosac Tunnel was the largest and longest transportation tunnel in the Western Hemisphere. Many major rock-tunneling innovations, such as steam drills and nitroglycerin, were used successfully on this project. The use of a central ventilation shaft as a construction shaft to provide two additional work faces was another remarkable engineering feature used in its construction.

Hoover Dam, Nevada **1984**

Completed in 1935, ASCE designated this dam one of “America’s Seven Modern Civil Engineering Wonders” in 1955. This 726-foot high arch gravity structure was the greatest constructed at that time and remains the highest concrete dam in the Western Hemisphere. It continues to generate unparalleled benefits to the nation through regulation of the Colorado River for water conservation (fulfilling international commitments), power production, flood control, recreation and fish and wildlife enhancement. †

Horseshoe Curve, Pennsylvania **2003**

Designed and built under the direction of Pennsylvania Railroad chief engineer and, later, company president, J. Edgar Thomson, Horseshoe Curve opened February 15, 1854. It was 549 meters across and 805 meters long with a 1.8 percent grade. Eliminating the Portage Railroad’s 10 incline planes greatly encouraged east-west trade crossing the Allegheny Mountains.

Houston Ship Channel, Texas **1987**

The Houston Ship Channel, originally constructed in 1837, has been under continuous development since that time. The main channel, about fifty miles long, is directly linked to hundreds of transportation facilities, industrial plants, and other enterprises that use the channel to ship products to markets throughout the world.

Hudson and Manhattan Railroad Tunnel, New York-New Jersey **1978**

The original Hudson River tunnel crossing was begun in 1874 and construction was completed in 1908. It was the first railroad tunnel under a major river in the country and introduced shield-system of subaqueous tunneling to the United States. Acclaimed internationally at its opening, it currently serves millions of commuters each year.

Hydraulic-Powered Incline Plane System of the Morris Canal, New Jersey **1980**

This system was the key civil engineering feature that permitted the successful completion of the Morris Canal project in 1831. The bold concept of using water turbine power to supply the energy necessary to lift canal boats over the 914-foot topographic barrier was a technical feat conceived by engineering consultant Professor James Renwick enhancing American engineering prestige worldwide.

Hwaseong Fortress, Republic of Korea **2004**

The Hwaseong Fortress was designed by the builder/scholar Jeong Yak-Yong and built from 1794 to 1796. Hwaseong Seong-yeokuigwe is a unique ten-volume work that documents its construction. The rapid construction of the fortress, using paid labor, symbolizes the cultural and technological renaissance under King Jeongjo.

Ifugao Rice Terrace, Philippines **1995**

Dating from 100 BC, it is the oldest and most extensive use of terraces in the world. The 20,000 hectares of terraces represent a rearrangement of the Cordillera Mountain Range from bedrock to topsoil. The engineering principles of hydrology, sustainable development, and efficient use of water resources and irrigation are all embodied in the careful design of this ancestral land management program.

Ingalls Building, Ohio **1973**

The building, completed between 1902 and 1903, was the first reinforced concrete skyscraper in the world. A 16-story (210 feet) structure that demonstrated for the first time the safety and economy of reinforced frames for high-rise construction, it was a vital stimulus for the use of reinforced concrete as a fireproofing structural material.

International Boundary Marker #1, United States-Mexico Border **1976**

This marker, located between Dona Ana County, New Mexico (near El Paso, Texas), and Juarez, Mexico, not only represents an international boundary but is also a monument to the professional skills of the American surveyors who were called upon to locate it in 1855.

Iron Bridge, England **1979**

This bridge, completed in 1779, is recognized as the first iron bridge in the world. Standing today, it is an outstanding international monument to both the civil engineering profession and the industrial revolution.

Iron Building of the U.S. Army Arsenal, New York **1983**

Completed in 1859 by James Bogardus, this half-acre military storehouse is an outstanding example of the civil engineer's skill and the iron master's art in the mid-nineteenth century. Built entirely of cast iron and wrought iron elements, it is believed to be the oldest all-metal building in the United States. The Iron Building remains in service as a warehouse housing the Arsenal's Ordinance Museum.*

John A. Roebling Bridge, Ohio **1982**

When completed by John A. Roebling in 1866, this suspension bridge, with a main span of 1,057 feet, was the greatest structure of its kind in the world and was the prototype for his greatest achievement, the Brooklyn Bridge, which followed 16 years later. This bridge, due to renovations, has remained in continuous service since its opening, even in 1937 when the Ohio River rose eighty feet.*†

Joining the Rails – Transcontinental Railroad, Utah **1968**

On May 10, 1869, the completion of the 1,776 miles of trunk line railroad over the mountains and deserts of the continent marked a turning point in American history by signaling the opening of the West and the emergence of a unified Nation. *†

Kamehameha V Post Office, Hawaii **1987**

Designed by J.G. Osborn and completed in 1871, this structure is the oldest public building in the United States to incorporate structural elements of reinforced Portland cement concrete.

Kansas City Park and Boulevard System, Missouri **1974**

This pioneer project, completed between 1893 and 1915, was among the first to integrate the aesthetics of landscape architecture with the practicality of city planning. Not only did the Kessler plan, a system of parks connected by scenic boulevards, provide the people of Kansas City with close contact with the natural environment amid the urbanized area, but it also stimulated other metropolitan areas to undertake similar projects.

