SARVAJANIK COLLEGE OF ENGINEERING & TECHNOLOGY

Industrial visit Report

Project Udaan- Adani at Mundra

(22-08-2024 to 23-08-2024)

Electronics and Communication Engineering Department

Prepared by:

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DETAILS OF VISIT

Date	:	22nd&23rd August 2024
Duration	:	2 Days
Faculty co-ordinator	:	Dr. Ketki Pathak
Other faculties	:	Prof. Jigisha Pandya, Assi. Ashwin Rathod
Visitors	:	Students of 2nd year , 3rd year and 4th year E&C Department

COMPANY PROFILE

Company name	:	Adani Mundra Port & Special Economic Zone Ltd.
Address	:	Mundra, Dist. Kutch, Gujarat.
Office Address	:	Adani House, Nr. Mithakhali Circle Navrangpura, Ahmedabad, Gujarat-380009.
Contact	:	Tel.- +91 79 2656 5555 Fax - +91 79 2555 6490
Home Page	:	www.info@adani.com
Work Profile	:	Natural gateway for the cargo hubs functioning in the Northern and Western states of India as well as the NCR.

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1. Introduction

The Adani Group is one of India's leading business houses with revenue of over $11 billion. Founded in 1988, Adani has grown to become a global integrated infrastructure player with businesses in key industry verticals - resources, logistics, energy and agro. The integrated model is well adapted to the infrastructure challenges of the emerging economies.

Adani Group's growth and vision has always been in sync with the idea of NationBuilding. We live in the same communities where we operate and take our responsibility towardscontributing to the betterment of the society very seriously. Through Adani Foundation, we ensure development and progress is sustainable and inclusive; not just for the people living in these areas, but the environment on the whole. At Adani, we believe in delivering benefits that transcend our immediate stakeholders.

2. About Mundra Port

An infrastructural marvel, the mega port at Mundra is major economic gateway that caters to the land locked northern hinterland of India with multimodal connectivity. Mundra Port is a deep draft, all-weather port that is today the largest commercial port of India with a high degree of mechanization. In fact, it is the only port in the country with handlingand storage facilities for crude oil, containers, dry bulk, break bulk, automobiles and liquid cargo. Mundra can berth the largest post panamax vessel and can handle four million TEUs or Twenty feet Equivalent Unit.

Mundra Port is the largest private port of India located on the north shores of the Gulf of Kutch near Mundra, Kutch district, Gujarat. Formerly it was operated by Mundra Port and Special Economic Zone Limited (MPSEZ) owned by Adani Group which later it was expanded into Adani Ports & SEZ Limited (APSEZ) managing several ports. In 2013-2014, Mundra Port has handled 100 million tons of cargo in a year becoming the first Indian port to do so. It also became India's biggest port by cargo handled.

2.1 Location

Strategically situated on international maritime routes, Mundra Port on the Gulf of Kutch offers multiple benefits for global trade. The Gulf acts as a natural shelter for the port, facilitating24x7 safe berthing, un-berthing and vessel operations. Compared to other ports on West Coast,

Mundra Port enjoys logistical advantage in reaching the North-West hinterland of India. This makes it the preferred port for the cargo hubs functioning in the Northern and Western states and union territories of India.

3. About Visit

We have visited mainly four places.

