Kalyani Charitable Trust's
Late G. N. Sapkal College of Engineering
Kalyani Hills, Anjaneri, Trimbakeshwar Road,
Nashik – 422 213

Department of Civil Engineering

List of Industrial Visit (A. Y. 2023-24)

Academic Year	Class	Details of Organization Visited	Date	Ref. File No. of Institute level Criteria file (Original Report)
2023-24	TE	Central Engineering Railway Workshop, Manmad	27/10/2023	
	TE	Nilgiri Bagh Water Treatment Plant, Bidi Kamgar Colony, Nashik, Maharashtra	02/11/2023	
	SE	Gargoti Museum	04/11/2023	
	BE	Pawar Patkar Construction Hot Mix Plant	06/11/2023	
	TE	North land, Meri Rasbihari link road, Morade Nagar, Nashik.	28/02/2024	
	SE	Designer ready mix concrete plant limited, Satpur MIDC, Nashik	05/03/2024	
	BE	Darna Hydropower station, Nandgaon, Tal. Igatpuri, Dist. Nashik.	12/03/2024	
	BE	Residencial building structure, near Parkside, Panchvati, Nashik.	04/04/2024	

Prof. K. M. Deore
Site Visit Coordinator

Prof. K. A. Salunke
Head of Civil Department

Late G N Sapkal College of Engineering
Civil Engg Dept
KTC's

Kalyani Charitable Trust's

Late G. N. Sapkal College of Engineering

Sapkal Knowledge Hub, Kalyani Hills, Anjaneri, Trimbakeshwar Road,
Nashik - 422 212, Maharashtra State, India
Tel: +91-2594-220168/71; Fax: +91-2594-220174
Website: www.sapkalknowledgehub.org;
E-mail: gns_engineering@sapkalknowledgehub.com

Date:07/03/2024

DEPARTMENT OF CIVIL ENGINEERING

NOTICE

All BE Civil Engineering students are hereby informed that, site visit for **Hydropower Engineering (HP) and Dams & Hydraulics structures (DHS) arranged on 12th March 2024** at **Darna Hydroelectric power plant Nandgaon, Igatpuri, Nashik and Darna Dam** as per following schedule.

Sr. No.	Class & Division	Date	Time	Faculty Coordinator
1	BE	12/03/2024	9:00 am to 3.00 pm	Prof. Sachin U. Pagar Prof. Dipak D. Shelke Prof. Nishigandha R. Nimse

Note:-

1. Route of visit: From Campus to CBS and CBS to Darna Hydroelectric power plant Nandgaon, Igatpuri, Nashik
2. It's compulsory for all students.
3. Absenteeism will not be considered.
4. All wear college uniform along with I-card and shoes.
5. Students should maintain discipline and follow instructions during visit.

Visit Coordinator

Prof. Ketan A. Salunke
Head of Department

DLI POWER (INDIA) PRIVATE LIMITED
2 X 2.45 MW HEP Dama Dam At Post Nandgaon Bk. Tal Igatpuri, Dist. Nashik - 422 403
Tel. : (02553) 204264 : 219020 • E-mail : dama@dlz.co.in

INSTRUCTIONS TO VISITORS

The students of the educational institutes who has been permitted to visit power house should follow following instructions during their stay at power house premises.

1. The time duration allotted should be strictly followed.
2. The photography is strictly prohibited. Photography using mobile phones is also not allowed. However photograph at main gate may be permitted upon request for report making purpose.
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4. The Safety of the visitors, Injury or damages to their belongings in entirely their own responsibility. Company in any manner will not be responsible for this.
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6. The housekeeping and discipline during stay at power house premises should be strictly followed.

We hereby assure to accept and follow above instructions.

Name and Signature of Visitor representative :

Date : 12/03/2024

Name of the institute : Late G.H. Sapkal College of Engineering

Branch : Civil Engineering.

Number of Students : 44 students.