Kavanagh Building, Argentina **1994**

This 31-story structure, complete with central air conditioning and advanced technology, was one of the first reinforced concrete skyscrapers in the world when opened in 1935. It remained the tallest building in South America for many years.

Kentucky Dam, Kentucky **1996**

The Kentucky Dam, completed in 1944 at mile 22.4 on the Tennessee River, is the key structure in the Tennessee Valley Authority (TVA) system. Not only does it play an important role in the reduction of flood crests on the lower Ohio and Mississippi Rivers, but the construction process also involved the first successful use of ground freeze stabilization for an open vertical shaft, and made pioneering use of extensive aerial photography. In addition, the project contained the largest single lift lock on any United States inland river at the time of its construction.

Keokuk-Hydro-Power System, Iowa **1988**

This privately financed enterprise went into operation in 1913. At that time, the Keokuk project incorporated the longest monolithic concrete dam in the world and was a pioneering effort in large-scale, low-head hydroelectric power.

King’s Road, Florida-Georgia **1976**

When completed between 1766 and 1775, King’s Road was the principal overland transportation link between the former British Colony of St. Augustine, and the 13 Colonies. The original road of 126 miles was a remarkable engineering feat passing through the swampy flatlands of coastal Florida and over rivers and streams.

Kinzua Railway Viaduct, Pennsylvania **1982**

Constructed in only 102 days and completed in 1882, the viaduct was by far the highest (302 feet) and the longest (2,053 feet) viaduct in the world at that time. Reinforced in 1900 because of heavier service loads, the new bridge included the first “vierendeel” type truss in the western hemisphere. Octave Chanute, 1891 ASCE president, participated in the engineering of both structures.*

Lake Moeris Quarry Road, Egypt**1996**

This road is recognized as the oldest surviving paved road in the world. Dating from the Old Kingdom period in Egypt (2575-2134 BC), it transported basalt blocks from the quarry to a quay on the shores of ancient Lake Moeris. It was paved with large slabs of limestone and sandstone, of which approximately 47% of its total length of 11.7 km remains.

Lake Washington Ship Canal & Hiram M. Chittenden Locks, Washington **1997**

Conceived and built by the U.S. Army Corps of Engineers between 1911 and 1917, these heavily utilized locks, the largest on the West Coast, incorporated unique, parallel dual-sized lock chambers for water conservation and preventive measures to reduce salt water intrusion into Lake Washington.

Lawrence Experiment Station, Massachusetts**1975**

Established in 1886, the Lawrence Experiment Station was a pioneer engineering laboratory dedicated to research the treatment of water supply, sewage, and industrial waste. The station's contribution to the field of environmental engineering has been outstanding both nationally and internationally.

Louisville and Portland Canal – Locks & Dam, Kentucky**2002**

The original canal and locks constructed at this site in the first half of the 19th century were responsible for permanently changing navigation on the Ohio River. The original locks and their successors improved the transportation of people and goods towards St. Louis, New Orleans and points west and played an important role in the settlement and growth of the nation.

Louisville Water Works, Kentucky**1981**

When constructed in 1875-1896 by Charles Hermany (1904 ASCE President) this project demonstrated the practicality of rapid sand filtration on a municipal scale, and was a major milestone in American sanitary engineering.†

Lowell Waterpower System, Massachusetts**1984**

A network of power canals with a highly sophisticated controlled and measured distribution system, when work commenced in 1821, this was a pioneer water-development scheme. The network was continually expanded and improved until the 1880's when electrical energy was introduced. The early industrial development of the Northeast was greatly enhanced by application of this original civil engineering concept, leading to the emergence of the famous mill towns of New England and elsewhere. For many years, the principal engineer of this enterprise was James Bischoen Francis, (1881 ASCE President).*†

Maine Turnpike, Maine**1999**

The Maine Turnpike, opened in 1947, was the first superhighway in New England and the second modern toll highway in the United States. Financed entirely by revenue bonds issued by the Main Turnpike Authority to be paid solely from toll revenues, it was the first major modern highway built without any state or federal funding.

Marlette Lake Water System, Nevada

1975

Constructed from 1873 - 1887, the Marlette Lake Water System was the first American system developed to overcome mountainous topography. This system's inverted siphon, sustaining a head of over 1,700 feet, was the greatest in the world—more than double the next highest pressure line.

Marshall Building, Wisconsin

2002

A pioneer of reinforced concrete construction, Claude A.P. Turner, designed the Marshall Building's structure. It is the oldest extant example of Turner's "mushroom" flat-slab system, which transformed the design and construction of reinforced concrete floors worldwide.

Mason-Dixon Line, Maryland-Pennsylvania

1977

This world-famous line, completed in 1767, established the highest standards for engineered surveys in its delineation of the boundary lines between Delaware, Maryland, Pennsylvania, and Virginia.

McNeill Street Pumping Station, Louisiana

1999

The station is a self-contained lesson in the history of municipal water system development. From high-volume pumping technology to water filtering and disinfection, it helped introduce or refine key technologies that were central to the evolution of America's urban water supply. This facility was Louisiana's second waterworks and provided potable water for Shreveport for over a century (1887-1994). It was the last facility in the United States to use steam power to distribute water to a major city and is the only remaining steam-power water treatment plant with much of its antique equipment still intact.