I. South Port.

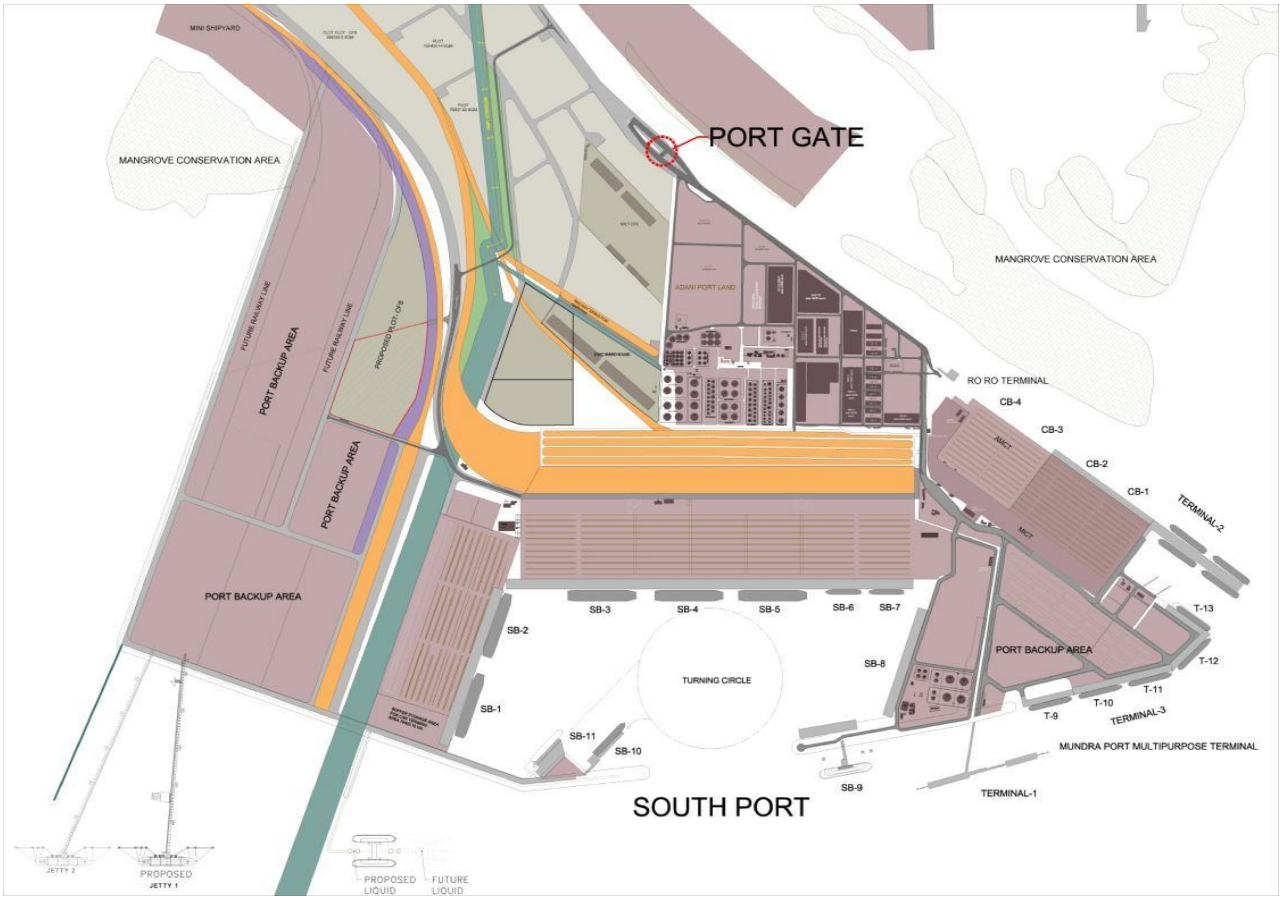
II. Adani Willmar.

III. West Port.

IV. Adani Power Station.

❖ *SOUTH PORT*

Mundra Port is the largest private port of India located on the north shores of the Gulf of Kutch near Mundra, Kutch district, Gujarat. Formerly it was operated by Mundra Port and Special Economic Zone Limited



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Mundra Port is the second largest port in India in handling container cargo. In 2014 – 15, Mundra port handled 1.75 Million TEUs and has the installed terminal capacity to handle 2.3 Million TEUs p.a. Mundra port is known for its customer centric approach by providing higher productivity, innovation logistics solutions, faster turnaround of vessels and faster evacuation of containers from the port through double stacked trains. Adani Ports operates two terminals at Mundra - Adani Mundra Container Terminal (AMCT) which started operations in 2007, and Adani International Container Terminal (AICTPL)which was operationalized in 2013. Jointly both terminals handle 26 services, connecting India to destinations across the world.