Number of Staff Members : 03

conducted on 12.03.2024

KALYANI CHARITABLE TRUST'S
LATE G. N. SAPKAL COLLEGE OF ENGINEERING
Kalyani Hills, Anjaneri-Vadhok, Trimbakeshwar Road, Dist. Nashik – 422 212 (India)
Tel.: +91 – 2594 – 220168/71, Fax: +91 – 2594 – 220174
Website: www.sapkalknowledgehub.org E-mail: gns_engineering@sapkalknowledgehub.com

SITE VISIT REPORT ON HYDRO ELECTRIC PROJECT

Date: 12/03/2024

Time: 09.30 am

Venue: Darna Hydropower Station and Darna Dam, Nandgaon, Tal- Igatpuri, Dist Nashik

Name of Coordinator(s): Prof. Sachin U. Pagar (9096370125)
Prof. Dipak D. Shelke, and Prof. Nishigandha R. Nimase

Number of students: 50 students of BE CIVIL Div A and Div B

Name of Instructor(s): Mr. Yogesh Pangavhane (9623023125)
Mr. Vilas Deshmukh (9662018498)

Photo 1.1

Late G. N. Sapkal College of Engineering, Anjaneri, Nashik, 422 212 – KCT's

1.1 INTRODUCTION:

The Department of Civil Engineering of Late G. N. Sapkal College of Engineering, Nashik organized one day visit to Darna hydroelectric plant on 12/03/2024 for the Final year student of Civil Engineering (BE) program.

The visit was organized with the prior permission and guidance of Respected Principal Prof. (Dr.) Sahebrao B. Bagal and HOD of Civil Department Prof. (Dr.) Ketan A. Salunke along with the staff members, students of BE have taken hard efforts and initiative for the visit. Faculty members Prof. Sachin U. Pagar and Prof. Dipak D. Shelke of our college accompanied the 50 student of BE civil program for educational visit.

1.2 OBJECTIVE OF VISIT:

The main aim of visit is to observe & understand the functions of each unit in detail of hydroelectric plant. Mr. Yogesh Pangavhane (9623023125) has briefed the students about different units of hydroelectric plant.

1.3 INTRODUCTION ABOUT PROJECT

Title of the project - 4.9 MW Darna Small Hydro Electric Project in Nashik District of Maharashtra

Scale of the project activity- Small Scale

Completion date of the PCN- 14/01/2022

Project participants- DLI Power (India) Private Limited (Project Proponent)

Host Party- India

Applied methodologies and standardized baselines- Applied Baseline Methodology: AMS-I.D : "Grid connected renewable electricity generation", version 18

Standardized Methodology: Not Applicable

Sectoral scopes- 01 Energy industries (Renewable/Non-Renewable Sources)

Picture 1.2

1.4 PURPOSE OF THE PROJECT :

This project is promoted by 'DLI Power (India) Private Limited. The project is the installation and operation of 2 horizontal shaft Kaplan hydro turbine generators having capacity of 2450 kW each with aggregated installed capacity of 4.90 MW, located in the village Nandgaon of Nashik district in the state of Maharashtra in India. This project also known as Darna small hydroelectric power project (SHEP) is a project on Darna dam. Dam is operated and maintained by Government of Maharashtra, Water Resources Department (GOMWRD).

It is one of the oldest masonry gravity dams, built in 1916 to meet the water demand of drought prone eastern part of the Ahmednagar and Nashik District of Maharashtra State. Water from the dam is released as per the irrigation requirement of these areas. Sluices are provided to control the flow of water through the reservoir. After completion of this project activity, water is released through the turbines thereby generating electricity. The voltage at the generator terminals is 3.3 kV, which is stepped up to 33 kV at the nearest substation. The generated electricity is fed / exported into the nearest Wadivarhe sub-station of Maharashtra State Electricity Distribution Company Limited (MSEDCL) grid system for transmission & distribution. This project activity is

expected to supply a net amount of electricity of 24,222 MWh per year to the integrated or unified Indian Grid system. The project utilizes a net head of about 19.43 m.

The net generated electricity from the project is sold to state electricity board i.e., MSEDCL under the Power Purchase Agreement (PPA) signed between the PP and the utility. In pre-project scenario, electricity delivered to the grid by the project activity would have otherwise been generated by the operation of fossil fuel-based grid-connected power plants and by the addition of new fossil fuel-based generation sources in the grid. As the nature of the hydro project, no fossil fuel is involved for power generation in the project activity. The electricity produced by the project is directly contributing to climate change mitigation by reducing the anthropogenic emissions of greenhouse gases into the atmosphere by displacing an equivalent amount of power at grid.

