

**A
Report
on
Industrial Visit
At
Ukai Hydro Electric power station, Gujarat
Organized By
DEPARTMENT OF ELECTRICAL ENGINEERING**



छोटुभाई गोपालभाई पटेल प्रौद्योगिकी संस्थान, बारडोली
Chhotubhai Gopalbhai Patel Institute of Technology, Bardoli

About Power Station:

Ukai Hydro Electric power station and dam located in ukai of songadh taluka & tapi district in the state of gujarat 100km. far from surat. It is first Hydro electric power project in gujarat. It has got an excellent record in the field of generation. Ukai dam is located across the river tapi about 29 km. up stream of the kakrapar weir.

This project is the largest multi-project undertaken by the state government. the various. utility of the project is as under.

- Irrigation purpose(surat,valsad & Bharuch dist.)
- Power generation (Total 305 mw)
- Flood protection(up to surat)
- Fisheries development
- Bed cultivations
- To control water in such a way that during winter and summer industrial and muncipal get water.
- Foundation ceremony of dam perfomed in---- November 1959 (By late union financeminister morarji Desai)
- Project accepted by planing----in 1961 commission.
- Dam was completed----in 1971
- Opening ceremony----in 1972(By late minister smt. Indira Gandhi)

DAM HYDROLOGY :-

1. Catchment area = 62225 sq.k.m.
2. Gross Storage Capacity = 6.4 MAFT
345 FRL
757.523 MUS Energy available.
0.715 MAFT
270 FRL
3. Dam Leanth = 4926.79 Meter total
4. Dam Height = 68.58 Meter from river bed.
5. Maximum Possible flood = 21.16 Lac cu sec.
6. Reserivior = 120 km length and 5km average width.
7. Total irrigation Covered = 9,02250 Aceres.
8. Spill way
gates = nos 22
Types = Redial gates
Size = 51' x 48.5'
Weight = 100 tones each
Discharge capacity = 49490 m/sec.(17-48 lac cusecs)
9. Tail Race Canal Length = 1220mtr.
Width = 30.5mtr.
10. Pan stock dia = 7.01mtr
Thickness = 18 to 22 mm
Length = 60mtr.
11. pen stock gate = 4 Nos one for each pan stock
having 17 minutes opening time & 72 second closing time
12. kakrapar distance from hydro = 22 k.m.

13. Area Coverd When Full of dam = 112 sq.k.m.

14. Const cost of dam = 108.64 crores

DAM

Construction cost of DAM	180.74 Cr	
Max. Dam Level	1990-91	346.17 Feet
Min. Dam Level	1979-80	268.30 Feet

MAIN HYDRO

Main Hydro Total Cost	22.87 Cr	
Commissioning date of Main Hydro Units		
Unit # 1 (75 MW)	08-07-1974	
Unit # 2 (75 MW)	13-12-1974	
Unit # 3 (75 MW)	22-04-1975	
Unit # 4 (75 MW)	04-03-1976	
Max. Generation (for Monsoon Year)	1976-77	1261.217 Mus
Max. Generation (Monthly)	Sept-1989	210.100 Mus
Max. Generation (Daily)	25-09-1998	7.689 Mus
Gentation Since Commissioning (Up to 31-3-2014)	29099.834 Mus	
Gentation Since Commissioning (Up to 9-4-2014)	29125.490 Mus	

Financial Genration Details

Year	Generation in Mus	PLF %
2006-07	880.608	33.51
2007-08	901.181	34.19

Ukai Hydro Power Station has been declared 3rd best performing station in India during 2006-2007 year and awarded Bronze shield for the same by ministry of the power New delhi.

Hydro electric power station which is a part of multipurpose project is being executed by the Gujarat electricity Board had installed four hydro units having rated capacity of 75 mw each with 15% overload. Each of four kaplan turbine is designed and erected by m/s BHEL. Bhopal to give an output of 105000 MHP for maximum net head of 57.2 meter. The prime mover drives matching generator of 75mw rated capacity. this power station has got an excellent record in the field of generation.