Particulars	Adani Mundra Container Terminal	Adani International Container Terminal	Adani CMA Mundra Terminal
Quay Length	2 Berths, 631 Mtrs	2 Berths, 810 Mtrs	2 Berths, 650 M
Capacity	1 Mn TEUs	1.3 Mn TEUs	8,00,000 TEUs
Ground Slots	4,014 TEUs	8260 TEUs	
Quay Cranes	6 Super Post Panamax (22 across)	6 Super Post Panamax (24 across)	4 Post Panamax
Rubber Tyre Gantry Cranes	20 – All Converted to Electronic Drive	18- All Converted to Electronic Drive	12

Mundra port handles multiple types of Bulk Cargo including coal, fertilizers, minerals, and agri-products. With deep draft berths and multipurpose terminals, the port efficiently handles the largest bulk carriers in the world. The port has covered and open storage areas with enormous capacity. Excellent cargo evacuation and receiving infrastructure support smooth cargo movement in and out of the port.

The Fertilizers handled at Mundra Port are of all types and grades including Granular Urea / Prilled Urea / DAP / DAP Lite / MOP Red / MOP White / NP / NPK / Rock Phosphate. The port operations team understands the delicate nature of fertilizer cargo and knows the best way to handle it, even during the peak season, ensuring full customer satisfaction.

For meeting the increased demand of customers for dispatching fertilizer during peak season, Mundra port has developed a fully mechanized fertilizer handling system known as Fertilizer Cargo Complex (FCC), capable of turning around 10 rakes in a day.

Mundra Port has expertise in successfully handling over-sized and overweight Project cargo. Availability of an exclusive sea front and berthing ensures that there are no restrictions on the kind of Project cargo that the port can handle. In the past, the port has handled Boilers, Rail Wagons (of Delhi metro), Heavy Transformers, complete Windmills and Heavy Machineries. Due to the high strength structure, very heavy parcels can be handled efficiently at Mundra.

Salient Features

- State-of-the-art technology Goliath cranes attached with vacuum lifters to get scratch free handling of quality sensitive cargo of steel pipes.
- Single window service by APSEZ facilitating all activities from berthing, stevedoring, back-up handling to dispatch.
- Best-in-class steel yard spread across 1.5 lacs m^2 within the port having a capacity to handle 6 MMT/ year.

- Equipment at port for handling steel cargo includes 6 Kalmars (42 T capacity), 16 mobile harbor cranes (100 MT capacity), 8 Goliath cranes with vacuum lifting attachments, forklifts (42 T capacity) and 1 Reach Stacker.
- Specially designed coil stands for locking of coils on trailers for internal movement and System 88 for use on trailers for safe pipe transportation.

All types and grades of steel cargo, including Plates, Beams, Coils, Pipes, Slabs, Bars, Billets, CR Coils, HR Coils, over dimension Steel Plates / Beams or Pipes requiring specialised operations can be easily handled at Mundra port.

The port has a state-of-the-art, fully mechanised steel cargo handling facility. This facility allows for enhanced safety and eliminates chances of cargo damages.

Port's multiple berths equipped with different types and sizes of pipelines from jetty to tank farm, ensure safe and efficient handling of liquid products in big parcels. The tank farm at the port is capable of storing multiple types of liquid cargo including veg oil, chemicals and petroleum, oil & lubricants (POL) products. The infrastructure at the Liquid terminal ensures best in class storage, safe and contamination free handling of cargo for the customer.

The port has dedicated tanks with heating facilities and heat tracing facility in the pipelines from the tank to the loading point for Vegetable oils. The port handles a range of Vegetable oil products including Crude Palm Oil (Edible and Non-edible oil Grades) (CPO), Crude Soybean Oil (CSO), Crude Palm Styrene (CPS), Palm Fatty Acid Distillate (PFAD), Refined Sunflower Oil (RSO), Crude Safflower Seed Oil (CSSO), Refined Soya bean Oil (RSO), Crude Palm Kernel Oil (Edible and Non-edible oil Grades - CPKO).

The tanks in the enclosure for POL cargo have insulation facility and a floating roof capable of storing any class of Petroleum products like Naphtha, Base Oil, High Speed Diesel (HSD), Motor Spirit (MS), Superior Kerosene Oil (SKO), Fuel/Furnace Oil (FO), Waxes, Carbon Black Feed Stock (CBFS). Mundra port is the only port terminal which handles Bulk Bitumen on the North-West coast of India.

