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DEPARTMENT OF CIVIL ENGINEERING

KONGUNADU COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

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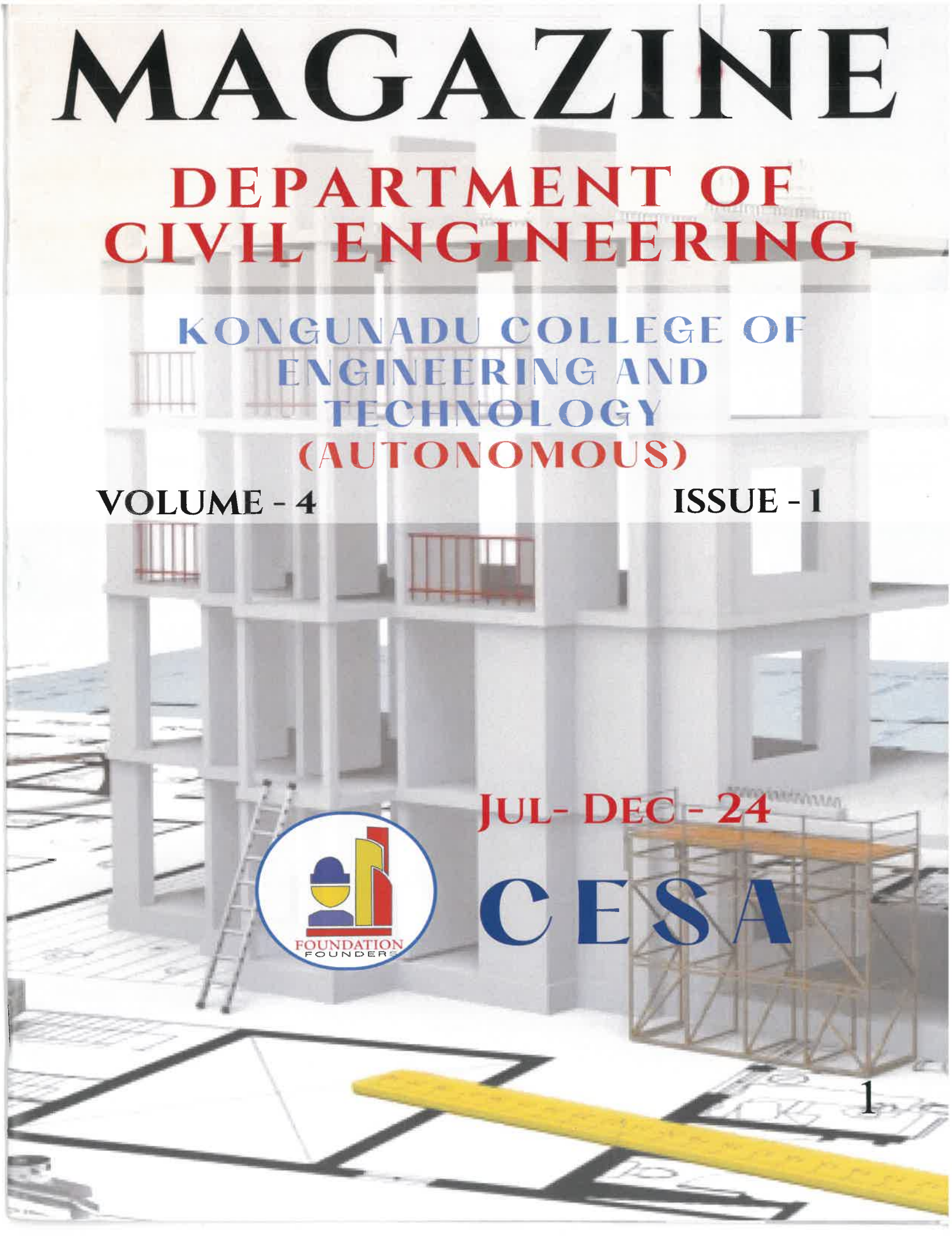

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CESA

BRIDGE DESIGN

THE ELEMENTS OF BRIDGE DESIGN

BEAM

Beam bridge beam bridge, with forces of tension represented by red lines and forces of compression by green lines.