1.5 PROJECT'S CONTRIBUTION TO SUSTAINABLE DEVELOPMENT-

Indian economy is highly dependent on "Coal" as fuel to generate energy and for production processes. Thermal power plants are the major consumers of coal in India and yet the basic electricity needs of a large section of population are not being met. This results in excessive demands for electricity and places immense stress on the environment. Changing coal consumption patterns will require a multi-pronged strategy focusing on demand, reducing wastage of energy and the optimum use of renewable energy (RE) sources.

This project is a greenfield activity where grid power is the baseline. The renewable power generation is gradually contributing to the share of clean & green power in the grid; however, grid emission factor is still on higher side which defines grid as distinct baseline. The Government of India has stipulated following indicators for sustainable development in the interim approval guidelines for such projects which are contributing to GHG mitigations. The Ministry of Environment, Forests & Climate Change, has stipulated economic, social, environment and technological well-being as the four indicators of sustainable development.

It has been envisaged that the project shall contribute to sustainable development using the following ways:

Social well-being: The project will facilitate communication development and access infrastructures in the area, which will help in civic development and enhance various livelihood options for the villagers, helping them improving their standard of living. Thus, project will improve the economical index around the project area.

Economic well-being: The project proponent agrees to provide employment to local people against the manpower requirement in the project activity to bonafide people of the state of Maharashtra, in

respect of all the unskilled, skilled, semi-skilled staff and other non-executives as may be required for execution, operation and maintenance of the project. The project activity will contribute in reduction of power demand-supply gap in the region in an environment friendly manner, thus meeting the development needs of the country.

Technological well-being: The project activity leads to the promotion of 4.90 MW hydro turbine generators into the region and will promote practice for small scale industries to reduce the dependence on carbon intensive grid supply to meet the captive requirement of electrical energy and also increasing energy availability and improving quality of power under the service area. Hence, the technology used is safe and well-practised and leads to technological well-being.

Environmental well-being: The project activity, being dam based hydro scheme, will be having no impacts on the local environment and the community living in the vicinity. The electricity to be generated by the proposed project activity will be replacing the carbon intensive thermal energy (by equivalent amount) dominated power generation from the respective grid system, thus will help in reducing GHG emission from the atmosphere.

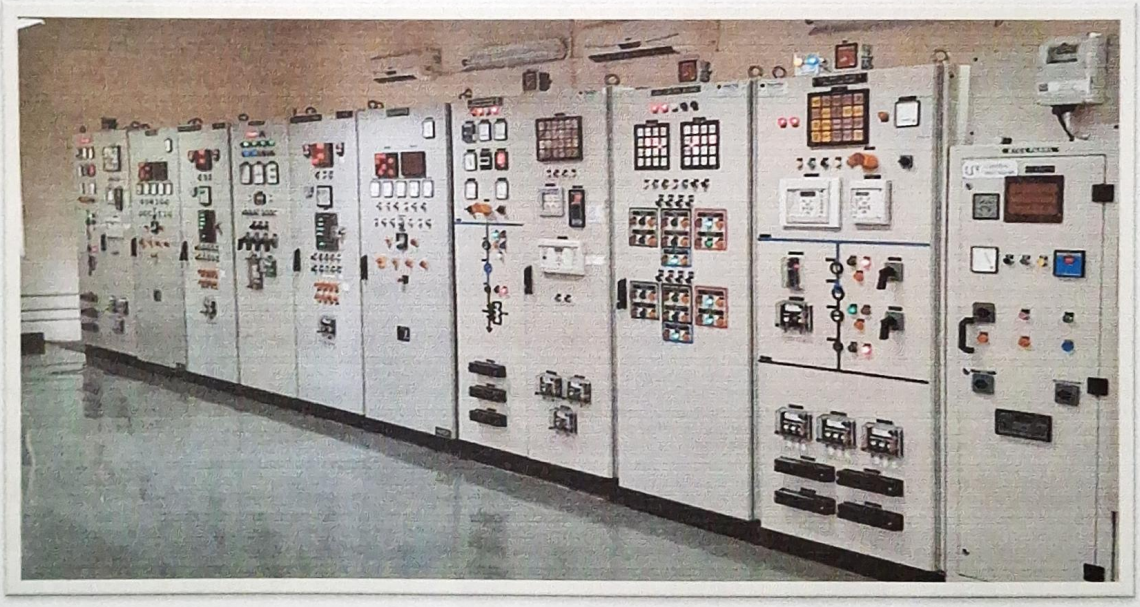


Photo 1.3

1.6 LOCATION OF PROJECT

- This Darna small hydroelectric power project is located in district Nashik of Maharashtra and harnesses hydro power potential through power house constructed on Darna dam, built on Darna river. Dam is about 170 kms from Mumbai. The nearest big town is Ghoti and closest railhead is