Mundra Tank farm has a combination of SS tanks, CS tanks & MS tanks enabling storage of a wide range of chemicals and petrochemicals. The port handles various products including Methanol, Ethanol, Acetic Acid, Glycerin, Caustic Soda Lye, Toluene, Phenol, Ethylene Di-Chloride (EDC), Solvent C-9, N-Butanol, Linear Alkyl Benzene (LAB), Heavy Aromatic Oil, 2 Ethyl Hexanol, Benzene, Ethyl Acetate, Epichlorohydrin, Vinyl Acetate Monomer (VAM), Paraxylene, Lauryl Alcohol, Acrylonitrile (ACN).

Mundra port established Automobile Roll On – Roll Off (RO RO) Terminal in the year 2009 and since then has been serving as a gateway port for Automobile companies situated in Delhi NCR, Rajasthan and Gujarat region. Mundra port handles exports of Cars, Buses, and Trucks.

The port operations team is mindful of the specificities involved in Automobile exports has highly skilled personnel and systems in place for the same. Mundra port has a highly innovative floating pontoon and link span which is also one-of-its-kind in India for round-the-clock RO-RO operation without any tidal restriction. The port also has a buffer yard along with a washing facility for parking and washing of vehicles before loading them on ships.

A service agreement was signed in 2008 with Maruti Suzuki India Ltd. To handle exports of automobiles. All the left hand drive cars were exported to different countries from the port through a ship. The maximum capacity to export automobile in single time is about 5000 cars pership.

Mundra Port operates two Single Point Mooring (SPM) facilities to evacuate imported crude oil.

These SPMs can handle Very Large Crude Carriers (VLCC) and Ultra Large Crude Carriers (ULCC) up to 360,000 Tonnes of Dead Weight Tonnes (DWT). The crude is transported to refineries in North India through cross country pipeline network.

❖ *ADANI WILMAR (OIL REFINARY)*

Adani Wilmar Limited (AWL) is a joint venture incorporated in January 1999 between Adani Group Conglomerate, the leaders in International trading & Private Infrastructure and Wilmar International Ltd. - Singapore, Asia's leading Agri-business group.

A manufacturer of edible oils, including soybean, cottonseed and groundnut, based in India and selling under the Fortune, Raag and Jubilee brands. A manufacturer of edible oils, including soybean, cottonseed and groundnut, based in India and selling under the Fortune, Raag and Jubilee brands.

❖ **ADANI WILMAR LTD.**

✓ M.D – Pranav Adani

✓ Main Business – Grain & Oil seed milling.

✓ It is a joint venture between two global corporations.

✓ The Adani group of India – The leaders in international trading and private infrastructure, and The Willmar International limited of Singapore – agri-business group and leading merchandiser and processor of edible oils.

✓ The company has production infrastructure across the country with crushing capacity of over 6000 TPD.