The beam bridge is the most common bridge form. A beam carries vertical loads by bending. As the beam bridge bends, it undergoes horizontal compression on the top. At the same time, the bottom of the beam is subjected to horizontal tension. The supports carry the loads from the beam by compression vertically to the foundations.

When a bridge is made up of beams spanning between only two supports, it is called a simply supported beam bridge. If two or more beams are joined rigidly together over supports, the bridge becomes continuous.

Factories create bad air pollution

ENGINEERING CONNECTION

Engineers who design structures must completely understand the problem to be solved, which includes the complexities of the site and the customer needs. To design for safety and longevity, engineers consider the different types of loads, how they are applied and where. Engineers often aim for a design that is strongest and lightest possible—one with the highest strength-to-weight ratio.

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BURJ KHALIFA

Standing at 829.8 meters, the Burj Khalifa in Dubai is the tallest building in the world. The building's incredibly tall design inspired the creation of the 'buttressed core', an engineering structural system with a hexagonal core which helps to support higher buildings than ever before. The building was named in honour of the ruler of Dubai and President of the United States Arab Emirates, and its design was inspired by the patterns and structures of Islamic architecture. The structure cost $1.5 billion to build. The building has been a major feature in popular culture; it can be seen in the 2011 film 'Mission: Impossible – Ghost Protocol' and 2016 film, 'Independence Day: Resurgence'. Burj Khalifa has broken numerous other records, including building with most floors at 211 and it has received immensely positive acclaim from citizens, engineers and architects.

Construction of the Burj Khalifa began in 2004, with the exterior completed five years later in 2009. The primary structure is reinforced concrete and some of the structural steel for the building originated from the Palace of the Republic in East Berlin, the former East German parliament.[5] The building was opened in 2010 as part of a new development called Downtown Dubai. It was designed to be the centerpiece of large-scale, mixed-use development.

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SURVEYING

Levelling and surveying is the operation required in the determination or, more strictly, the comparison of heights of points on the surface of the earth. If a whole series of heights are given relative to a plane, this plane is called a datum. In topographical work, the datum used is the mean level of the sea because it makes the international comparison of heights possible. The value for mean sea level (MSL) as datum is obtained by averaging the elevations of high and low tides, at several points, for a long period of time, about 19 years. The vertical heights of points above or below a datum are referred to as levels.

Levelling and surveying is primarily used to determine the relative height of various points on, above, and below the ground's surface. It is a method of calculating the difference in elevations or levels between two points on the earth's surface. Distance is always measured from a reference point with known parameters (elevation, height above MSL, etc.). This aspect of vertical distance measurement is referred to as levelling and surveying.

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SEISMIC ISOLATION DEVICES

A base isolation system is a method of seismic protection where the structure (superstructure) is separated from the base (foundation or substructure). By separating the structure from its base the amount of energy that is transferred to the superstructure during an earthquake is reduced significantly.

These base isolation systems often tend to include one or more type of bearing to support the weight of the structure. Some examples of these components are; elastomeric pads, sliding plates or inverted pendulums. All of these components can provide some level of energy dissipation, but typically only in the form of hysteretic damping. Hysteretic damping has certain limitations in terms of energy absorption and can excite higher modes in some cases.

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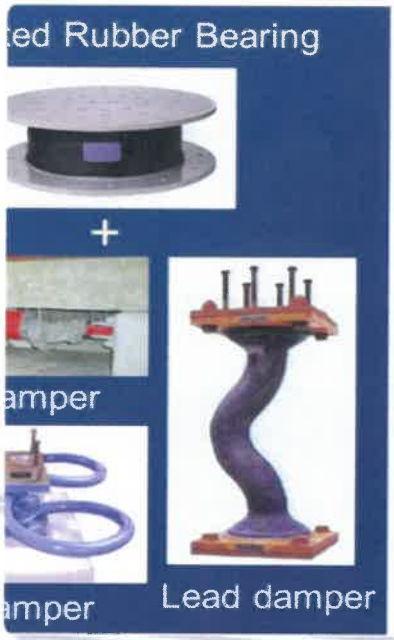