Menai Suspension Bridge, Wales

2002

Built for the Chester-Holyhead Railway, this bridge was a major structure on the road connecting London with Holyhead and by sea to Ireland. The bridge had the world's longest span which greatly advanced suspension bridge development.

Miami Conservancy District, Ohio

1972

This project, completed in 1922, was the first regionally coordinated flood control system in the United States embodying retention reservoirs for controlled release of floodwaters. The actual project consisted of the construction of five dams, levee and channel improvements of nine villages and towns. It also included the relocation of four railroad lines and of many highways and wire lines, the removal of one village, the lowering of water and gas mains, and the overcoming of many other obstacles. Since its completion, there has been no flood damage to the protected Miami Valley.

Middlesex Canal, Massachusetts

1967

The canal is one of the oldest man-made waterways in the United States. Begun in 1794 and completed in 1803, the canal stretched 27 miles from what was to become Lowell, to Charlestown, Massachusetts. Twenty locks and nine aqueducts were designed and constructed along the route. The canal served as a model for the later Erie Canal and was the first in the country to prove the practicality of canal transportation by low freight rates and expansion of traffic. It was designed and constructed by Col. Loammi Baldwin.*

Milwaukee Metro Sewage Treatment Plant, Wisconsin **1974**

Started in 1919, the plant is America's earliest large-scale activated sludge type municipal sewage treatment plant. Because it was a major improvement over other contemporary methods and an advance in municipal sanitary engineering, many other municipalities have adopted its system of effective environmental recycling.*

Minot 's Ledge Lighthouse, Massachusetts **1977**

This lighthouse, built between 1855-1860, successfully served mariners for over 116 years. It was engineered by Joseph G. Totten, (Hon.M.ASCE), and was internationally recognized as an outstanding achievement in the civil engineering design and construction of a structure to resist open-sea wave forces.

Missouri River Bridges, South Dakota **1994**

Of the five Pratt truss steel bridges, completed between 1924 and 1926, that comprised the first Missouri River Highway Commission, only the Chamberlain Bridge remains in service. It now includes trusses from the original Wheeler Bridge. Subsequent Missouri River dams made the river too wide for the original structures.

Moffat Tunnel, Colorado **1979**

Beginning service in 1928, this 6.2 mile Rocky Mountain tunnel, located 60 miles west of Denver, Colorado, was not only the largest railroad tunnel in the Western Hemisphere when completed, but also demonstrated new tunnel construction techniques and the innovative concept of using its pilot bore later as a permanent aqueduct.

Montgomery Bell's Tunnel, Tennessee **1981**

As the earliest (1818) known rock tunnel of significant size in the United States, it served as a guide to early American civil engineers and thus can be said to be the precursor to later American tunneling accomplishments.*†

Morison 's Memphis Bridge, Tennessee **1987**

Erected in 1892 by George S. Morison, (1895 ASCE president), this cantilever truss was built entirely of the then-newly-developed basic open hearth steel. When completed, its 790-foot main span was the longest railroad truss in North America.

Mormon Tabernacle, Utah **1971**

Completed in 1867 with 150-foot wooden lattice arches, the design and construction of the roof was an engineering challenge. Stone and lumber building materials were obtained from surrounding mountains. A railroad had not yet been completed that could bring metal building components from the industrialized centers of the East. Few changes have been made in the original construction, and the roof remains structurally sound. *†

Moseley Wrought Iron Arch Bridge, Massachusetts **1998**

Designed, patented, and built by Thomas W.H. Moseley in 1864, this arched 96-foot span bridge incorporated for the first time in the United States the use of riveted wrought iron plates for the triangular-shaped top chord.

Mount Washington Cog Railway, New Hampshire

1975

When completed in 1869, this was the first mountain climbing railway in the world. Its cog rail system allows the railway to overcome grades exceeding 37 percent. Still in service, this world-renowned project clearly demonstrated the ability of the American engineer to provide innovative and economical solutions to unusual and difficult problems. (Jointly designated with the American Society of Mechanical Engineers.)

Mullan Road, Washington-Montana

1977

This road surveyed between 1853 and 1854 and constructed between 1858 and 1862, was the first major engineered highway in the Pacific Northwest. Its 624 miles connected the Missouri River Basin to the Columbia River Basin, thereby greatly accelerating the development of the Northwest as an integral part of the United States.*

Muskingum River Navigation System, Ohio

2000

The Muskingum River Improvement, started in 1837, played a key role in economic development of the Greater Ohio River Valley as one of the nation's first complete slackwater navigation systems for steam powered vessels, and survives as the most intact system of large hand-operated locks in the United States.

National Road, Maryland, Ohio

1976

Constructed between 1811 and 1839, this highway, surveyed by Jonathan Knight and Josiah Thompson, was the precursor of today's federal interstate system and represented the highest standards of road design and construction of the time.

Navajo Bridge, Arizona

1997

The 616-foot main span, three-hinged, braced spandrel arch steel bridge was completed in 1929, and for the next 66 years, it served as the only crossing of the Colorado River for 600 miles. The bridge's opening provided the first permanent connection between the states of Utah and Arizona. The span provides access between the southern and northern rims of the Grand Canyon, and connects the Navajo nation and three national parks. At the time of its construction, it was the highest steel arch bridge in the United States.