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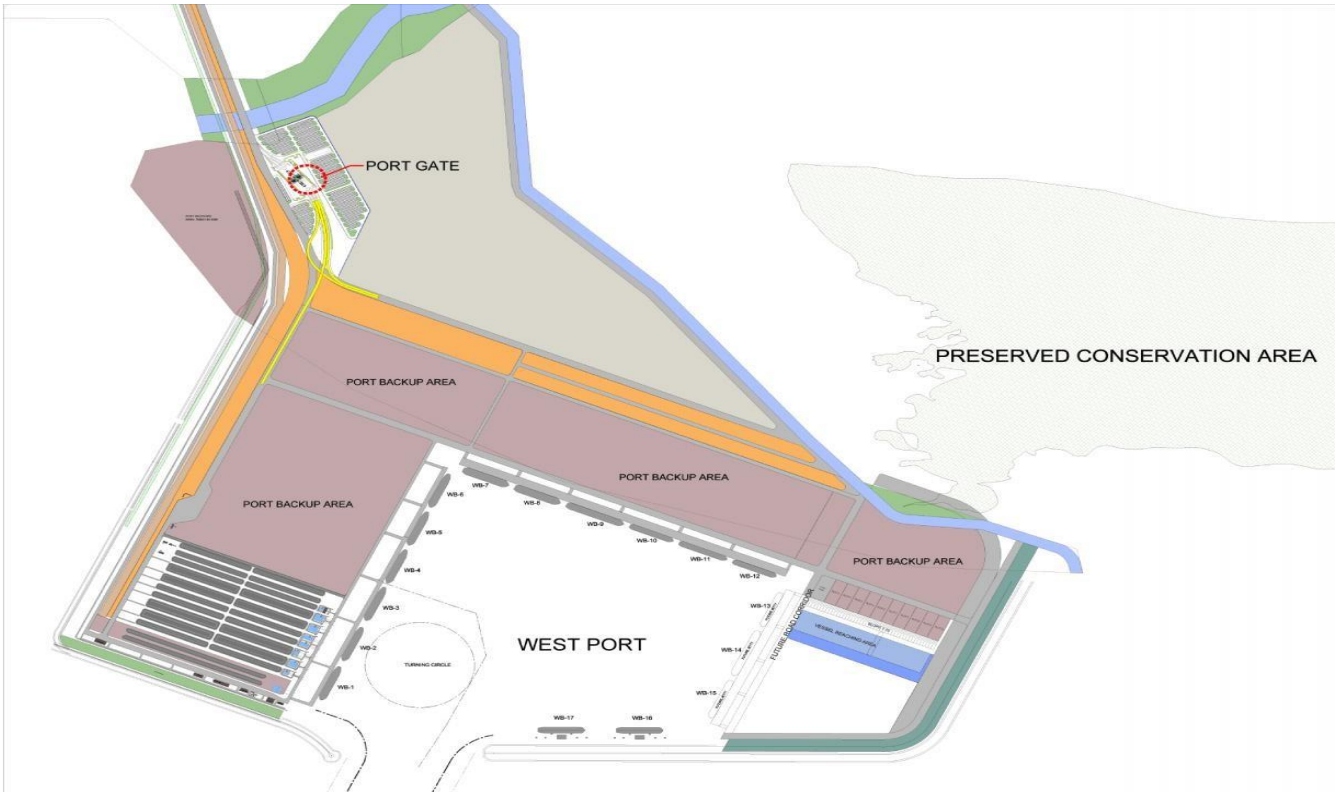
❖ *WEST PORT*



West Port of Adani. The Coal Port. The coal arrives here is from 4 different countries Australia, South Africa, Indonesia & China. The port was having India's biggest Crain with Capacity of loading coal up to 200000 tons in a single turn.

West Basin, the world's largest coal import terminal, is an ultra-modern fully mechanized infrastructure with unparalleled capabilities in coal handling. We handle all types and grades of coal including steam coal, coking coal imported into the country or moved from domestic sources.

The deep draft berths at West Basin are capable of handling the largest capsize bulk carriers. The integrated conveyor system along with mechanized system allows the port to handle hugevolumes of coal cargo required by the customers.

Now a days it has capacity of parking for 2 ships at the same time. But Adani is planning to make the parking yard in sea of 'G' shape with having the capacity up to 17 Ships a time, which will be completed in 2020 It also has the India's longest conveyor for the transformation of coal of 22Kms.

❖ *POWER PLANT*

Mundra Thermal Power Station or Mundra Thermal Power Project is located at Mundra in Kutch district in the Indian state of Gujarat. The power plant is one of the coal-based power plants of Adani Power. The coal for the power plant is imported primarily from Bunyu, Indonesia. Source of water for the power plant is sea water from the Gulf of Kutch. It is the world's 11th-largest single location coal based thermal power plant as well as India's second largest operational power plant. The plant has nine power generating units, unit 5 to 9 involves supercritical boiler technology. The company is India's largest private power producer, with capacity of 4620 MW. Power production 4620 MW (5 X 660 MW + 4 X 330 MW).

Adani Power created history by synchronizing the first super-critical technology based 660MW generating unit at Mundra. This is the first super-critical generating unit in India. The Mundra power project is also the fastest project implementation ever by any power developer in the country with a record completion of inception to synchronization within 36 months. Phase III of the Mundra Project, which is based on supercritical technology, has received 'Clean Development Mechanism (CDM) Project' certification from United Nations Framework Convention on Climate Change (UNFCCC). This is the world's first thermal project based on supercritical technology to get registered as a CDM Project under UNFCCC.

❖ UNIQUE FEATURES

✓ Largest private Thermal power station in India at a single location.

✓ First super critical unit in India.

✓ 100% raw water source is sea water for entire station.

✓ Single high speed conveyor from port to plant.

✓ First & longest private sector HVDC system in India, 500 KV Bipolar HVDC from Mundra to Mohindergarh.

