REPORT ON

INDUSTRIAL VISIT

TO

PARAMBIKULAM ALIYAR PROJECT (PAP)

on

13 - 8 - 2010

by
III. B. E. Civil Engineering (2008 – 2012 batch)
Dr. Mahalingam College of Engineering and Technology
Pollachi – 642 003.

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1 INTRODUCTION:

The III. B. E. Civil Engineering students (2008 – 2012 batch) of Dr. Mahalingam College of Engineering and Technology went on an Industrial visit to Parambikulam Aliyar Project (PAP) on 13-8-2010. The following are the details of places visited:

1. Parambikulam dam.
2. Walk through the Infiltration Gallery of Parambikulam dam.
3. Thunakadavu dam.
4. Wildlife Museum located in Top Slip.

PARAMBIKULAM – ALIYAR PROJECT (PAP) is a joint venture project between the Governments of Tamil Nadu and Kerala. It consists of eight interconnected dams. Five dams are situated in Tamil Nadu and the remaining three in Kerala.

The reservoirs lie at various elevations ranging between elevation + 3780 feet and + 1050 ft. and this difference of elevations has made it possible to utilize the drop between them for the development of hydroelectric power.

2 AIM OF THE PROJECT:

The Parambikulam Aliyar Project (PAP) successfully accomplishes the diversion and integration of 8 West flowing rivers; 6 in the Anaimalai Hills and 2 in the plains- for the benefit of the drought prone areas in the Coimbatore and Erode Districts of Tamilnadu State and stabilizing the existing irrigation system in Chittoorpuzha of Kerala State. Dams on the 8 rivers with inter connecting tunnels have been constructed. They divert the west flowing waters to the east and irrigate the plains of the Coimbatore District and Erode District of Tamil Nadu State and Chittur area of the Kerala State. The main components of this project comprises of 8 Dams, 4 Power Houses, 6 Main Tunnels and 7 Irrigation canals.

3 RESERVOIRS

3.1 UPPER NIRAR WEIR:-

The Nirar river has its source in the Kattamalai Hills, and takes the name of Kallar after its confluence with some of the streams. It runs in a South Westerly direction and falls into Edamalayar, the major tributary of Periyar river.

3.1.1 HYDRAULIC PARTICULARS

District	--	Coimbatore
State	--	Tamilnadu
Basin	--	Periyar
Catchment area	--	29 sq.miles (11 T.Nadu 18 Kerala)
Area of Water spread	--	0.07 Sq.miles
Full Reservoir level	--	3800 feet
Maximum Water level	--	3800 feet
Deepest Foundation level	--	3714.70 feet
Capacity at FRL	--	39 MC.ft
Construction cost of Dam	--	Rs.178 Lakh

3.2 LOWER NIRAR DAM:-

A dam across Nirar River at a lower site, about 8 Km, below the Upper Nirar weir has been constructed. This dam will conducts the diverted waters of Anamalaiyar Basin to the Sholayar valley through the un-lined lower Tunnel taking off from the dam site. In addition to this, the yield of the catchment between the Upper Nirar Weir and the Dam will also be diverted to the Sholayar Basin.

3.2.1 HYDRAULIC PARTICULARS

District	--	Coimbatore
State	--	Tamilnadu
Basin	--	Periyar

Catchment area	--	39 Sq. miles (21 T.Nadu 18 Kerala)
Area of Water spread	--	0.2 Sq.miles
Full Reservoir level	--	3350 feet
Maximum Water level	--	3350 feet
Deepest Foundation level	--	3195 feet
Capacity at FRL	--	274 MC.ft
Construction cost of Dam	--	Rs. 547 Lakhs

3.3 SHOLAYAR RESERVOIR:-

Sholayar river is one of the main tributaries of Chalakudi river. It has its source in Valparai Estate and runs in a westerly direction for about 30 miles before it joins the Parambikulam River. The total catchment area of this river upto its in-fall into Parambikulam river is 100 Sq.miles of which 55 sq.miles is in the TamilNadu State and the rest in Kerala. The Upper catchment of this river is situated at an elevation from 3000 to 8000'. This is influenced by the South West Monsoon.