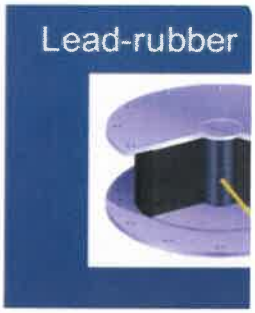

When the Earthquake comes there is a huge force acts on the earth surface. The soil influences the motion of structure and the motion of structure influences the response of soil. Due to the earthquake forces, displacement occurs in the structure which consequently causes the huge damage to the structure. In order to minimize the damage which is caused by the earthquake we use seismic isolation devices. Seismic isolation devices absorbs or minimize the shock in the structure arises from earthquake. Seismic isolation devices reduce the stiffness or damping in the structure. Seismic isolation devices mounted between the foundation and floor of the structure

SMART CITY

A smart city is an urban area that uses digital technology to collect data and to operate/provide services.[1][2] Data can be collected from citizens, devices, buildings, or cameras. Applications include traffic and transportation systems,[3] power plants, utilities, urban forestry,[4] water supply networks, waste disposal, criminal investigations, information systems, schools, libraries, hospitals, and other community services.[5][6] The foundation of a smart city is built on the integration of people, technology, and processes, which connect and interact across sectors such as healthcare, transportation, education, and infrastructure, etc.[7] Smart cities are characterized by the ways in which their local governments monitor, analyze, plan, and govern the city. In a smart city, the sharing of data extends to businesses, citizens and other third parties who can derive benefit from using that data.[8][9] The three largest sources of spending associated with smart cities as of 2022 were visual surveillance, public transit, and outdoor lighting.

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FLOOD PROTECTION PLANNING

The projects for flood management and control are formulated and implemented by respective state governments/Union Territories from their own resources and as per their priority. Central Government provides financial assistance to states/UTs for implementing some projects in critical areas. Central Govt. has been providing financial assistance through a scheme called Flood Management Programme (FMP) since XI Plan. The scheme since its inception has undergone several changes as per demands of states/UTs and also on account of various directions and policies of Govt. of India.

FLOOD MANAGEMENT PROGRAMME (FMP)

During X Plan, following four schemes were sanctioned to provide central assistance to the flood prone states to take up flood control and river management works in critical areas:

Critical Anti-erosion works in Ganga Basin States (a Centrally Sponsored Scheme)
Critical Flood Control and Anti Erosion Schemes in Brahmaputra and Barak Valley States (a State Sector Scheme),
Improvement of Drainage in critical areas in the country (a State Sector Scheme)
Critical Anti-erosion Works in Coastal and other than Ganga Basin States (a State SectorScheme).

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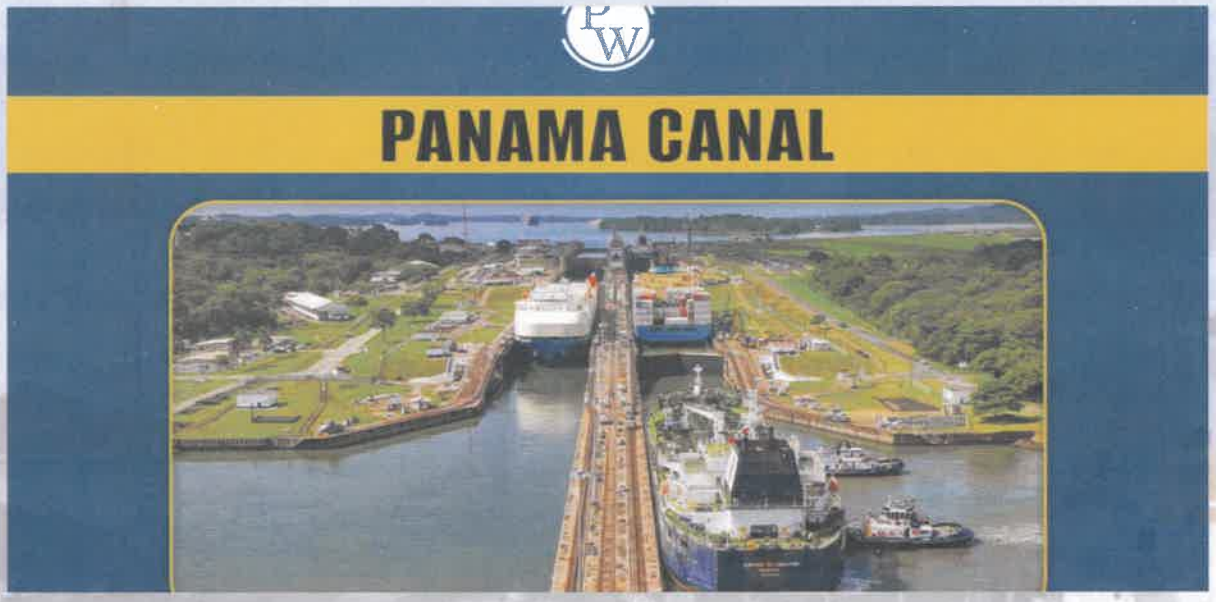
PANAMA CANAL