✓ 1st High Voltage Direct Current power transmission system in the world, to have been registered under Clean Development Mechanism.

❖ **PLANT DETAILS**

Plant capacity is 4620 MW, comprising of 9 units with 4 units of 330 MW and 5 units of 660 MW. The 330 MW units are based on sub critical technology and the 660 MW units are based on supercritical technology.

The technical visit to Adani Mundra port started at 21st August 2024 at 9:00 pm from Surat. There were two buses containing total 92 students (2nd, 3rd, 4th - year) and 3 faculties (Dr. Ketki Pathak, Prof.Jigisha Pandya, Mr. .Ashwin Rathod). The private buses were boarded up to Ahmedabad. The buses reached CTM cross road at Ahmedabad around 3:00 am.

Day-1

22nd August 2024

The journey started from Ahmedabad. The 92 students along with 3 faculties were ready for an exciting visit. Sharp at 4 o'clock early in the morning two buses of Adani Ltd. arrived. It was still dark and chilly morning but the students created a very energetic and disciplined environment. The buses were well maintained and comfortable. Within an hour we were on NH947 and our speed geared up. We were yet to cover around 300kms to reach our destination.

5:30 am

As our fun time started we started to feel hungry and luckily the first halt was not far away. We took our halt at a hotel at Halvad and we were served Tasty and Healthy breakfast. And after that the journey resumed and we started to play fun games like cards on the way. 13:30 pm after a long and fun filled journey we reached a very secluded and poised place named 'Shanti Vihar'. We were mesmerized by the view of the place and a spiritual vibe was felt by the 'Shanti Nath' temple.

We were received by the in charge of 'Shanti Vihar' Mr. C.N. Pandya. Rooms were allotted to us in a group of five. We found out the rooms very spacious and equipped with all the basic amenities that an individual needs.

14:00 pm

After some rest we were called by a whistle for lunch in the mess. The meal was very delicious and hygienic as well. Also the service was excellent. After lunch we again went back to our room. One of the most significant part of the visit was that our electronic gadgets were taken. And this was done for rules and also the fact that we can focus on learning rather than posing for pictures.

16:00 pm

We left accommodation for the purpose we came for. With all the safety instructions and helmets we kick-started our crusade of learning about the industry. The buses took us to the Adani Port (South Port). Meanwhile we saw huge machinery and were astonished to see tons of cargo loading and unloading. Heaps of coal was alongside the road.

Throughout the travel to port we were amazed to see the work of mechanics. About an hour later we reached the port. The bauxite was unloaded from the ship by huge grabbers. The authority received us and gave facts and information about the port. There was no material which was not imported or exported from that port. We saw huge containers being loaded on ships for export. After that we went to Adani Wilmar Oil Refinery. There various types of edible oils were processed. An engineer gave a quick information about the processing of tin canisters as well as the plastic bottles. On our way we could see the oil being filled in the bottles by automated machines. Samples of oil at its different stages were shown to us. We all also received 500 grm Fortune Besan as a Gift Hamper of love from Adani Willmar.

6.00 pm

We were taken back to our accommodation in the evening. After a quick break we had a Tea-break. Then were shown VR headset show on Adani industry. The VR show presentation gave a nice visualization of their whole infrastructure and planning.

7.00 pm

It was time for daily 'Aarti' in the Shanti Nath temple. The temple was a piece of art in itself. The garden and fountains were well maintained. Inside the temple we could see the sculptures onthe ceiling. The temple priest completed aarti with holyness and we went back to our rooms for rest.

8:00 pm

It was time for dinner and it was equally delicious as lunch. We enjoyed a Pav-Bhaji with delicious butter. In Dessert we ate Ice-Cream & choco-bar also.

9:00 pm

After dinner we went in gallery and played games. After we all gather and Fully enjoyed non-stop Garba Beats. Everyone enjoyed alot and feel each beat by moving-steps.

11:00 pm

After such an amazing and exhausting day we couldn't resist to go to our beds.
The first day ended with full of joy.

Day-2

23rd August 2024

5:45 am

The day started with a knock on our doors as a wakeup call. After getting fresh we gathered in the Hall No. 2. A very inspiring lecture was given by C.N. Pandya to us about heal thy lifestyle and yoga. But the part which made our day was the laughing session. We laughed our sleepiness off and got ready for another day start.