at Igatpuri which is about 30 kms away. Ghoti is 25 kms from the project activity and is on busy Mumbai-Agra National Highway No 3. The nearest domestic airport is at Nashik which is about 40 km. The geographic co-ordinates of the project locations are: 73 o 45' E & 19o 48' N.

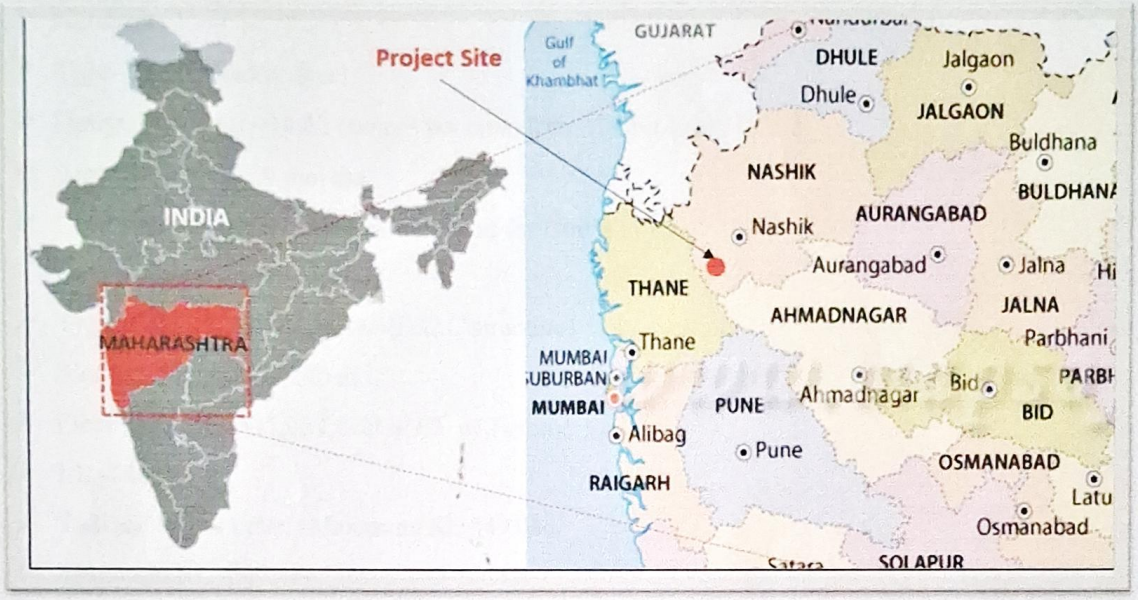


Photo 1.4

Technologies/measures

- Design Discharge -14.62 m^3 / sec for Unit 1 and Unit 2
- Gross Head- 24.51 m
- Net Head -19.43 m

Darna Reservoir

- Type- Masonry Dam
- Gross Storage -203.44 MCM
- Live Storage for Power- 193.80 MCM
- Top of Dam -571.65 m

Intake Gates

- Numbers -2
- Full Reservoir level (FRL) -571.50 m

- Maximum draw down level for Power -558.50 m
- Size Rectangular; 1.80 × 3.00 m
- Gate- Individual River Sluice Gates individual for Machine

Water Conductors

- Numbers -2
- Type- Boiler Quality Steel
- Design Discharge- 14.62 cumecs per conductor of Unit 1 and Unit 2
- Penstock size -2100 mm dia
- Length -65.73 m for Unit 1 and 69.83 m for Unit 2

Power House

- Type- Surfaced Power House (R.C.C structure)
- Size- 31.225 m × 35.240 m
- Floor level RL- 545.00 Level of CL of Turbine
- RL -546.40
- Tailrace Water Level -Maximum RL 549.086
- Minimum RL -547.464
- Capacity of OH Crane -30/5 Ton