THE CANAL

The Panama Canal:

The Panama Canal lies at a latitude of 9° N, at a point where the North American Continental Divide dips to one of its lowest points. The canal does not, as is generally supposed, cross the isthmus from east to west. It runs due south from its entrance at Colón on the Atlantic side through the Gatún Locks to a point in the widest portion of Gatún Lake; it then turns sharply toward the east and follows a course generally to the southeast until it reaches the Bay of Panama, on the Pacific side. Its terminus near Balboa is some 25 miles (40 km) east of its terminus near Colón. Parallel to the canal are the Panama Canal Railway and the Boyd-Roosevelt Highway.

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BROOKLYN BRIDGE

The Brooklyn Bridge is a hybrid cable-stayed/suspension bridge in New York City, spanning the East River between the boroughs of Manhattan and Brooklyn. Opened on May 24, 1883, the Brooklyn Bridge was the first fixed crossing of the East River. It was also the longest suspension bridge in the world at the time of its opening, with a main span of 1,595.5 feet (486.3 m) and a deck 127 ft (38.7 m) above Mean High Water. The span was originally called the New York and Brooklyn Bridge or the East River Bridge but was officially renamed the Brooklyn Bridge in 1915.

The Brooklyn Bridge is the southernmost of four vehicular bridges directly connecting Manhattan Island and Long Island, with the Manhattan Bridge, the Williamsburg Bridge, and the Queensboro Bridge to the north.[15] Only passenger vehicles and pedestrian and bicycle traffic are permitted. A major tourist attraction since its opening, the Brooklyn Bridge has become an icon of New York City. Over the years, the bridge has been used as the location of various stunts and performances, as well as several crimes, attacks and vandalism. The Brooklyn Bridge is designated a National Historic Landmark, a New York City landmark, and a National Historic Civil Engineering Landmark.

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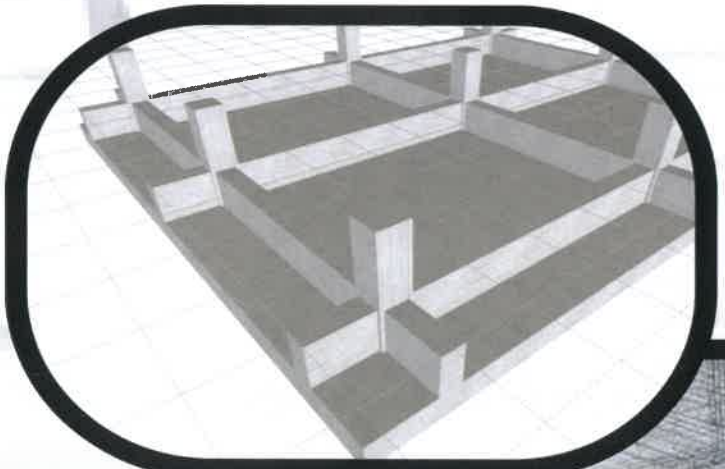
FLOATING FOUNDATION

In engineering, a foundation is the element of a structure which connects it to the ground or more rarely, water (as with floating structures), transferring loads from the structure to the ground. Foundations are generally considered either shallow or deep.[1] Foundation engineering is the application of soil mechanics and rock mechanics (geotechnical engineering) in the design of foundation elements of structures.