TURBINE:

1. **Type** = Reaction type, kaplan, vertical shaft, feathering propeller type.
2. **Make** = Bharat Heavy Electricals Ltd..
3. **Head** = 48.8 m (156.82 ft.) Rated head.
= 57.2 m (187.66 ft.) Max head.
= 34.4 m (112.86 ft.) Min head.
4. **Output power** = 105000 Metric HP
= 120750 Metric HP Max.
5. **Speed** = 150 RPM (Clockwise Rotation)
6. **Run away Speed** = 300 RPM with cam
= 350 RPM without cam
7. **Water discharge** = 6000 cusec (101 m³/sec) at 75 MW.
8. **Nos. of guide vanes** = 24 nos.
9. **Size of guide vanes** = 6660 mm x 19.4 mm
10. **Main Shaft dia.** = 900 mm
11. **Runner hub dia.** = 3160 mm
12. **Runner blades** = 6 nos. Each having weight of 5 tones & design to withstand 1700 tones hydraulic
13. **Spiral inlet dia.** = 6500 mm
14. **Largest transport item of turbine** = Inner top cover half size 6.1m x 3.5m x 3.0m
15. **Efficiency** = 98 % at the full water level
16. **Weight of turbine with shaft And runner disc** = 140 MT
17. **Bearing** = Turbine guide bearing 1 no having 8 nos. pads.

GENERATOR

1. **Nos. of Generator** = 4 Nos
2. **Sr. no. of Generator** = 3000107, 3000108, 3000109, 3000110 respectively
3. **Type** = G25 Vertical Umbrella Type Salient Pole Rated 83333 KVA, 0.9 p.f., 11KV (\pm 5%) 3 phase, 4370 AMPS. Rated KVAR 56000 at Zero leading P.F.
4. **Make** = Bharat Heavy Electrical Ltd.
5. **Stator Windings** = Slots 384, winding coils 384
Joint 1) Series joint = 264
 2) Pole to pole joint = 108
 3) Bus Bar joints = 12

Stator resistance per phase at 200=0.003415 ohm. Field resistance at 200 C=0.15 ohm. Rotor excitation at no load & 100% voltage= 608 amp. Rotor excitation at rated output & voltage = 1052 Amp. Excitation voltage = 180 v.

- 6. **Speed** = 150 RPM
- 7. **Overall dia.** = 4127.5 x2 =8255.0 mm
- 8. **Heaviest package for shipment**
Thrust bearing housing size 04.34m long x 4.12 m width x 2.6 m high having weight 55 tones.
- 9. **Weight of generator side** = 275 MT
- 10. Heaviest assembly to be lifted by crane weighting 220 tones.
- 11. **Bearing** = 1 no - thrust bearing having 12 pads.
1 no - Generator guide bearing having 24 pads.

SPILL WAY

- 1. **Spill Way Channel Length** = 1524 Meter, Width = 259 Meter Depth = 18.29 Meter
- 2. **Spill Way Gates :**
 - 1) Numbers = 22 nos
 - 2) Types = Radial Gates.
 - 3) Area = 15.545 m x 14.783 m.
 - 4) Weight = 100 Tones Each.
- 3. **Discharge Capacity** = 49490 m3/sec.,Maximum=59920 m3/sec
- 4. **Overvakk crest length** = 425.195

TAILRACE CANAL

- 1. **T.R.C Length** = 1220 m.
- 2. **T.R.C. Width** = 30.5 m.
- 3. **Discharge Capacity** = 736.24 m3/sec.
- 4. **T.R.C. Water Level**= 47.85m. minimuml = 65.00m. Maximum = 47.85m. minimum = 48.35m. Normal

PEN-STOCK (4 Nos.) (1)Diameter : 7.01 m (23')

(2) Thickness : 18 to 22 mm.