Turbine

- Make -Kirloskar Brothers Limited, Pune
- Type -Horizontal Kaplan S Type
- Rating - 2 × 2722.23 KVA + 20% COL
- Voltage - 3300 V
- Rated P.F. - 0.90
- Rated Speed - 750 rpm

Gear Box

- Make - Walchandnagar Industries Limited
- Type - K45 S
- Ratio - 350 / 750 rpm

Transformer

- Make - Universal Power Transformer Ltd. Bangalore
- Capacity - 7500 KVA, 3.3/33 KV 3 Phase, ONAN

- **Power**
- Installed capacity - 2 x 2450 kW
- No. of unit generated @ 75% dependable -17.76 MU

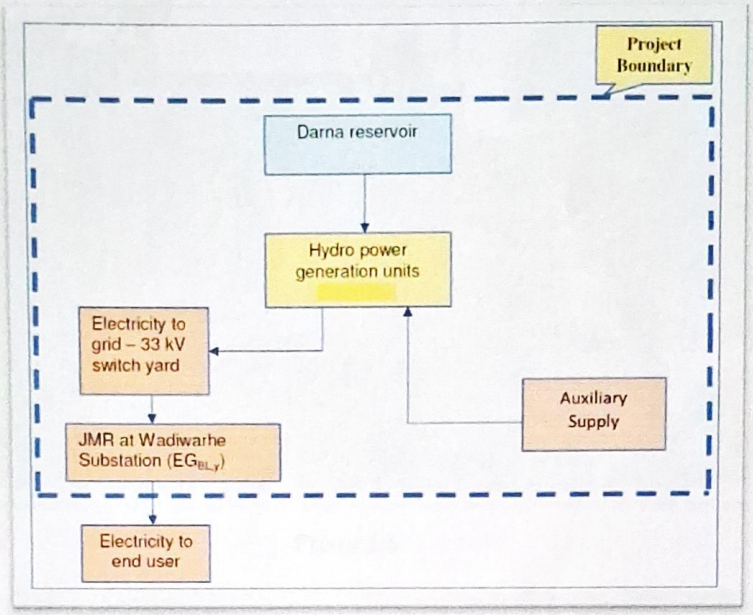
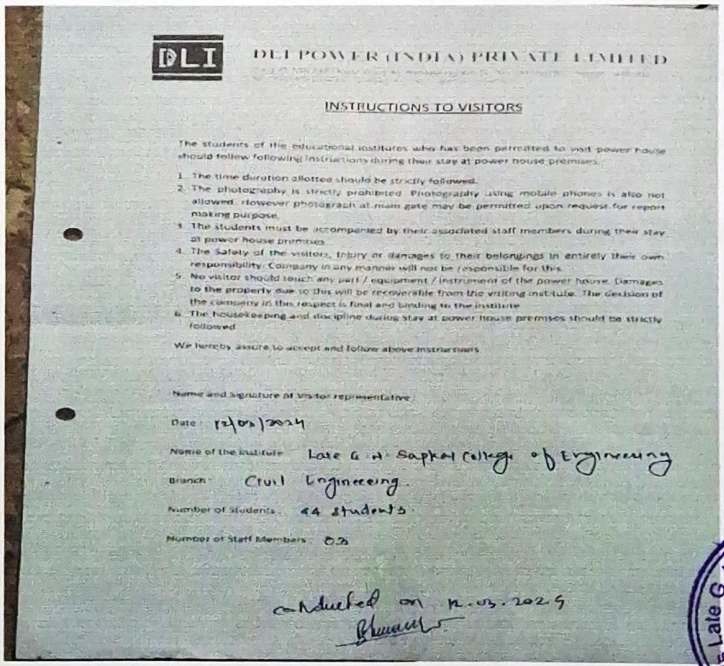