New Castle Ice Harbor, Delaware

1986

In 1794, because of the peril of ice crushing the wooden hulls of ships using the Philadelphia area harbors, a special protected harbor was authorized by the state of Delaware and three piers were built. In 1803, the existing piers and potential sites for new ice piers were transferred to the United States Government. These innovative harbor structures were prototypes for others, but with the advent of iron-hulled ships their demand declined and they were abandoned by the end of the nineteenth century. Their vestiges remain as monuments to the ingenuity of the early civil engineers who designed and built them. (Among those engineers was Richard Delafield who later became Chief of Engineers).

Newark Airport, New Jersey

1978

This pioneer major airport began service in 1928. This 1,600-foot runway was one of the first hard surfaced runways to be constructed at any municipal airport in the United States and, as such, it served as prototype for today's modern airport runways.

Norris Dam, Tennessee

1986

This was the first of a series of dams designed and built to put the vast water resources of the Tennessee River System to work for the people of the region. Located on the Clinch River in Anderson and Campbell Counties, Tennessee, the dam was the fourth largest water barrier in the world when its sluice gates were lowered in March 1936. The completion of the dam was a significant step in turning the destructive power of the Tennessee River into a resource for economic and social progress.

North Island Main Trunk Railway, New Zealand

1997

Constructed from 1885 to 1908, the railway linked Wellington and Auckland, New Zealand, permitting overland travel and development of the hinterland. Built under challenging conditions and over difficult terrain, cuts, fills, and tunneling were minimized by careful use of the topography and by features such as the famed Raurimu Spiral.

Northampton Street Bridge, Pennsylvania-New Jersey

1997

Completed in 1896, the Northampton Street Bridge is the sole existing through-type cantilever eyebar bridge in the United States serving only highway traffic. The structure's graceful lines were a prototype for aesthetic appeal in bridge design.

Northern Pacific High Line Bridge No 64, North Dakota

2004

This 1908 steel viaduct across the Sheyenne River Valley allowed the railroad to avoid steep grades. At 3886 feet (1184 meters) long and 155 feet (47 meters) high, it is an excellent example of its bridge type.

Ohio Canal System, Ohio

1983

This magnificent system of waterways constructed between 1825 and 1848 included both locks and slack-water navigation, some of which remain in use today. By integrating natural and artificial waterways, its engineers produced a transportation system that opened the heartland of America to the Atlantic states. Totalling over 1,015 miles in length, the engineering of this complex system of canals, bridges and dams, produced the largest manmade lake in the world at the time, and was one of the greatest feats of the early 19th century.

Old Cape Henry Lighthouse, Virginia

2002

The Old Cape Henry Lighthouse was the first construction project authorized by the First Congress. Constructed by John McComb, Jr., of New York City, this project set the stage for all subsequent public works projects of the Federal Government. In addition, this specific lighthouse was a vital navigation aid to all shipping through the Virginia Capes, thereby enhancing international and coastal trade with the Mid-Atlantic States.

Panama Canal, Republic of Panama

1984

Originally undertaken by the French, the canal was redesigned and constructed by American engineers between 1903 and 1914. The greatest sea-to-sea lock canal of all time, it was successfully built and remains today a major artery in world trade. The chief engineers of this American project were John F. Wallace, (1900 ASCE President) John F. Stevens, (1927 ASCE president,) and George W. Goethals.

Peavey-Haglin Concrete Grain Elevator, Minnesota **1983**

When completed in 1900, it was the first circular concrete grain elevator constructed in North America and the prototype of those ubiquitous structures that hold the country's wheat harvest. It demonstrated that the new engineering material, reinforced concrete, could sustain the varying loading conditions created by the fluctuating levels of granular material up to heights of 125 feet.*†

Pelton Impulse Water Wheel, California **1973**

Monument is the site of the first successful impulse water wheel. The high efficiency, due to the use of the first split bucket used on a water wheel, marks this significant development (1877-1878) by Lester Allen Pelton. This method was the key to tapping the vast waterpower of the American West.

Pennsylvania Turnpike, Pennsylvania **1988**

When completed in 1940, the original section of the Pennsylvania Turnpike was the greatest single highway project in the history of the United States. It was the prototype of the modern American high-speed, limited access superhighway that became a world standard for long distance highway travel.

Philadelphia Municipal Water Supply, Pennsylvania **1974**

This system, designed by Benjamin Henry Latrobe (1764-1820), was the first major municipal water works to employ steam powered pumping methods in the United States. Many of the Latrobe drawings and papers for the project are at the Library of Congress. Construction of the system started in 1799, and operation began in 1801.*†

Point of Beginning, U.S. Public Lands, Ohio **1985**

The point of beginning was established in 1785 following a Congressional ordinance "for ascertaining the mode of disposing of lands in the Western Territory." Directed by Thomas Hutchins, surveyors from eight states established the framework for the growth of the newly independent country. This original survey, completed under extremely trying conditions and with primitive instruments and techniques, resulted in the "seven ranges" of Ohio that provided the basis for similar frameworks for the disbursement of public lands in 30 other states.†

Ponte Maria Pia Bridge, Portugal **1990**

When opened in 1877, it was the longest iron arch bridge in the world with its parabolic arch being 160 m in length. Designed and built by Gustave Eiffel, it marked the beginning of his ascent to the top ranks of the world's best bridge engineers. Eiffel developed the technique of cantilevering the arch elements by means of cables connected to the tops of the end towers.