(3) Length : 60m

PENSTOCK GATES: 4 Nos. one for each penstock having 17 minutes opening time and 72 seconds closing time. Gates can be closed from hoist gallery and/or from power house control room.but gates can be opened from hoist gallery only.

MINI HYDRO

Mini Hydro Total Cost	6 Cr
Commissioning date of Mini Hydro Units	
Unit # 1 (2.5 MW)	08-12-1987
Unit # 2 (2.5 MW)	29-01-1988

SWITCHYARD: 220KV main bus and reserve bus. All M/cs ,feeder and trans. Bkr are SF-6 krs. (220 KV & 66 KV). All 11 KV feeders bkr are VCB.

1. 220KV current transformer (11 sets)
2. 220KV potential transformer (2 sets)
3. 66KV current transformer (2 sets)
4. 66KV voltage transformer (1 sets)

220KV line :

1. Achhalia feeder - 1
2. Achhalia feeder - 2
3. Hydro -Thermal tie Feeder-1
4. Hydro -Thermal tie Feeder-2

Details of Visit:

Department of Electrical Engineering organized the visit to Ukai Hydro Electric Power Station for the student of Diploma 2nd, B. Tech 2nd and 3rd year student on 31st January 2020 whose details are given as below.

Date of Visit	Branch and Semester	No. of Students	Total No. of Students	Accompanied Faculties
31/1/2020	4 th Sem B.Tech. (Electrical)	21	47	Ms. Unnati Mali Ms. Nidhi Shah
	6 th Sem B.Tech. (Electrical)	14		
	4 th Sem Diploma (Electrical)	12		

Chhotubhai Gopalbhai Patel Institute of Technology

Course Name : B.Tech. (EE)

Semester : 4

Visit Uka)

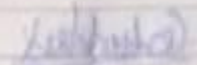
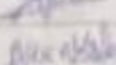
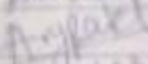
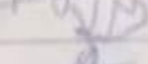
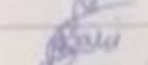
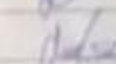
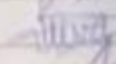
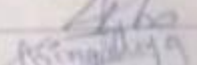
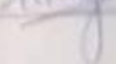

Sr. No.	Enrollment No	Student Name	Sign
1	201803100610001	ROSHANKUMAR YOGENDRAPRASAD	
2	201803100610002	RAJKUMAR JAYESHKUMAR RUPAWALA	
3	201803100610003	HETKUMAR DIPAKBHAI PATEL	
4	201803100610004	Daminiben Rajeshbhai Gamit	
5	201803100610005	SANDEEPBHAI RAMANBHAI ROHIT	
6	201803100610006	VATSAL PRAGNESHBHAI TANDEL	
7	201803100610008	Abhishek Balraj Dalmotra	
8	201803100610009	KISHORE PRANAVKISHORE SATYAM	
9	201803100610010	VIKAS RAJESHKUMAR MAURYA	
10	201803100610011	SAGAR BRIJLAL KAMAL	
11	201803100610012	Smitkumar Maheshsinh Parmar	
12	201803100610015	MAYUR DESAI MAHEK	
13	201803100610016	SAPNA K AGRAWAL	
14	201803100610017	FENIL DINESHBHAI TANDEL	
15	201803100610018	PEDDURI SAIRAM PEDDURI	
16	201903103520061	Prashant Jaiswal Nityam	
17	201903103520062	Gaurav Nandkishor Patel	
18	201903103520063	HIRALKUMARI SUBHASHBHAI PATEL	
19	201903103520064	MAYURIBEN NANUBHAI GAMIT	
20	201903103520065	PAYAL KIRANKUMAR PATEL	
21	201903103520066	SONALIKUMARI NAVINBHAI PATEL	
22	201903103520067	Jankiben Yogeshbhai Patel	
23	201903103520068	Kanakbhai Shinglot Nishita	
24	201903103520069	PALAKKUMAR RAJESHBHAI MISTRY	
25	201903103520073	DHRUVINIBEN MAHENDRABHAI PATEL	
26	201903103520077	Hitik Nileshbhai Dodiya	
27	201903103520085	Pradyumbhai Sunilbhai Jadav	
28	201903103520086	NIKITAKUMARI UMEDBHAI PATEL	
29	201903103520087	VIKASH ULLASH SAHOO	
30	201903103520088	MAYURKUMAR BHIKHUBHAI HALPATI	