3.3.1 HYDRAULIC PARTICULARS

District	--	Coimbatore
State	--	Tamilnadu
Basin	--	Chalakudi
Catchment area	--	47 Sq. miles (Tamil Nadu)
Area of Water spread	--	2.21 Sq.miles
Full Reservoir level	--	3290 feet
Maximum Water level	--	3295 feet
Deepest Foundation level	--	2960 feet
Capacity at FRL	--	5392 MC.ft
Construction cost of Dam	--	Rs.1125.40 Lakhs

3.4 ANAMALAYAR DIVERSION WORK:-

Under this proposal a diversion of 2,500 M.cft. each year from Anamalayar for use in the Parambikulam Aliyar Project system has been agreed to by the Kerala Government and the scheme proposals are awaiting clearance from Kerala Government. This work will be taken up after it is cleared by the Kerala Government and a supplemental agreement is concluded on this aspect.

3.5 PARAMBIKULAM RESERVIOR :-

Parambikulam river has its origin in Ramakrishna Malai with the name of Periyar at an elevation 4,000 to 5,000 ft. in Coimbatore District. Three tributories joins this Parambikulam River along its run.

Parambikulam Reservoir is the largest Reservoir of the Project with a gross storage capacity of about 17,820 M.Cft at F.R.L. + 1825 ft. Water from this reservoir is diverted to the adjacent Thunacadavu Reservoir a Balancing Reservoir through the Parambikulam Tunnel which is 8186 ft. in length.

3.5.1 HYDRAULIC PARTICULARS

District	--	Palghat
State	--	Kerala
Basin	--	Chalakudi
Catchment area	--	88.2 Sq. miles (60.7 T.Nadu 27.5 Kerala)
Area of Water spread	--	8.22 Sq.miles
Full Reservoir level	--	1825 feet
Maximum Water level	--	1825 feet
Deepest Foundation level	--	1595 feet
Capacity at FRL	--	17820 MCft
Construction cost of Dam	--	Rs. 405.430 Lakhs

3.6 THUNACADAVU RESERVOIR:-

This is a small balancing reservoir constructed across Thunacadavu River, which is a tributory of Parambikulam River. It's gross capacity is 557 M.Cft. The water that is received from Parambikulam Reservoir and from the Peruvaripallam Reservoir, as well as from its own catchment, is diverted to the Sarkarpathy Power House through the Sarkarpathy Power Tunnel.

3.6.1 HYDRAULIC PARTICULARS

District	--	Palghat
State	--	Kerala
Basin	--	Chalakudi
Catchment area	--	16.7 Sq. miles (7.7 T.Nadu 9.0 - Kerala)
Area of Water spread	--	1.675 Sq.miles
Full Reservoir level	--	1770 feet
Maximum Water level	--	1770 feet
Deepest Foundation level	--	1694 feet
Capacity at FRL	--	557 MC.ft
Construction cost of Dam	--	Rs. 60.00 Lakhs

3.7 PERUVARIPALLLAM RESERVOIR:-

This Reservoir is formed by an earthern Dam 1535 feet in length and has a gross capacity of 620 M.Cft. This is connected to the Thunacadavu reservoir by an open cut channel. The combined catchment area of Thunacadavu River and Peruvaripallam is 22.80 sqm. at the Dam Site.

3.7.1 HYDRAULIC PARTICULARS

District	--	Palghat
State	--	Kerala
Basin	--	Chalakudi

Catchment area	--	6.10 Sq. miles (Kerala)
Area of Water spread	--	1.12 Sq.miles
Full Reservoir level	--	1770 feet
Maximum Water level	--	1770 feet
Deepest foundation level	--	1668 feet
Capacity at FRL	--	620 M.Cft
Construction cost of Dam	--	Rs. 34.30 Lakhs

3.8 ALIYAR RESERVOIR:-

A Reservoir has been formed by construction of a dam across the River Aliyar and it has a gross capacity of 3,864 M.Cft. Two irrigation canals i.e., Vettaikaranpudur and Pollachi canals take off from this Reservoir. This reservoir is also intended to meet the requirements of the existing command area in TamilNadu State and Kerala State. The catchment area at the Aliyar Dam site is 76 Sq.miles.

3.8.1 HYDRAULIC PARTICULARS

District	--	Coimbatore
State	--	Tamilnadu
Basin	--	Aliyar
Catchment area	--	76 Sq. miles
Area of Water spread	--	2.51 Sq.miles
Full Reservoir level	--	1050 feet
Maximum Water level	--	1050 feet
Deepest Foundation level	--	914 feet
Capacity at FRL	--	3864 M.Cft
Construction cost of Dam	--	Rs. 300 Lakhs

3.9 THIRUMURTHY RESERVOIR:-

This reservoir across the River Palar has a gross capacity of 1,935 M.Cft. Apart from its own catchment it receives the diverted waters from the Upper

Reservoirs in the Anamalai Range, through the Sarkarpathy tunnel and the Contour canal. An irrigation canal called, the Parambikulam Main Canal takes off from this Reservoir and it branches into two.

