



**ADIKAVI NANNAYA UNIVERSITY: RAJAMAHENDRAVARAM
UNIVERSITY COLLEGE OF ENGINEERING
DEPARTMENT OF MECHANICAL ENGINEERING**

**INDUSTRIAL VISIT REPORT ON POLAVARAM PROJECT
Academic Year 2021-2022**

NAME OF THE PLACE: POLAVARAM, WEST GODAVARI DIST., A.P

NAME OF THE PROJECT: INDIRA SAGAR (POLAVARAM) PROJECT

NAME OF THE WORKS: EARTH-CUM-ROCKFILL DAM, SPILLWAY GATES, HYDROELECTRIC PROJECTS, CHANNELS CONSTRUCTION.

DATE OF VISIT: 26/03/2022.

LIST OF THE FACULTY ACCOMPANIED:

- 1) Ms.B.Lakshmi
- 2) Dr. K. Durga Rao
- 3) Mr. K. Sri Harsha Reddy
- 4) Dr. Damayanthi

NO OF STUDENTS VISITED: 68

BATCH/ YEAR: III Year B.Tech Mechanical Engineering students.

All the B.Tech Third year students of Department of Mechanical Engineering have visited the Constructing work of Polavaram project in Polavaram. All the students observed and learned many aspects related to Dam construction, diaphragm wall and Polavaram Project Technical Details and Project Benefits.

PURPOSE:

The Polavaram Irrigation Project is on the river Godavari near Ramayyapeta village of Polavaram Mandal, about 34 km upstream of Kovvur-Rajahmundry road-cum-rail bridge and 42 km upstream of Sir Arthur Cotton Barrage, where river emerges out of the last range of the Eastern Ghats and enters the plains in West Godavari District of Andhra Pradesh. This multi-purpose major irrigation project is intended for development of a gross irrigation potential of 4,36,825 ha. The project also envisages generation of 960MW of hydro power, drinking water supply to a population of 28.50 lakh in 611 villages and diversion of 80 TMC of water to Krishna river basin.

PROJECT SALIENT FEATURES:

1. 2454 m of Earth cum Rock fill dam/concrete dam in three gaps.
2. 1,118.40 m long spillway for discharging probable maximum flood of 1,41,435 cumec (about 50 lakh cusec).
3. 181.999 km long Left Main Canal to irrigate Culturable Command Area (CCA) of 4 lakh acres (1,61,855 ha).
4. 178.81 km long Right Main Canal to irrigate a CCA 3.2 lakh acres (1,29,500 ha).
5. The intensity of irrigation is increased as 150%. Thus annual irrigation potential is 10.80 lakh acres (4,36,716 ha).
6. Live capacity of the reservoir with FRL of +45.72 m (+150 ft) is 2.130 TMCum(75.20 TMCft).
7. Stabilization of 10.13 lakh acres of Godavari delta and 13 lakh acres of Krishna delta.
8. Interlinking of Godavari and Krishna rivers proposing to divert 80 TMC to Krishna basin.
9. 23.44 TMC of water supply to industries and drinking water to Visakhapatnam.
10. Domestic water supply to 28.5 lakh population in 611 villages.
11. Generation of 960 MW power (12 x 80 MW).
12. Sharing of 5 TMC and 1.5 TMC of water from reservoir rim with Odisha and Chhattisgarh, respectively.

PROJECT TECHNICAL DETAILS: -

The project reservoir has live storage 75.2 TMC at canal's full supply level of 41.15 metres (135 ft.) MSL and gross storage 194 tmcft thereby enabling irrigation of 23,20,000 acre (including stabilisation of existing irrigated lands) in Krishna, West Godavari, East Godavari, Visakhapatnam, Vizianagaram and Srikakulam districts of Andhra Pradesh.

The silt free dead storage water of nearly 100 tmcft above the spillway crest level 24.5 metres (80 ft.) MSL, can also be used in downstream lift irrigation projects (Pattiseema lift, Tadipudi lift, Thorrigedda lift, Pushkara lift, Purushothapatnam lift, Venkatanagaram lift, Chagalnadu lift, etc.) and Dowleswaram Barrage during the summer months.