Portland Headlight, Maine **2002**

Portland Headlight was the first lighthouse completed (1790) and put into service by the Federal government under the Lighthouse Act of 1789.

Potowmack Canal and Locks, Virginia

1970

These canals and locks are a part of the first extensive system of canal and river navigation works undertaken in the United States. The Potowmack Company began this project's construction in 1785 and it operated from about 1799 to 1821. The locks required at Great Falls to overcome the 76-foot difference in elevation are a significant component of the system proposed and planned by George Washington.

Prehistoric Mesa Verde Reservoirs, Colorado

2004

Mesa Verde's industrious Ancestral Puebloans designed, constructed, and maintained Morefield, Box Elder, Far View, and Sagebrush Reservoirs for domestic water-storage between A.D. 750 and 1180.

Quebec Bridge, Canada

1987

This bridge is the longest span (549 meters) cantilever bridge in the world. It was the longest overall single span bridge in the world from 1917 to 1929. The bridge carries railway and highway traffic across the St. Lawrence River. ASCE and the Canadian Society for Engineering jointly designated it.

Queretaro Aqueduct, Mexico

1995

This 1280-meter long, 74 semi-circular stone arch aqueduct, completed in 1738, provided a dependable supply of clean water to the city of Queretaro, Mexico. Based on the Roman aqueducts, it remains virtually intact today, and is one of Mexico's most important monuments. With a maximum height of 23 meters, it is a remarkable example of 18th century civil engineering practice in Mexico.

Red Hill Underground Fuel Storage Facility, Hawaii

1994

This complex system of 20 underground fuel tanks, each large enough to hold a 20 story building, is buried under 100 feet of volcanic rock. Innovatively designed and constructed, this system provided fuel for United States forces during the latter half of World War II and for the next 50 years. Construction began prior to the outbreak of World War II and was completed two years later.

Reversal of the Chicago River, Illinois

1977

Completed in 1900, this major civil engineering innovation required imaginative planning and ingenious construction. It resulted in a multi-purpose project involving water supply, pollution control, transportation, and power, and had a significantly beneficial impact on the development of America's heartland.

River des Peres Sewage & Drainage Works, Missouri

1988

The 13-mile system of sanitary trunk sewers and drainage channel was the largest undertaking of its kind when completed between 1924 and 1931; it is still operating. Among the many innovations associated with this project are the advanced techniques of hydrologic computations, use of large diameter (32-foot span) buried reinforced concrete pipe designed with original geotechnical calculations, new large-scale trench dewatering methods and soil stabilization procedures.

Robyville Bridge, Maine**2001**

This, bridge built in 1876, was the only completely shingled covered bridge in the State. The supporting members are the Long truss design and span 73 feet between the stone abutments.

Rockville Stone Arch Bridge, Pennsylvania**1979**

When opened in 1902, this bridge represented the zenith of American stone arch construction. This span is one of the longest (3,820 feet) and widest (52 feet) multiple stone arch bridges in the world.*

Rocky River Pumped Storage Hydroelectric Plant, Connecticut**1984**

Completed in 1925, this project was the first pumped major storage hydroelectric project in the United States. The engineers on the project, sensitive to rugged landscape, created Candlewood Lake that enhances the beauty of the area while still providing economical power from the Housatonic River.

Rogue River Bridge, Oregon**1982**

Completed in 1931 this seven-span arch bridge was the first major structure in America to use the concept of the pre-stressed concrete arch. Each twin-ribbed arch spanned 230 feet. As an experimental structure sponsored by the Federal Bureau of Public Roads, it successfully demonstrated the engineering application of the pre-compression technique of the French engineer Freyssinet, and formed the basis for its later widespread use.*

Royal Colonial Boundary of 1665, Kentucky**1989**

Begun in 1728, the survey of this boundary, located in what is now Cumberland Gap National Park, Kentucky, reached the Mississippi River in 1819. It delineated, in part, the present states of Virginia, North Carolina, Kentucky, and Tennessee. Its execution was characterized by personal courage, dedication, and technical innovation in the art and science of cadastral and geodetic survey practice in the United States.

Salginatobel Bridge, Switzerland**1990**

Designed by Robert Maillart, the bridge represents a major innovation of structural type – the three-hinged, hollow-bow arch of reinforced concrete – using a new method of staged-arch construction. This unprecedented form by the most celebrated bridge designer of the time was completed in 1930 and is considered a work of art.

San Antonio River Walk & Flood Control System, Texas**1996**

This planned flood control and river enhancement system was built between 1929 and 1941. This system has proven extremely successful in controlling San Antonio's devastating urban flooding problem. Beyond its success in flood control, the engineering design pioneered the sensitive and effective blending of architectural, historical, environmental, and urban development needs. The river walk, considered a prototype for effective urban river development, is replicated both in the United States and internationally.