Dry stone and stones laid in mortar to build foundations are common in many parts of the world. Dry laid stone foundations may have been painted with mortar after construction. Sometimes the top, visible course of stone is hewn, quarried stones.[8] Besides using mortar, stones can also be put in a gabion.[9] One disadvantage is that if using regular steel rebars, the gabion would last much less long than when using mortar (due to rusting). Using weathering steel rebars could reduce this disadvantage somewhat.



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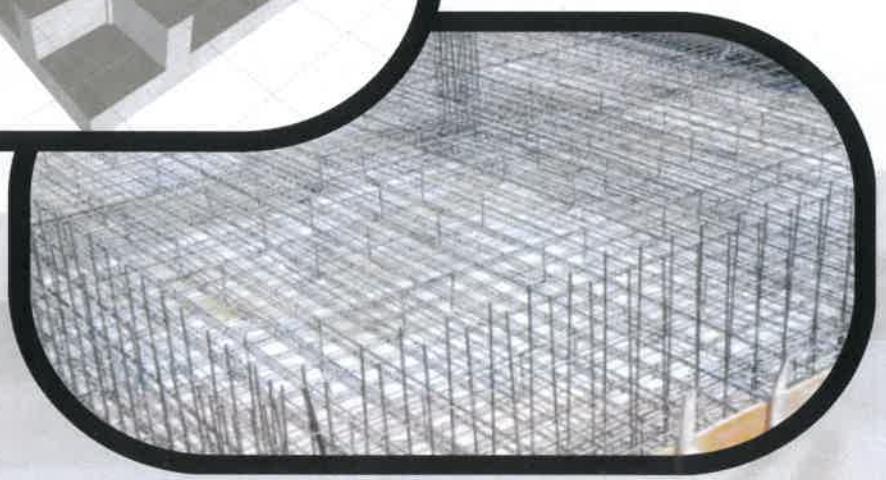

GREAT WALL OF CHINA

The history of the Great Wall of China began when fortifications built by various states during the Spring and Autumn (771–476 BC)[1] and Warring States periods (475–221 BC) were connected by the first emperor of China, Qin Shi Huang, to protect his newly founded Qin dynasty (221–206 BC) against incursions by nomads from Inner Asia. The walls were built of rammed earth, constructed using forced labour, and by 212 BC ran from Gansu to the coast of southern Manchuria.

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Later dynasties adopted different policies towards northern frontier defense. The Han (202 BC – 220 AD), the Northern Qi (550–574), the Jurchen-ruled Jin (1115–1234), and particularly the Ming (1369–1644) were among those that rebuilt, re-manned, and expanded the Walls, although they rarely followed Qin's routes. The Han extended the fortifications furthest to the west, the Qi built about 1,600 kilometres (990 mi) of new walls, while the Sui mobilised over a million men in their wall-building efforts. Conversely, the Tang (618–907), the Song (960–1279), the Yuan (1271–1368), and the Qing (1644–1912) mostly did not build frontier walls, instead opting for other solutions to the Inner Asian threat like military campaigning and diplomacy.

HOOVER DAM

Hoover Dam, dam in Black Canyon on the Colorado River, at the Arizona-Nevada border, U.S. Constructed between 1930 and 1936, it is the highest concrete arch-gravity dam in the United States. It impounds Lake Mead, which extends for 115 miles (185 km) upstream and is one of the largest artificial lakes in the world. The dam is used for flood and silt control, hydroelectric power, agricultural irrigation, and domestic water supply. It is also a major sightseeing destination, with some seven million visitors a year, almost one million of whom go on tours through the dam.

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CHANNEL TUNNEL

The Channel Tunnel (French: Tunnel sous la Manche), sometimes referred to by the portmanteau Chunnel,[3][4] is a 50.46 km (31.35-mile) undersea railway tunnel, opened in 1994, that connects Folkestone (Kent, England) with Coquelles (Pas-de-Calais, France) beneath the English Channel at the Strait of Dover. It is the only fixed link between the island of Great Britain and the European mainland.

At its lowest point, it is 75 m (246 ft) below the sea bed and 115 m (377 ft) below sea level.[5][6][7] At 37.9 km (23.5 miles), it has the longest underwater section of any tunnel in the world and is the third-longest railway tunnel in the world. The speed limit for trains through the tunnel is 160 km/h (99 mph).[8] The tunnel is owned and operated by Getlink, formerly Groupe Eurotunnel.

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