Government of AP announced the decision to construct Purushothapatnam lift irrigation scheme to transfer water at the rate of 3500 cusecs to

Polavaram left bank canal and Yeleru reservoir to feed Yeleru canal which is supplying water to Vizag city. All the irrigated lands under these lift schemes can be supplied from Polavaram right and left canals by gravity flow when Polavaram reservoir level is above the canal's full supply level of 41.15 m MSL. However these lift stations are to be operated every year during the dry season to draw water from the substantial dead storage available behind the floodgates of the Polavaram dam.

The dam construction involves building of a 1.5 m thick concrete **diaphragm wall** up to depths from 40 to 120 m below the river bed under the earthdam which is first of its kind in India. The purpose of diaphragm wall is to secure the river bed stability for withstanding the water pressure across the dam. The project would constitute an **earth-cum-rock fill dam** of 2,310 metres (7,580 ft.) length, **spillway** of 907 metres (2,976 ft.) with 48 vents to enable discharge of 3,600,000 cuft/s (100,000 m³/s) of water. The spillway is located on the right bank of the river for which nearly 5.5 km long and 1.0 km wide approach and spill channels up to river bed level is envisaged involving nearly 70 million cubic meters earth/rock excavation which is nearly 2/3rd of the project's total earth work. The maximum flood level at Polavaram is 28 metres (92 ft.) MSL and lowest water level is 10.9 metres (36 ft.) MSL.

A **cofferdam** is constructed up to 41 metres (135 ft.) MSL initially to facilitate faster pace of work on earth-cum-rock fill dam. With coffer dam inclusion and the bed level of the approach and discharge canals of the spillway increased to 17 metres (56 ft.) MSL, the spillway related rock excavation is reduced by 70% leading to substantial cost reduction in the project's head works cost. Ultimately, the cofferdam would become peripheral portion of the main earth-cum-rock fill dam. On the left side of the river, 12 water turbines, each having 80 megawatt capacity, were to be installed. The right canal connecting to Krishna River in the upstream of Prakasam Barrage (173 km) discharges 17,500 cu ft/s (500 m³/s) at head works and left canal (182 km long) discharges 17,500 cu ft/s (500 m³/s) of water.

MAIN WORKS :

- i) Earth-cum-rock fill dam : 2454 m long
- ii) Spillway in right flank : 1128.40 M
- iv) Left Main Canal, : 181.50 KM
- v) Right Main Canal. : 174 KM

HYDROLOGY :

- i) Catchment Area. : 3,06.643 Sq. Km (1,18,446 Sq.Miles)
- ii Design flood discharge : 1.02 Lakhs cumec (36 Lakhs cusec)
- iii) Maximum flood discharge observed at Dowlaiswaram(in1953) : 0.85 Lakh cumec (30 Lakh cusec.)

iv) Annual Rainfall : 1022.95 mm

DAM AND APPURTENANT WORKS:

Water Levels:

- i) Full Reservoir level : + 45.72 m (+ 150.00 Ft)
- ii) Low water level (MDDL) : + 41.15 m (+ 135.00 Ft)
- iii) Maximum tail water level : + 30.48 m (+ 100.00 Ft)
- iv) Minimum tail water level : + 13.64 m (+ 44.75 Ft)

Reservoir:

- i) Gross storage at FRL (+ 45.72 m) : 5.511 TM. Cum. (194.60 TMC)
- ii) Storage at MDDL (+ 41.15 m) : 3.381 TM Cum. (119.40 TMC)
- iii) Live storage above MDDL (+41.15 m) : 2.130 TM. Cum. (75.20 TMC)



CONSTRUCTION SITE VIEW OF POLAVARAM PROJECT



IN THE CONFERENCE ROOM



A MODEL VIEW OF POLAVARAM PROJECT

References

- [1] Polavaram Project Authority (PPA) website
(<https://ppa.gov.in/WPSCore/Common/WebPages/Home/ProjectMap.aspx>)

Course Co-ordinator

Principal