San Francisco - Oakland Bay Bridge, California

1986

Built between 1933 and 1936, it was the longest crossing over water and most costly bridge of its time. Construction was possible due to the use of compressed-air flotation caissons. The two-mile wide West Bay was bridged by two suspension spans, linked in tandem by the world's largest bridge anchorage.*

San Jacinto Monument, Texas

1992

Precise monitoring of foundation settlement for the world's tallest freestanding concrete tower at the time of construction (1936-1939) provided data for testing Dr. Karl Terzaghi's consolidation theory, a fundamental component of soil mechanics.

Sault Ste. Marie Hydroelectric Complex, Michigan

1983

Completed in 1902, this complex remains the largest low-head facility in the United States. Its canal, carrying 30,000 cubic feet per second, is the largest of its kind. James W. Rickey, who is honored with the Society's Rickey Medal, and ASCE Presidents Alfred Noble (1903) and Clements Herschel (1916) are among the engineers responsible for this project.*†

Second Street Bridge, Michigan

1982

The 225-foot span, Whipple double intersection, through truss, erected in 1886 by the King Iron Bridge and Manufacturing Company, represented the culmination of an era during which cast iron was replaced by the far more reliable wrought iron as an engineering material.

Sewall's Bridge, Maine

1986

Built over the York River in 1761, this bridge was designed and constructed by Major Samuel Sewall, Jr. It is the first pile structure for general highway traffic constructed in accordance with an engineering plan based upon a site survey. It was reconstructed in 1934 as a treated wooden pile structure, designed to look like the original bridge while accommodating modern day traffic.

Shannon Hydroelectric Scheme, Ireland

2002

By international standards, the Shannon scheme for the electrification of the Irish Free State was one of the largest civil and engineering projects at the time it was built. It created an essential framework and platform for the social, economic, and industrial development of the country. The civil engineering achievements include the removal of 7.6 million cubic meters of earth and 1.2 million cubic meters of rock, the building of a 60-mile purpose built narrow gauge railway, the construction of four major bridges and the diversion of nine rivers and countless streams.

Smithfield Street Bridge, Pennsylvania

1975

This project completed in 1883 represents a unique adaptation of a contemporary European engineering device, the lenticular truss, to suit American needs. It served as a guide for the many highway bridges of similar design built in America during the ensuing decades. Probably the oldest major steel truss in the United States, it was the earliest major project of Gustav Lindenthal, (Hon. M. ASCE).*†

Snoqualmie Falls Cavity Generating Station, Washington

1981

The concept of an underground hydroelectric station was first successfully achieved at this site in 1899. This innovation has since been applied successfully in many other sites throughout the world. The plant is still producing power today.*

Snowy Mountains Hydro-Electric Scheme, Australia

1997

The Snowy Mountains Hydro-Electric Scheme, consisting of 16 large dams, 145km of tunnels, 7 power stations, a pumping station, and 80 km of aqueducts is a world-class civil engineering project that provides vital electric power and irrigation water. Its construction, which commenced in 1949 and was completed in phases through 1974, remains the largest construction project in Australia, and one of the largest of its type in the world.

St. Claire Tunnel, Michigan-Ontario

1991

This tunnel, constructed between 1888 and 1891 under the St. Claire River, was the first successful subaqueous railway tunnel in North America. Canadian engineer Joseph Hobson of the Grand Trunk Railway directed design and construction of the 6028-foot tunnel. The 20-foot diameter tunnel was shield-driven under compressed air and was lined with segmental cast irons rings.*†

Starrucca Viaduct, Pennsylvania

1973

This key masonry viaduct of the New York and Erie Railroad was one of the earliest structures between the Eastern seaboard and the Midwest. It was constructed in record time, and was among the first, if not the first, important engineering work to utilize structural concrete. It was built in 1848 to the design of Julius Adams, (1875 ASCE President), and under the supervision of James B. Kirkwood (1868 ASCE President), and is still in use today.*

Statue of Liberty, United States

1985

Through the aesthetic genius of Frederick Bartholdi and the engineering ingenuity of other French and American engineers, particularly Gustav Eiffel, Charles Stone and Charles C. Schneider, (1905 ASCE President), the “Lady” was completed in 1886, and became the world’s symbol of the United States as the land of the free.*

Stevens Pass Railroad Tunnels and Switchback System, Washington

1993

The area of Stevens Pass contains the first and second Cascade Tunnels and the switchbacks that carried Great Northern Railroad trains over the pass since 1892. The pass is named for John F. Stevens, (1927 ASCE President), who located it in 1890. Stevens was made chief engineer of the Great Northern in 1895, and while in this position, he supervised construction of the first Cascade Tunnel between 1897 and 1900. The second Cascade Tunnel was the longest tunnel in the Western Hemisphere from 1929 to 1989.

Stone Arch Bridge - Great Northern Railway, Minnesota

1974

The oldest extant railroad bridge over the Mississippi was constructed in 1883 and was a key element in development of the northwest part of the country. The span is a double track structure, 2,100 feet long, 76 feet high, 26 to 28 feet wide, with 23 circular stone arch spans of various lengths.

Suez Canal Project, Egypt**2003**

The longest man-made sea level canal in the world when opened in 1869, the modern Suez Canal is one of the world's most heavily used shipping routes and continues to play a critical role in international trade.