a) A 125 Km long Parambikulam Main Canal and

b) A 30.4 Km long Udumalpet Canal

3.9.1 HYDRAULIC PARTICULARS

District	--	Coimbatore
State	--	Tamilnadu
Basin	--	Aliyar
Catchment area	--	31 Sq. miles
Area of Water spread	--	1.57 Sq.miles
Full Reservoir level	--	1337 feet
Maximum Water level	--	1337 feet
Deepest Foundation level	--	1222 feet
Capacity at FRL	--	1935 M.Cft
Construction cost of Dam	--	Rs. 237.75 Lakhs

3.10 UPPER ALIYAR RESERVOIR:-

A 235 feet high Dam across Aliyar called the Upper Aliyar Dam has been constructed just above the Aliyar Dam and is mainly intended for generation of power through a Power House situated in the foreshore of the Aliyar Reservoir.

4 MAP OF PARABIKULAM – ALIYAR PROJECT

5 TUNNELS

5.1 DETAILS OF TUNNELS

Serial No	Name of Tunnel	Size	Length in feet	Discharge in cusecs	Nature
1	2	3	4	7	8
1	Upper Nirar Tunnel (Cost Rs. 227 Lakhs)	20' Horse shoe	15167	2670	Unlined
2	Lower Nirar Tunnel (Cost Rs.693 Lakhs)	22' Horse shoe	26664	2200	Unlined
3	Sholayar Power Tunnel 1 (Cost Rs. 107.25 Lakhs)	9' Horse Shoe	8390	750	Lined
4	Sholayar Power Tunnel	9' Horse Shoe	3500	750	Lined
5	Parambikulam Tunnel (Cost Rs. 56.20 Lakhs)	16'9" Horse Shoe	8186	1400	Unlined
6	Sarkarpathy Tunnel (Cost Rs. 161 Lakhs)	12' Horse Shoe	12635	14.00	Lined

6 POWER HOUSES :-

The total installed capacity of the four Power Houses of this project is 185 MW.

6.1 SHOLAYAR POWER HOUSE NO.1 :-

The fall of 1327 feet at the end of Sholayar Tunnel is utilised for generating Power with an installed capacity of 70 MW.

6.2 POWER HOUSE NO. II :-

A head of 508 feet below the Sholayar Dam has been used to develop 25 MW of Power from the waters released to the Kerala Sholayar Reservoir.

6.3 SARKARPATHY POWER HOUSE :-

A drop of 326 feet at the end of Sarkarpathy Tunnel is being utilised for generation 30 MW of Power.

6.4 ALIYAR POWER HOUSE (NAVAMALAI) :-

A fall of 1400 feet available in the Aliyar Valley between Upper and Lower Aliyar Reservoir is utilised for generating 60 MW of Power.

7 CANALS

The peculiarity of this project is that the entire canal system is lined with concrete, even initially, during execution itself, to prevent seepage losses.

They are :-

7.1 ALIYAR FEEDER CANAL

13.15 Km long with a carrying capacity of 286 cusecs, serving an ayacut to 4665 acres in addition feeding Aliyar Reservoir.

7.2 SETHUMADAI CANAL

8.2 Km. long with 63 cusecs carrying capacity serving an ayacut of 5044 acres.

7.3 POLLACHI CANAL

48 Km. long with a carrying capacity of 299 cusecs and serving an area of 23488 acres.

7.4 VETTAIKARANPUDUR CANAL

17.2 Km. long with a carrying capacity of 95 cusecs and serving an area of 11181 acres.

7.5 PARAMBIKULAM MAIN CANAL

Parambikulam Main Canal is the longest and the biggest canal.It is 125 Km. in Length and is designed to carry a discharge of 1031 cuses for irrigating an area of 316383 acres.

7.6 UDUMALPET CANAL

Udumalpet canal - 30Km. long is designed to carry a discharge of 278 cusecs for irrigating an area of 58292 acres.

7.7 CONTOUR CANAL :-

This Contour Canal is unique in the whole of South India. This canal is designed to take the tail race waters from the Sarkarpathy Power House and feed Thirumurthy Dam. It is built along the slopes of the mountainous range. During its run of about 52 Km. it passes through 4 tunnels of which Navamalai is the longest one. Its carrying capacity is 1,150 cusecs. The execution of this canal is an engineering achievement. It has been constructed against heavy odds in a very difficult terrain amidst forest area involving rock cutting on one side and filling on other side.

