



Padre Conceição College of Engineering, Verna, Goa

Semester : II

Course : Introduction to civil engineering

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Unit 1

Basic Understanding of Civil Engineering

Role of a Civil Engineer

The role of a civil engineer is seen in every walk of life and in the infrastructure development activities such as:

1. Providing shelter to people in the form of low cost housing to constructing high rise buildings in urban areas.
2. Laying of ordinary village roads to constructing express highways.
3. Constructing irrigation tanks, multipurpose dams and canals for supplying water to agricultural fields.
4. Supplying safe and portable water for public and industrial uses.
5. Protecting our environment by adopting sewage treatment and solid waste disposal techniques.
6. Constructing hydro-electric and thermal power plants for generating electricity.
7. Providing and maintenance of various means of transportation such as roads ,railways, harbour, airports etc.
8. Constructing bridges across streams, rivers and seas.
9. Tunelling across mountains and also under water to connect places easily.
10. Monitor land, water, air pollution and taking measures to control them.

Importance of civil engineering

Civil engineering is a very broad discipline. It provides the following infrastructure facilities to the public:

1. Transport facilities such as roads, railways, bridges, airports etc
2. Drinking water and sanitation facilities
3. Irrigation facilities like dams and canals.
4. Power generation & transmission facilities
5. Education facilities
6. Health care facilities
7. Housing facilities
8. Recreation facilities

The well being of a nation is dependent on the quality & the quantity of the above services that are provided to the public.

Effects of Infrastructure development on the Socio-economic development of a country

Development of infrastructure has number of good effects which can be listed as follows:

1. It is a basic necessity for any country or state
2. It forms a part of business, research & education.
3. It leads to improved health care & Cultural activities.
4. It provides housing & means of communication to people.
5. It provides direct employment to many number of skilled, semiskilled & unskilled workers.
6. It leads to the growth of associated industries like cement, steel, glass, timber, plastics, paints, electrical goods etc.
7. It helps in increasing food production & protection from famine.
8. Exporting agricultural goods can fetch foreign currency .

Scope of Civil Engineering

The scope of Civil Engineering lies in developing, designing, planning, calculating, monitoring construction as well as executing and managing the construction of buildings, roads and physical structures like bridges, dams, etc. and their maintenance. Civil engineers can work in both public and private sectors. The job profiles in civil engineering include project manager, site engineer, surveyor, environmental engineer, consultants, Structural engineers, entrepreneur etc.

History of Civil Engineering

Civil Engineering has been an aspect of life since the beginnings of human existence. The earliest practices of Civil engineering may have started between 4000 and 2000 BC in Ancient Egypt and Mesopotamia (Ancient Iraq). This was when humans started to abandon a nomadic existence, thus causing a need for the construction of shelter. Man used the old shelter caves to protect themselves of weather and harsh environment, and used a tree trunk to cross the river, which being the demonstration of ancient age civil engineering.

Ancient monuments in civil engineering

Some ancient monuments in civil engineering are as follows:

1. The Pyramids of Egypt
2. Qanat water management system
3. The Parthenon
4. The Appian way
5. The Great wall of china

Modern marvels in civil engineering

Some of the modern marvels in civil engineering

1. Millau Viaduct (Millau, France)
2. The Venice Tide Barrier Project (Venice, Italy)
3. National Stadium (Beijing, China)
4. Palm Islands (Dubai)
5. Three Gorges Dam (China)

Eminent Civil Engineers:

1. Sir Mokshagundam Visvesvaraya
2. John Smeaton
3. Stephen Bechtel Sr.
4. Isambard Kingdom Brunel

1. Sir Mokshagundam Visvesvaraya

His famous works include:

1. He was involved in irrigation structures, flood protection structures and others.

2. He supervised the construction of the Krishna Raja Sagar dam across the Cauvery River in south India and when it was built it was the biggest reservoir in Asia.
3. He implemented the irrigation system in the Deccan area and designed a system for having storage in a reservoir or increasing the storage in a reservoir without causing damage to existing dams
4. His other famous works are creating a flood protection system for the state of Hyderabad, India, creating a system to prevent the port from getting eroded by the sea for Visakhapatnam.
5. He was patented for designing automatic barrier water floodgates.

2. John Smeaton

1. He is responsible for the construction of many famous bridges, harbours, lighthouses etc in England.
2. He rediscovered the modern concrete.
3. He pioneered in using proper chemical composition to get better hydraulic lime to create high strength lime concrete.
4. His contribution led to the invention of Portland cement and modern concrete.
5. He designed the famous Eddystone Lighthouse which is now called Smeatons Tower.
6. His works on water and wind power to turn mills increased the efficiency of the turning mills and directly contributed to the industrial revolution.

3. Stephen Bechtel Sr.

1. Stephen Bechtel was a construction project manager par excellence.
2. He is the project manager of world-famous Hoover Dam which was built in 1930 in the United States.
3. 3.7 cubic million cubic yards of rock were excavated, 4.4 million cubic yards of concrete were poured to build this massive structure in a very remote area to provide water.
4. His company build pipelines, power plants in the Canadian Rockies, built structures in the Arabian Desert and in the South American jungles.
5. He even built an entire city Jubail in Saudi Arabia. Overall Bechtel was involved in construction in 140 countries and 6 continents.

4. Isambard Kingdom Brunel

1. Brunel was an engineering mastermind who altered the face of England with his ingenious designs and inventions.
2. He has built numerous important bridges, tunnels dockyards etc.
3. He was the first in the implementation of many new designs.

4. His designs on public transportation revolutionised transportation engineering.
5. He is best remembered for his works on Clifton Suspension Bridge in Bristol.
6. It was the engineering wonder when it was constructed, with many new innovative design and techniques.