Sydney Harbour Bridge, Australia**1988**

A steel through-arch multi-modal structure, this bridge was the second longest span (503 m) of its type when completed in 1932. J.J.C. Bradfield and Sir Ralph Freeman designed the bridge that is now an international symbol of Australia and her engineering achievements.

Tehachapi Pass Railroad Line, California**1998**

This line, which climbs out of the San Joaquin Valley and through the Tehachapi Mountains, had 18 tunnels, 10 bridges and numerous water towers for the old steam locomotives. It was completed in less than 2 years time under the leadership of civil engineer J. B. Harris, chief of construction. This line was part of the last and final line of the first railroad line connecting San Francisco to Los Angeles. It was the primary factor in the early growth of the City of Los Angeles and the State of California.

Tennessee State Capitol, Tennessee**2003**

The Tennessee State Capitol (constructed 1845-1877) was designed by engineer and architect William Strickland. It was one of the first buildings in the nation with structural iron roof trusses. The Capitol grounds were designed by engineers J.A. Hayden and John Bogart and set the standard for park development in the region.

Texas Commerce Bank (formerly Gulf, now Chase) Building, Texas**1997**

This building, completed in 1929, was the tallest building west of the Mississippi River until 1962. With Dr. Karl Terzaghi as consultant, this building was one of the first applications of the new field of soil mechanics to foundation design and building settlement on a clay soil.

Thames Tunnel, England**1991**

Built between 1828 - 1843, this tunnel was the crowning achievement of Marc Brunel and the inception of Isambard Kingdom Brunel's illustrious career. This project marked the beginning of a new era in tunneling practice. It was the first shield-driven tunnel, the first successful soft ground subaqueous tunnel and, in 1869, was adapted as the first subaqueous railway tunnel.

Theodore Roosevelt Dam & Salt River Project, Arizona**1970**

This dam was the first project of the Bureau of Reclamation and the first multipurpose (irrigation, river regulation, power generation and recreation) project in the United States. The dam marked the beginning of federal reclamation projects throughout the West. When it was completed in 1911, the dam was one of the highest in the world at 284 feet above bedrock.*†

Triborough Bridge Project, New York

1986

This three and a half mile, three-branched waterway crossing, opened in 1936, is comprised of a major suspension bridge, a large vertical lift span, a fixed span designed to be convertible to a lift span, a long viaduct, and an innovative three-legged roadway interchange. It included 14 miles of arterial highway approaches and urban design features such as parks and recreational facilities. The project is an early example of the complete planning and development of a major transportation project in an urban environment. Robert Moses and Othmar H. Ammann (Hon. M. ASCE) were key to the project.

Tunkhannock Viaduct, Pennsylvania

1975

This reinforced concrete structure, the largest of its kind ever built, was put in service in 1915 by the Delaware, Lackawanna & Western Railroad. The Tunkhannock Viaduct represents a great feat of construction skill and a successful departure from contemporary, conventional concepts of railroad location in that its main line traversed the regional drainage pattern, therefore reducing the distance and grade impediments to economy of operation.*

U.S. Army Engineers Waterways Experiment Station, Mississippi

1986

The Waterways Experiment Station was created in 1929 as the first federal hydraulics research facility and is now the largest engineering and scientific research facility of the U.S. Corps of Engineers. The station has expanded into a six-laboratory complex that employs over 1,600 people and has an annual program of over \$130 million. The project's hydraulic roots have evolved to include fields such as soil and rock mechanics, earthquake engineering, coastal engineering, concrete, nuclear and conventional weapons effects, vehicle mobility, water quality, and more.*

U.S. Capitol, Washington, DC

1986

Started in 1793 and completed in 1863, the capitol's construction included an iron-ribbed dome 135 feet in diameter topped by Thomas Crawford's statue "Freedom." The dome required a scaffolding 350 feet high. New engineering techniques of construction and quality control were developed to meet the challenge of this immense project that was to become an international symbol of Democracy.

Union Canal Tunnel, Pennsylvania

1970

The Union Canal Tunnel is the oldest existing transportation tunnel in the United States. It is part of the canal connecting the Susquehanna and Schuylkill Rivers, providing an important transportation route to the West. Completed in 1828 under difficult conditions, the tunnel is 729 feet long, 18 feet wide, 14 feet high. The tunnel has been restored to its original condition.*†

Union Station, Missouri

1981

The structure, wherein 22 railroad lines from east and west terminated in a centralized location, was the largest in the world at the time of its construction 1894. The problems involved in the planning, design, and construction of this project were enormous and its successful completion brought international acclaim to American civil engineering.*†

United States Military Academy, New York **1978**

The Academy is the oldest educational institution in the United States to offer formal academic instruction in the field of civil engineering (1813).

Viaducto del Malleco, Chile **1994**

This early steel viaduct, opened in 1890, was allegedly designed by the Chilean engineer, Victor Lastarria, and utilized steelwork prefabricated in France. It has an overall length of 408 m, and carries the rail line 91 m above the Malleco River. As one of the key structures in the Chilean railway system, it typifies the engineering challenge associated with design and construction in remote mountainous areas.