The design criteria for the canals adopted in this project are for irrigated dry crops in the command area. Due to the position of the command area wet cultivation in the low lying areas and the valleys of the command area is permitted upto 20%.

A duty of 120 has been adopted for irrigated dry crops and for the wet crops a duty of 60 is allowed. The average duty works out to 85. The carrier system of this project includes open cuts, cut and cover sections, Flumes and Tunnels.

8 PAP SCHEMATIC LAYOUT OF RESERVOIRS

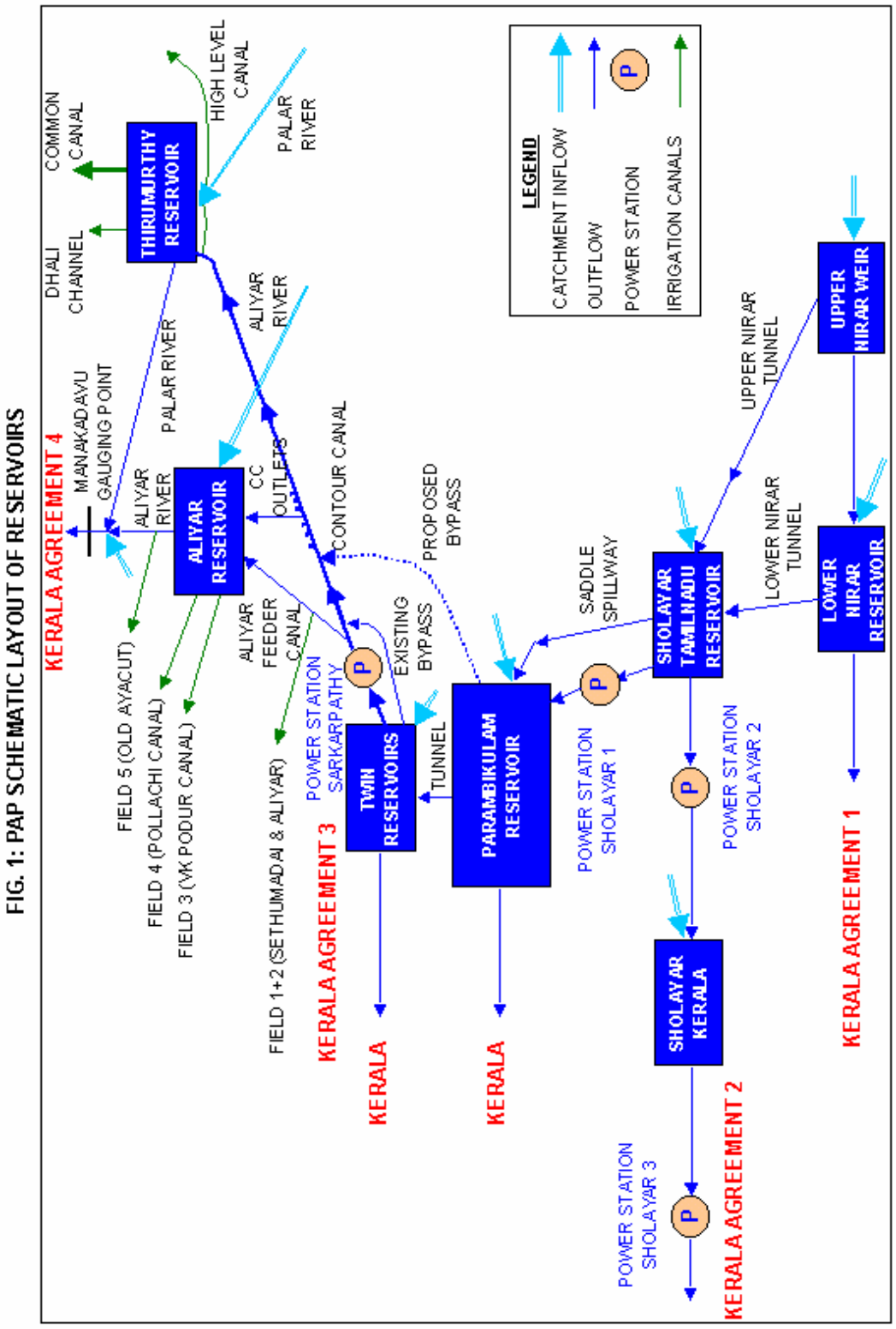

FIG. 1: PAP SCHEMATIC LAYOUT OF RESERVOIRS

9 PHOTOS OF VISIT

9.1 AT DOWNSTREAM OF PARAMBIKULAM DAM

From Left:

Row 1 - standing: Jeya Ishwarya, Manjari, Arun.A, Gopalakrishnan.M, Kumarappan, Srinath.

