

Report on

Visit to “Kadana Dam, Wanakbori Weir & Mahi Aqueduct”

Department of Civil Engineering, GCET had organized one day Educational visit to “Kadana Dam, Wanakbori Weir & Mahi Aqueduct” on July 06th, 2018. 44 students, 2 faculty members had visited the Kadana Dam Power House, Kadana Dam (Main Dam & View Point), Wanakbori Weir (Diversion Work), Mahi Aqueduct on Mahi River (NMC – 142 m Chainage).

About Kadana Dam:

Kadana Dam is an earthen and masonry dam on the Mahi River in Mahisagar district of Gujarat, India. The dam was constructed between 1979 and 1989. The dam supports a pumped-storage hydroelectric power-station. The first two generators were commissioned in 1990, the second two in 1998. The first two generators commissioned, Stage I, are reversible kaplan turbines that allow the power station to generate electricity during peak hours then pump it back into the reservoir during low demand hours such as night. The salient features of dam are as given in table below:

Table-1: Salient Features of Kadana Dam

Location	Village: Kadana, Tal: SantrampurDist: Panchmahals
Purpose	Irrigation, Hydro-Power & Flood Protection
River	Mahi
Area of catchment	25520 km ²
Mean annual runoff in the catchment	7696 Mm ³
Mean annual rainfall	760 mm
Year of commencement of construction work	1969
Year of completion	1979
Type of dam	Masonry with embankment main section
Height	66 m (217 ft.)
Length	575 m (1,886 ft.)
Active capacity of reservoir	1,203,000,000 m ³ (975,000 acre· ft.)
Catchment area	25,520 km ² (9,850 sq. m)
Turbines	Stage I: 2 x 60 MW Stage II: 2 x 60 MW Kaplan type
Installed capacity	240 MW
Spillway	
Type of spillway	Ogee
Length	406 m Main Spillway + 133 m Add. Spillway
Energy dissipater	Roller Bucket
Maximum discharge	49497 m ³ /s
Type, Nos. and size of gate	Radial, 27, (15.5m x 14m) (21 Main spillway, 6 Add. Spillway)

About Kadana Dam Hydroelectric Power Station:

The power station is located at Kadana Dam on Mahi River in Mahisagar District which is 190 km from Ahmedabad. There are four units of hydro turbines, each of 60 MW with total installed capacity of 240 MW. All the units are of BHEL make. The dam was constructed between 1979 and 1989 and supports the pumped-storage hydroelectric power-station. The first two generators were commissioned in 1990, the second two in 1998. The first two generators commissioned, Stage I, are reversible Kaplan turbines that allow the power station to generate electricity during peak hours then pump it back into the reservoir during low demand hours such during evening hours. Kadana Hydro Power Plants have been operated and handled by Gujarat State Electricity Corporation Limited (GSECL).

The visit was commenced from G H Patel College of Engineering & Technology at 6:30 AM and students were firstly taken to Kadana Dam and Kadana Dam Hydroelectric Power Station at 10:30 AM. After completing the visit of Kadana Dam they were taken to next part of visit i.e. *Wanakbori Weir (Diversion Head works)* at 3:00 PM.

About Wanakbori Weir:

The Weir was inaugurated in 1958 by Dr. Jivraj Mehta, the finance minister of Bombay state. The project is owned by Narmada, Water Resources, Water Supply and Kalpsar Department. It consists of a Random Rubble Masonary dam of 122 m. length and having 20.60 m. height from its lowest bed. It has canal head regulator with 7 nos. of radial gate known as sluice gate, open up-to 12 ft. height. The Dam is having capacity of 32.2 million m³, and is solely satisfying the irrigation purpose. It consist of storage pond on U/S side & nos. of dam such as Mahi dam & Amba dam in Rajasthan, Bajaj sagar Dam in M.P., Kadana Dam & Panam Dam in Gujarat.

On D/S side, Hydroelectric Power house is there operated by OREVA having capacity of generating electricity of 1 MW. In Power house Kaplan Turbine is installed as it can work with low discharge. Daily target production is approximately 25-30 MW. It supplies electricity to G.E.B Balasinor & some other village.

Mahi main canal provides irrigation water for 12 months to Kheda, Anand & Mahisagar district. Its irrigation capacity is around 2 lakhs hector of above mentioned region. It also provides drinking water to Ahmedabad city. It also supply the water for some well-known industries i.e. I.P.C.L., G.S.F.C., Wanakbori Thermal Power Plant, Sevaliya rail.

After completing the visit of weir the students were taken to *Mahi Aqueduct (Cross Drainage Works)* constructed on Mahi river at 5:00 PM.

About Mahi Aqueduct:

Narmada Main Canal crosses Mahi, a perennial river, between km 142.86 & km 143.46. To convey the discharge of canal across the river one cross drainage work is constructed called

Mahi Aqueduct. The discharge of the canal through the Mahi aqueduct will be 1008 cumecs. The flow through the aqueduct will be carried through two monoliths, each comprising of 4 rectangular ducts of 6.1 m width & 7.6 m height. The monoliths are supported by abutments and piers. There are 24 spans having 25 m spacing c/c. The piers are founded in hard rock with open pit foundations upto 8 m depth below the rocky river bed.

The piers are constructed by slip forming the entire section measuring 64 M length, 3.3 m width and 20 to 25 M height from the foundation raft operating 84 hydraulic jacks simultaneously. The monoliths are cast with specially designed rolling girder false formwork supported on pier caps below the soffit level of trough slab. The soffit formwork panels of the slab portion have a rolling system to push them to the next span without having to be dismantled and rehandled.

This is one of the largest aqueducts in the world. Slip forming technique was used for constructing piers of 64M length, 3.3M width & upto 25M height. Innovative false formwork was used for 25M spans of 28.9M & 9M height & also for RCC monoliths having 4 ducts of 6.1M width & 7.6M height.

Finally after completing the visit successfully students were taken back to college campus at 8:45 PM.

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 (Kadana Dam), Diversion Head works (Wanakbori Weir) & Cross Drainage works (Mahi Aqueduct) as they are studying the same in subject called “*Irrigation Engineering*”.