9:00 am

After breakfast we went for our last spot that was Adani West Base. Again the journey to port was interesting in itself. Heaps of coal was again there but this was less dusty than before. The fact behind this we came to knew later that this base uses modern grabbers which stack the coal without much dust. The atmosphere was pleasant on west base. The port was made in a curve which was actually in a 'G' shape. This port also held the record for unloading in minimum time in India which was almost 55 seconds. Also there was a 22 km long conveyor which loaded with coal for transportation. Along with these amazing facts we continued our journey.

10.20 am

Our next stop was Adani Power Plant. Meanwhile we saw transmission lines and huge transformers. The power plant was a multi-storey building with boilers at the basement and controlling unit above. We went to control unit and engineer gave us information about the power generation. The steam was generated by boiling water with the help of coal as a fuel. And this steam went to generator at high pressure to produce electricity. The power plant supplied Megawatts of energy and we could see the live status of frequency and power generated in the control room.

11:20 am

We visited Adani Solar Techno Park, where they observed the manufacturing process of solar panels using silica. Adani's in-housemanufacturing plant enables them toproduce 88% of their solar panels, making them the sole Indian company manufacturing solar cells. These cells are supplied for their hybrid plant, which currently boasts a capacity of 550 MW and is set to expand to 30 GW at Thawada, aiming to become theworld's largest hybrid power plant by integrating wind turbines and other renewable sources. Key suppliers in this process include Vishaka and Company, providing glass for the solar panels, and Jash Energy, providing solar trackers. In the upcoming month, Adani aims to meet a production target of 1000 MW of solar panels at Thawada, showcasing their commitment to large-scale renewable energy production We also learned about the process of manufacturing a solar panel from silica, coveringstages from ingot to wafer, wafer to solar cell, and solar cell to module.

12:30 pm

We went back to accommodation for lunch. The visit was about to end but without a remember memories it was incomplete. After said Good bye we left for Ahmedabad at 13:30 pm. The visit ended quite comfortably.

21:00 pm

We took our Dinner at a hotel at Honest and we were served Mouth-watering Dishes. We reached Ahmedabad at 12:00 am. After taking dinner at hotel near Narol cross road our journey started towards Surat in our bus. We reached Surat at 5:00 am on 24th August 2024.

- We are very much Thankful to **Dr. Chirag Paunwala** (Head of the department, E&C Engineering) for a kind of permission.
- We are Thankful to Dr. Ketki Pathak ma'am for always motivating us in curricular and activities.
- We are very much Thankful to M/s Adani Corporation and E&C Engineering Department for organizing such a resourceful industrial visit which not only helped us getting acknowledged with corporate industry work but also taught us the way to live life in a healthy and disciplined manner.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Summary : -

The industry visit of Adani Port in Mundra was very informative and helpful in providing real life exposure to us. The state of the art systems at Adani Port and their automation by using IT toimprove decision making and efficiency. Industry visit proved to be learning and fruitful experience for both students and faculty members. Industrial visit to the Adani Thermal Power Plant was both enlightening and enriching. We witnessed the intricate workings of a large-scale power generation facility, from the towering chimneys to the bustling Industrial visits provide valuable insights into real-world applications of theoretical knowledge. Our recent generator units. The sight of the cooling towers juxtaposed against the chimneys was particularly striking, highlightingthe various components involved in the power generation process.

Exploring the miniature model of the power plant allowed us to visualize its layout andunderstand the intricate network of equipment and infrastructure involved in power generation. The real-time data displayed on the TV screen provided a glimpse into the plant's operational dynamics, showcasing the magnitude of power being generated and the technical parameters involved. Overall, the visit offered a comprehensive understanding of power generation processes,from boiler operations to electricity transmission.

It underscored the significance of power plants in meeting energy demands and emphasized the importance of sustainable energy practices. As students aspiring to contribute to the field of engineering, this experience has broadened our horizons and reinforced the relevance of our academic pursuits. It has instilled in us a deeper appreciation for the complexities of power generation and the critical role it plays in driving industrial progress and societal development. We are grateful for the opportunity to witness firsthand the practical applications of ourstudies and look forward to applying this knowledge in our future endeavors.