Photo 1.5A



DLI DLI POWER (INDIA) PRIVATE LIMITED

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Branch: Civil Engineering

Number of Students: 44 students

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Conducted on 12.03.2024

Late G. N. Sapkal College of Engineering Anjaneri Nashik 422 212

Photo 1.5B

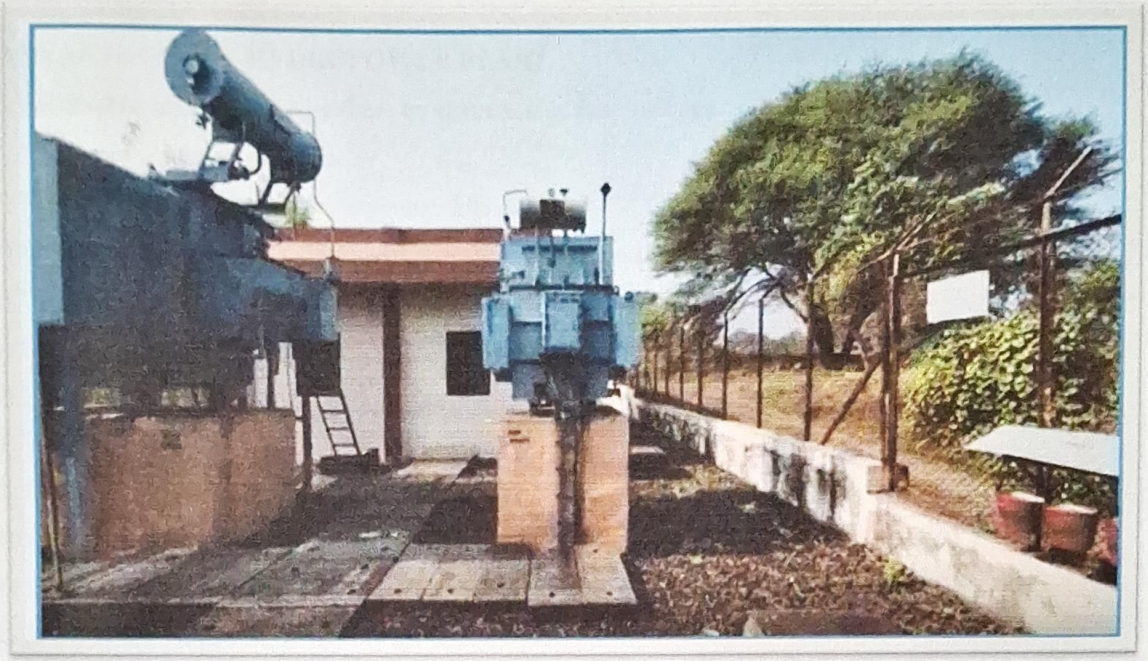

Photo 1.6

Photo 1.7

1.7 ADVANTAGES OF HYDROPOWER PLANT :

1) Renewable source of energy there by saves scares fuel reserves.
2) Economical source of power.
3) Non-polluting and hence environment friendly
4) Reliable energy source with approximately 90% availability.
5) Low generation cost compare with other energy sources.
6) Indigenous inexhaustible perpetual and renewable energy source.
7) Low operation and maintenance cost.
8) Possible to build power plant of high capacity.
9) Plant equipment is simple.
10) Socio economic benefits being located usually remote areas.
11) Higher efficiency, 95%-98%.
12) Fuel is not burned so there is minimal pollution.
13) Water to run the power plant is provided free by nature.
14) Its renewable rainfall renews the water in the reservoir, so the fuel is almost always their.

1.8 DISADVANTAGES OF HYDROPOWER PLANT :

1) Susceptible to vagaries of nature such a draught.
2) Longer construction period and high initial cost.
3) Lose of large land due to reservoir.
4) Non availability of suitable size of sites for the construction of time.
5) Displacement of large population from reservoir area and rehabilitation.
6) Environment takes aspect reservoir verses river ecology.
7) High cost of transmission system for remote site.
8) They use up valuable and limited natural resources.
9) They can produce a large of pollution.
10) Companies has a dig up the earth or drill wells to get the coal, oil, and gas.
11) For nuclear power plants there are waste disposal problems.

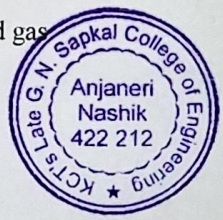

Photo 1.8

Photo 1.9

Photo 1.10

➢ CONCLUSION

From this visit, we get the information and practical knowledge about the hydroelectric plant. The visit was nicely completed with group photography at 3:00 pm.

K.C.T.'s Late G. N. Sapkal College of Engineering ★ Anjaneri Nashik 422 212

Prof. Sachin U. Pagar & Prof. Dipak D. Shelke	Prof. (Dr.) Ketan A. Salunke	Prof. (Dr.) Sahebrao B. Bagal
Visit Coordinator(s)	**HOD (Civil)**	**Principal, LGNSCOE**