



G H Patel College of Engineering & Technology, V. V. Nagar

Department of Civil Engineering

Report on

### Visit to “Sardar Sarovar Dam and Statue of Unity”



Department of Civil Engineering, GCET had organized one day Educational visit to “Sardar Sarovar Dam and Statue of Unity” on February 06<sup>th</sup>, 2019. 62 students, 2 faculty members had visited the Statue of Unity (Viewing Gallery & Museum), Sardar Sarovar Dam (A-Frame), River Bed Power House (R.B.P.H.), Canal Head Power House (C.H.P.H.), Narmada Main Canal (0-Ch. HR).

#### **Aim of Visit:**

The main aim of visit was to make students aware and to teach them about the main components and construction of Storage Head works (Sardar Sarovar Dam), Hydroelectric Power Plant (R.B.P.H. & C.H.P.H.), Distribution works and Canal Regulating Works (Narmada Main Canal & NMC Head Regulator 0-Chainage). Also, to make them aware about construction of Tall Structures (Statue of Unity) as they are studying the subjects *Applied Fluid Mechanics, Advanced Construction & Equipment* etc.

#### **About Visit:**

The visit was commenced from G H Patel College of Engineering & Technology at 6:30 AM and students were first taken to *Statue of Unity* at 10:30 AM. Mr. Manoj Brhambhatt Sir, Deputy Executive Engineer explained about the construction of Statue of Unity and what different challenges they faced during construction. The details of Statue of Unity are given here below:

#### ***Statue of Unity***

The statue of unity depicts the Indian independence activist Sardar Vallabhbhai Patel who was the first Home minister of India. He is highly respected for his leadership in uniting 562 princely states to form the single large Union of India. It is located in the state of Gujarat, India.

It is the world’s tallest statue with a height of 182 meters. It is located on a river island facing the Sardar Sarovar Dam on river Narmada, 100 kilometers southeast of the city of Vadodara. The construction process started by L&T in October 2013 with budget of \$420 million and designed by sculptor Ram V. Sutar. And finally it was inaugurated by Indian Prime Minister Shri. Narendra Modi on October 31<sup>st</sup>, 2018.

The core of the statue utilised 210000 cubic metres of cement concrete, 6500 tonnes of structural steel and 1700 tonnes of bronze plates. The statue till the shoulder is made up of concrete and the head part is made up of steel. Self-compacting cement of M65 grade were used for the construction.

The most interesting part is the height of statue which is from its base 240 m with a base of 58 m and statue of 182 m. The height of 182 was specifically chosen to match the number of seats in the Gujarat Legislative Assembly.

The statue is divided into five zones of which only three are accessible to the public. There are a memorial garden and a museum which we have visited and enjoyed a lot. There was gallery at a height of 153 meters and we reached there by 2 lifts which can carry 26 each at a time and the gallery can hold up to 200 people.

It was mesmerizing experience clubbed with bunch of knowledge for all. After completing the visit of Statue of Unity they were taken for the lunch following with next part of visit i.e. *Sardar Sarovar Dam* at 1:30 PM.

### ***Sardar Sarovar Dam***

Sardar Sarovar Project (SSP) - An Epitome of Engineering is a perfect example where engineering meets technology. Sardar Sarovar Project is constructed on the river Narmada which originates from Amarkontak, Madhya Pradesh and ends in Gulf of Khambhat, Gujarat trailing a length of 1312 km. It is the fifth largest in the country, comprising 30 Major Dams, 135 Medium Dams and about 3000 Minor Dams along the total length. The SSP is located near Navagam, Gujarat.

The Sardar Sarovar Project is known as the Most Controversial Project in Indian history. The reason behind it is the political and social obstructions faced while construction of the dam. The main public figure behind it was Medha Patkar.

First we went to Dam View point where one of the prominent engineering Mr. A. V. Gajjar Sir, Executive Engineering explained all fundamentals and design part of Sardar Sarovar Dam. Sir explained each and every thing right from the site selection of dam to its complete design and construction covering all minor details.

Sardar Sarovar Dam is a concrete gravity dam across river Narmada, 1210 meters (3970feet) in length and with a maximum height of 163 m above the deepest foundation level, is constructed up to the crest level of spillway i.e. 121.92 m which is the second largest gravity dam in the world with an aggregate volume of 6.82 million m<sup>3</sup>.

Then we reached the entrance of River Bed Power House (R.B.P.H.) and well guided by Mr. Gajjar sir along with us. The entrance was a huge tunnel opening which was formed by cutting the adamant rocks of mountains of Vindhya and Satpura Ranges. The power house is located under a mountain. When we entered the power house, we were amazed to see the heavy machineries. The power house was 200 m long, 23 m wide and 53 m tall. During that time the turbines were not working due to shortage in the water head of the reservoir. The River Bed Power House comprises of six reversible Francis type turbine having a power generation

capacity of 200 MW each. The turbines were supplied by M/S Sumitomo Corporation, Japan. The power generation capacity of the River Bed Power House is 1200MW. The minimum water head required for power generation is 128.68 m. The diameter of the penstock is 22 feet. The power generation cost is 30 paisa per unit. The power generated by the SSP is shared among three states – Gujarat (16%), Madhya Pradesh (57%), and Maharashtra (27%). The share of power supply was decided on the basis of the scale of people affected due to construction of dam. Approximately 193 villages in Madhya Pradesh and 19 villages of Gujarat were submerged in the basin of the reservoir. It is an engineering marvel and we were explained the whole procedure of power generation.

Then we went to the actual site of the dam. Late Prime Minister of India, Shri Morarji Desai laid the foundation stone of the dam. The dam is 1.2 km long and it is 146.5 m high. It is 163 m from foundation and it is located at an elevation of 146.5 m from sea level. The dam comprises of 30 gates each having a discharge capacity of 1 lakh cusecs.

Then we went to the Canal Head Power House (C.H.P.H.). The most wonderful thing of the project is that it generates power from the flowing water that enters canal making the project more efficient. The Canal Head Power House consists of five Kaplan turbines having generation capacity of 50 MW each. Thus power generation capacity of the power house is 250MW.

Then we went to the starting point of the main canal (0m – Chainage) of the dam. The SSP comprises of canals of length 67000 km, making it the world's longest lined canal network.

Though the controversies during the construction of the dam were huge, but it is a boon to the drier parts of Kachchh and Saurashtra. It is to be noted that approximately 8900 villages, 35 cities are benefitted by SSP and in addition 35 lakh areas are benefitted by SSP. Thus one cannot deny that it is one of the most wonderful engineering projects constructed in India having a higher benefit-cost ratio. Finally after completing the visit successfully students were taken back to college campus at 9:30 PM.