Row 2 - sitting: Praveena, Sandhya, Janani, K.L. Manikandan, Daniel Justus, Aathis Narayanan, Er. Satheesh , AE/WRO, PAP, Sabari Arumugam, Praveen kumar, Venkatesh, Siva Elango.

Row 3 – sitting: Alice Steffi Loyd, Ishwarya E, Hafiz Mohammad.

Row 4 – standing:Tiny George, Saranya, Sharmila, Vadivu Mam, Kavitha, Hariram, Thiyagarajan, Muthukumaran sir, Srinivasan @ Essaki raja, Akileswaran, Manikandan.K, Krishna Kumar, Prabu Shankar.

Row 5 – standing: Gowtham S, Raghul Raj, Ravikumar, Surya Prakash, Nivash, Gopalakrishnan R, Chandra Sekar.

9.2 AT TOPSLIP

From Left:

Row 1- Kneeling: Kavitha, Ishwarya E, Janani, Rama Kumarappan, Praveena, Alica Steffi Loyd.

Row 1- Standing: Vadivu Mam.

Row 2- Kneeling: Ravikumar, Akeleshwaran, Venkatesh Kumar, Aathis Narayanan, Arun A, Naveen, Hafiz Mohammad, Manjari, Sharmila.

Row 3- Standing: Sandhya Sugumaran, Jeya Ishwarya, Siva Elango, Srinath, Muthukumaran Sir, Srinivas @ Essaki Raja, Gowtham S, Raghul Raja, Gopalakrishnan M, Chandra Sekar, Saranya, Tiny George.

Row 4- Standing: Praveen Kumar, Daniel Justus, Prabu Shankar, Manikandan K, Krishna Kumar, Sabari Arumugam, Gopalakrishnan R, Hariram G, Thiyagarajan, K.L. Manikandan, Surya Prakash, Nivash.

9.3 AT PARAMBIKULAM PROJECT OFFICE

From Left:

Row 1: Sandhya Sugumaran, Tiny George, Manjari, Saranya, Kavitha.

Row 2: Sharmila, Janani, Alice Steffi Loyd, Jeya Ishwarya, Ishwarya E, Praveena.

10 VISIT ARRANGMENTS DETAILS

10.1 PERMISSION LETTERS

10.1.1 INITIATION LETTER

The Initiation Letter was written by Dean Dr. Ranga Palaniswamy to the Executive Engineer and Superintending Engineer of Prambikulam Project by post to get the approval.

10.1.2 PERMISSION LETTER

The permission letter was received by post to the college from both SE and EE.

10.1.3 CONFIRMATTION LETTER

The Confirmation letter was sent to SE/PAP, EE/PAP. On previous day of the visit, Er. Mathiyalagan, AEE/PAP was informed over the phone about the visit for getting the permit. On the day of visit, permit pass was issued in the PWD office in Vettaikaran Puthur at 8 am.

10.2 LOGISTIC DETAILS

10.2.1 TRANSPORT DETAILS

The buses were arranged at Rs. 8500 per day with the help of Mr. Senthil in Traffic Engineer of MCET.

10.2.2 BOARDING ARRANGEMENTS

The breakfast was arranged in anamalai with the help of Mr. Meheshwar, 2009 batch B.E. civil student, MCET and the lunch was arranged in Parambikulam with the help of Er. Babu Sabariswaran.

10.2.3 LODGING ARRANGEMENTS

The IV was one day program and there were no lodging arrangements made.

10.3 FACILITATORS

Staffs accompanied us : 1. Mr. Muthukumaran, Sr lecturer, 2. Ms. Vadivu, Lecturer.

This industrial visit was organized by 2008 batch B.E. civil class representatives :

1. Mr. Daniel Justus. 2. Mr. Praveen Kumar.

11 ACKNOWLEDGEMENTS

We are very thankful for our management, who gave us this opportunity to visit PAP. We sincerely thank our beloved Dean Dr. Ranga Palaniswamy, who helped in arranging everything. We thank our respected HOD Dr. G. Jaisankar, who helped us in organizing this trip with his valuable advice. I thank Mr. Marimuthu AE/WRO, PWD, who helped in getting permission in the PWD office. Our sincere thanks to SE/PWD, EE/PWD, Er. Babu Sabariswaran AE/PWD and Er. Satheesh , AE/WRO, PAP, who gave permission, helped in understanding the details of PAP and in arranging lunch in parambikulam. Our sincere thanks go to everyone who helped for this useful industrial visit.