Victoria Falls Bridge, Zimbabwe/Zambia **1995**

The Victoria Falls Bridge, completed in 1905, is a 152-meter span, steel-lattice, two-hinged arch bridge with a deck level 122 m above the Zambezi River. Conceived by Cecil Rhodes as a key link in his proposed Cape-to-Cairo railway, it is situated just downstream from Victoria Falls in a site of unsurpassed grandeur. Although a product of the colonial period, it continues to serve and improve the lives of all people living in the region.

Vulcan Street Plant, Wisconsin **1977**

When it began operation in September 1882, this plant was the first Edison hydroelectric central station to serve a system of private and commercial customers in North America. This project was the beginning of cooperation among civil, mechanical, and electrical engineers in order to provide power for the United States. (Jointly with the American Society of Mechanical Engineers and the Institute of Electrical and Electronic Engineers.).

Waldo-Hancock Suspension Bridge, Maine **2002**

This bridge was innovative in its use of Verendeel truss towers and has been a key structure on U.S. Route 1 connecting down east Maine to the rest of the Atlantic Bridge. Completed in 1890 with fifteen truss spans and an overall length of 2820 feet, it is the finest and largest example of the standardized wrought iron truss bridges produced by the Phoenix Bridge Company.*

Walnut Street Bridge, Pennsylvania **1967**

The Walnut Street Bridge, completed in 1890 with fifteen truss spans and an overall length of 2820 feet, is the finest and largest example of the standardized wrought iron truss bridges produced by the Phoenix Bridge Company.*

Ward House, New York **1977**

When built between 1873 and 1876, this house was the first reinforced concrete building constructed in the United States dramatically demonstrating the construction potential of an engineered combination of steel and concrete. (Jointly designated by the American Concrete Institute and identified as an Concrete Engineering Landmark in 1977.)

Washington Monument, Washington, DC **1981**

Completed in 1885, this monument was the tallest structure in the world. Lt. Col. Thomas Lincoln Casey was the engineer responsible for completing this project. It remains today the tallest stone masonry structure in the United States or the world.

Watertown Arsenal, Massachusetts

1982

This arsenal was the first major engineering testing laboratory in the United States. Beginning approximately in 1859 and continuing through the early 1900's, when the National Bureau of Standards began operations, the pioneering experiments and tests conducted contributed to not only the greater understanding of the properties of construction materials themselves, but also to the perfection of testing techniques and testing machines. The dissemination of its test results made this arsenal of special significance to the civil engineering profession.

Watson Settlement Bridge, Maine

2001

This bridge, built in 1911, is the farthest north and the youngest of Maine's original covered bridges. It has timber trusses of the Howe design and has two spans with a total length of 170 feet.

West Baden Springs Hotel, Indiana

2000

This hotel, designed by architect Harrison Albright and civil engineer Oliver J. Westcott, was constructed in less than one year. At the time of its completion in 1902, it was the largest domed structure in the world. The dome diameter of 200 feet was not surpassed for more than 60 years.

Wheeling Suspension Bridge, West Virginia

1969

Built in 1849, by Charles Ellet, Jr., this is the oldest existing major suspension bridge in the United States and was the first long-span wire-cable suspension bridge in the country. It served as a link in the National Highway from Washington, DC to the west. Wrecked in a storm in 1854, it was reconstructed in 1856 and remains in service today. Designated 1968.*†

Whipple Truss Bridge (circa 1855), New York

1981

The Whipple Truss Bridge (circa 1855), relocated to Union College, was built from a design patented in 1841 by Squire Whipple, (Hon. M. ASCE), and was the first scientifically designed truss bridge in the United States.

White Pass and Yukon Railroad, Canada/United States

1994

American and Canadian engineers constructed the White Pass and Yukon Railway, extending from Skagway, Alaska to White Horse, Yukon Territory, in only 27 months between 1898 and 1900. The Railroad passed through glacial terrain, far removed from supplies in the United States, and represented the first cold region engineered construction in Alaska.

White River Concrete Arch Bridge, Arkansas

1986

When completed in November 1930 (only one year after initiation) this innovative structure included the first major use of a cableway in association with lattice steel ribs that acted as reinforcement and precluded the need for conventional centering. This structure remains in full service. The engineer responsible for this beautiful multi-span arch bridge was J. Barney Marsh.

Wisla Bridge, Poland**2004**

This historic bridge is the first example of a long span lattice-truss bridge on the European mainland. By combining the original American idea of wooden trusses with the tubular concept of the Britannia Bridge, Wales, a new type of dense lattice truss structure made of iron was developed. This pattern of engineering was then disseminated throughout the continent.

Zhaozhou (or Anji) Bridge, China**1989**

This segmental stone arch, built between 595 and 605 AD with a span of 37 meters, has double arch spandrels, and is the earliest known bridge with this type of construction. Li Chun, the designer of the bridge, is recognized as one of China's great builders. The Zhaozhou Bridge (in Chinese literature known as the Anji Bridge) still serves its original function with a substantial number of its original components.

Zuiderzee Enclosure Dam, Netherlands**1986**

This structure, built in 1927-1932, has successfully barred the sea for over 50 years. The Zuiderzee closure protects a large area north of Amsterdam, allowing construction of polders to claim these areas of land from the sea.

*Historic Civil Works: projects built prior to the advent of engineering as a separate profession in the 18th century.