Chhotubhai Gopalbhai Patel Institute of Technology, Civil Engineering Department, Uka Tarsadia University

One day Educational tour at Ukai Dam site on 30/07/2016

B.Tech 5th Semester (Div.-A, B and C)

Chhotubhai Gopalbhai Patel Institute of Technology
DEPARTMENT OF CIVIL ENGINEERING

Industrial Visit Report

Name of Industry: UKAI Dam

Date of Visit:30**/**07/2016, Saturday

Total No. of Student: 117(UG-V Semester Div- A, B and C of B.Tech Civil Branch)

Total No. of Faculty: 06

Faculty Coordinator: Prof. Anuj Chandiwala
Other Faculty:- Prof. Urvi Rathod, Prof. Disha Parmar, Prof. Runali Chheda, Prof. Bhagyashree Desai, Prof. Nikhat Samnani

The department has arranged an industrial visit to Ukai Dam site for 3rd Year students of Civil department. The visit was organized with the prior permission and guidance of Hon. Director Dr. N.C. Shah and Head of Civil Engineering Department, Mr. K.N. Gandhi.

Details of Visit:

The **Ukai Dam**, constructed across the Tapti River, having the largest reservoir in Gujarat. It is also known as Vallabh Sagar. Constructed in1972. The dam is multipurpose, meant for irrigation, power generation and flood routing. Having a catchment area of about 62,255 km^2 and a water spread in area of about 52,000 hectares, its capacity is almost same as that of the Bhakra Nangal Dam. The site is located 94 km from Surat.

The storage capacity of Ukai dam is almost 46% of the total capacity of all the other existing dams in Gujarat if put together. During the last 40 years, the actual irrigation potential is attained through all the major and medium water resources projects in the State, which comprises only 14 million hectares. Some technical details are as given below in table1 and 2.

The dam is an earth-cum-masonry dam. Its embankment wall is 4,927 m long. Its earth dam is 80.77 meter high, whereas the masonry dam is 68.68 meter high. The dam's left bank canal feeds water to an area of 1,522 km^2. And 2275 $km^2$of area is irrigated through right bank canal which off takes from Kakrapar weir located in the downstream of Ukai Dam.

There are four units of hydro turbine each of 75 MW with a total installed capacity of **300 MW**. All the above units are of BHEL make.

At the end of dam visit, there was a technical interaction to strengthen the knowledge regarding Ukai Dam with Assistant engineer Shri Manish Vasava sir.

Lunch and Breakfast were arranged at Chamri Rest House. The arrangement of Mr. Mohanlal Maharaj is so nice all student were enjoy the food.

The visit was very fruitful as it improved our knowledge of irrigation and dam. We had very good support and cooperation from all concern instructors available on the site who explained each and every section very interestingly and deeply.

Education tour start from L.P. Savani circle and Poddar Arcade from surat at 6:00 Am and return to surat at 6:30 Pm.

Table-1 :- Details of Radial Crest Gates

Types of gate	Radial
Nos. of gate & size	Nos. 22 size- 51’ X48.5’ (15.544 m X 14.782 m)
Sill level of gate	297.50 Ft. (90.678 m)
Top level of gate	346.20 Ft. (105.465 m)
Discharge going capacity of one gate at FRL 345 Ft.	51141 Cusecs
Type of operation of gate	-Electrically -Diesel generator -Mobile generator -Manually
Time for fully opening of gate by electric motor	16 Minutes
Weight of each gate	174.10 M.T.
Cost of one gate	Rs. 8,16,635/-

Table-2 :- Ukai Reservoir Project

(A) Location of Dam

• State	• Gujarat
• District	• Surat
• Taluka	• Fort Songadh
• River	• Tapi
• Village	• Ukai
• Latitude	• 21° 15’ N
• Longitude	• 73° 35’ E

(B) Hydrology

1.	Catchment Area	(a) At Ukai 62225 Km^2 (b) At Kakrapar 62308 Km^2 (c) At Kathor Bridge 63823 Km^2 (d) At surat 64100 Km^2
2.	Mean annual rainfall in the water shed	785 mm
3.	Maximum annual rainfall in the watershed	1191 mm
4.	Minimum annual rainfall	270 mm
5.	Mean annual runoff at the dam site	17220 Mm^3
6.	Observed maximum flood at dam	42470 m^3/s
7.	Observed maximum dry weather flow	0.03813 X 16^8
8.	(a) Design flood	49490 m^3/s
	(b) Probable flood	59920 m^3/s
9.	Max. regulated outflow from the reservoir	24100 m^3/s
10.	Mean annual rainfall North of Tapi river	889 to 1145 mm
	(in the command) South of Tapi River	1524 to 2032 mm
11.	75 % Dependable annual yield (9.18 Maft)	12750 MCM

(C) Reservoir

1.	Gross storage capacity at FRL Design	8511 MCM Revised (7414 MCM)
2.	Dead storage below R.L. 82.296 m	1142 MCM Revised (684 MCM)
3.	Live storage	7369 MCM Revised (6730 MCM)
4.	Full reservoir Level	105.156 m
5.	Water spread at R.L. 105.156 m	60095 Ha.
6.	(a) Cultivated land submerged	30350 Ha.
	(b) Other land submerged	7485 Ha.
	(c) Forest land submerged	22260 Ha.
7.	Village affected by submergence	170 no.
8.	High Flood Level (HFL)	106.99 m
9.	Length of Reservoir	112 Km

(D) Dam

1.	Length of dam	
	(a) Length of masonry section incl. spillway	868.83 m
	(b) Length of earth dam section	4057.96 m
	Total Length	4926.79 m
2.	Maximum height of main dam	
	(a) Earth dam above river bed	68.58 m
	(b) Masonry dam above deepest foundation	80.772 m
3.	Total earth work	23240 X 10^6 m^3
4.	Total quantity of stripping	4950 X 10^3 m^3
5.	Total quantity of masonry concrete	1484 X 10^3 m^3
6.	Top of dam	111.252 m
7.	Road width on spillway	6.706 m

(E) Spillway

1.	Crest level of spillway	91.135 m
2.	Length of spillway	425.195 m
3.	Top of crest level	105.461 m
4.	Type of gates	Radial
5.	Size of Gates	15.545 X 14.783 m
6.	No. Gates	22 Gates
7.	Discharge capacity from all 22 gates	
	(a) At FRL-345 ft	13.37 lakh cusecs
	(b) At HFL- 351 ft	16.34 lakh cusecs

(F) Power Section (Hydro)

1.	Size of penstock	4 nos. 7.01 m Dia.
2.	Installation of 4 units of 75 MW each	300 M.W.
3.	Generation at 35 load factor	193 M.W.
4.	Annual energy (Units)	670 X 10^8 K WH

(G) Canal Bed Power House

1.	Size of penstock	3.96 m X 2.05 m
2.	Installation of 2 units of 2.5 MW each	5 M.W.
3.	Type of hoist	Hydraulic hoist
4.	Discharge through each unit	550 cusecs

Rest house (Chamri)