Chhotubhai Gopalbhai Patel Institute of Technology

Course Name : Diploma (EE)

Semester : 4

Visit Utkal

Sr. No.	Enrollment No	Student Name	Sign
1	201802100110006	YASHKUMAR ANILBHAI BARBER	
2	201802100110018	GANESH VIJAYBHAI PATEL	
3	201802100110019	AFRIN GULAMHUSEN SHAIKH	
4	201802100110020	AKANKSHA SUNIL MAHAJAN	
5	201802100110027	YUKTA ARVIND PATEL	
6	201802100110028	KAUSHALKUMAR KIRITKUMAR MEHTA	
7	201802100110030	SHUBHORIN GYANPRAKASH SENGUPTA	
8	201802100110032	RAVI HARPALSINGH CHAHAR	
9	201802100110034	RATHOD NARESH KUMAR	
10	201802100110035	VIVEK JAGDISHBHAI PATEL	
11	201802100110036	MOHAMADAFRIDI ABBASBHAI KHAN	
12	201802100110038	APLESH EDWARD SINGADIYA	

Chhotubhai Gopalbhai Patel Institute of Technology

Course Name : B.Tech. (EE)

Semester : 6

Visit (Date)

Sl. No.	Enrollment No.	Student Name	Place (How to Reach company)	Sign
1	201603100610023	Dhruv Hiteshbhai Patel		
2	201703100610001	Bhargav Pravinbhai Radadiya		
3	201703100610002	Abhirajsinh Yogendrasinh Atodaria		
4	201703100610003	Jenish Kamleshbhai Kanetiya		
5	201703100610005	Hemanshu Mansukhbhai Sojitra		
6	201703100610007	Dhruv Rameshbhai Patel		
7	201703100610009	Jigarkumar Harishbhai Patel		
8	201703100610010	Poorvikumari Chandubhai Ganvit		
9	201703100610014	Riken Sanjaybhai Bodara		
10	201703100610015	Meet Dinesh Purohit		
11	201703100610019	Harshit Suresh Chawla		
12	201803100620001	Rohit Sureshbhai Kumbhani		
13	201803100620002	Venish Rameshbhai Goyani		
14	201803100620003	Pranavkumar Hemantbhai Bhavsar		
15	201803100620007	Tejal Pareshbhai Patel		
16	201803100620008	Dikshi Rakeshbhai Modi	P.P. Modi	P.P. Modi
17	201803100620009	Bhavik Shalleshbhai Ahir		
18	201803100620010	Krutiben Ashokbhai Valvi		K.V.V.
19	201803100620011	Nidhesh Vinubhai Italiya		
20	201803100620012	Rikin Shambhubhai Chabhadiya		
21	201803100620015	Falgunikumari Umedbhai Patel		
22	201803100620016	Yuvrajsinh Mulrajsinh Ravrana		

Activities on the Day of Visit:

We took entry for our visit at 9:00 AM. In the visit, authorities welcomed us on the Gate-Pass section. All the students had registered first. We moved to plant. Then the two of their plant engineers brought us to plant. They explained us the whole generation process step by step and also explained us about all control units. The questioning was also being taken by us and the satisfactory answers were given by them.

After arriving at the main exit we officially checked out and then after we thanked the all authorities and left the plant. On the way back to college, the photos of the visit have been taken and all the students finally left for the college.

Glimpses of Visit:



We heartiest thanks to Ukai Hydro Power Station to give an opportunity to visit such an esteemed organization and we also want to thank our director Dr. R. V. Patil sir, Head of the Department Mr. Ankur V. Rana sir and all the faculties for coordinating the visit.