CHHOTUBHAI GOPALBHAI PATEL INSTITUTE OF TECHNOLOGY

CIVIL ENGINEERING DEPARTMENT

A

REPORT

ON

"Academic tour of Project Udaan- Adani at Mundra

(16-01-2018 to 19-01-2018)"

B.Tech (8th Semester)

Prepared by:
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UKA TARSADIA UNIVERSITY, BARDOLI, SURAT

CHHOTUBHAI GOPALBHAI PATEL INSTITUTE OF TECHNOLOGY

DETAILS OF VISIT

Date	:	17th &18th January 2018
Duration	:	2 Days
Faculty co-ordination	:	Prof. Anuj Chandiwala
Other faculties	:	Prof. Aditya Bhatt, Prof. Bijal Chaudhary, Prof. Khyati Msitry
Visitors	:	Students of 8th Semester Civil Engineering

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 Nation Building. We live in the same communities where we operate and take our responsibility towards contributing 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 mechanisation. In fact, it is the only port in the country with handling and 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 tonnes 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, facilitating 24x7 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.

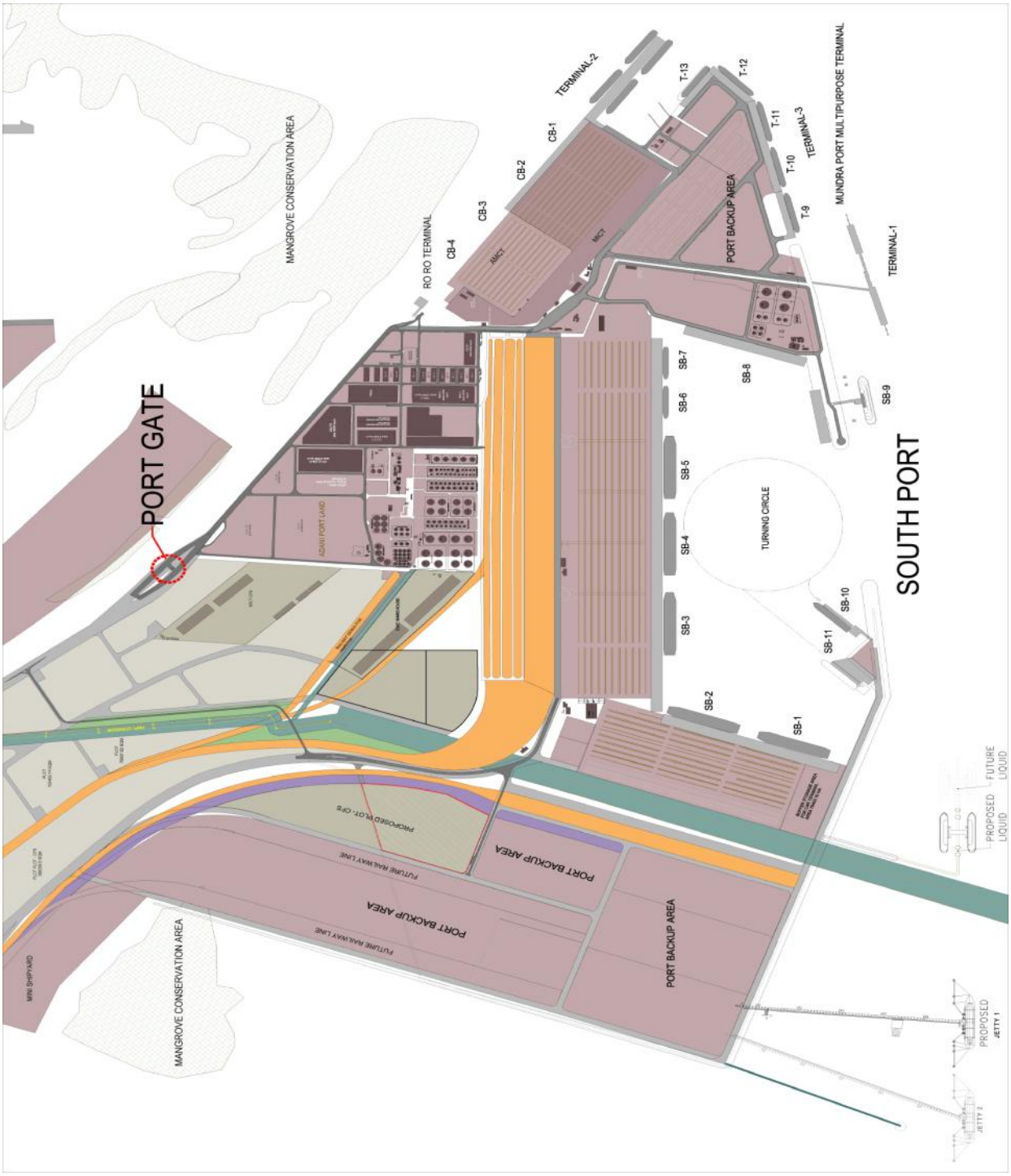
II. Adani Willmar.

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.



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 Fertilisers 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 mechanised fertiliser 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 per ship.

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 a crushing capacity of over 6000 TPD.

WEST PORT


PRESERVED CONSERVATION AREA
PORT BACKUP AREA
PORT BACKUP AREA
PORT BACKUP AREA
PORT BACKUP AREA
WEST PORT
PORT GATE

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 mechanised 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 mechanised system allows the port to handle huge volumes 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 synchronising 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 isalso the fastest project implementation ever by any power developer in the country with a record completion of inception to synchronisation 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.

❖ DESIGN AND DEVELOPMENT

Mundra plant sets global benchmarks for power producers in terms of size, efficiency and sustainability. Despite its enormous capacity, the facility stands unique in the world when compared with area per MW. Located on a very optimized layout of 734 Acres alongside auxiliaries like cooling towers, 47 MLD desalination plant and flue gas desulfurization plant. India's central authority allows for 0.5 Acre/MW which for Mundra TPP could have meant 2310 Acres. Over three times its actual area.

The plant was constructed in 36 months - A record among Indian power developers. The plant was also the first to introduce the 660 MW supercritical power technology to India with the commissioning of its Unit # 5 in December 2010 following installation of four 330 MW units.

❖ PURCHASE AGREEMENT

APL Mundra is having Long term PPA with Gujarat State for 2000 MW and with Haryana State for 1424 MW.

❖ POWER EVACUATION

To help the state and regional utilities evacuate electricity from the plant and into the grid, Adani Power had constructed two power lines. The 433 km, 400 KV transmission line to transmit 1000 MW from Mundra to Dehegam in Gujarat and the 989 km, 500 KV high Voltage Direct current (HVDC) bipole line with the capacity to transmit 2500 MW from Mundra to Mohindergarh in the northern state of Haryana. The latter is the first and longest HVDC system by a private player in India.

❖ BENCHMARKS

✓ Mundra super critical units 6 & 9 achieved synchronization from boiler light up in less than 3.5 months.

✓ Unit 5 of Mundra TPP (660MW): Supercritical unit synchronized within 36 months from the inception, fastest implementation in the world.

✓ 2 super critical units (Unit-8 and Unit-9 of Mundra TPP) completed the steam blowing within 2 days from boiler light up.

✓ Mundra unit 3, 5 & 9, 3 units at single location achieved full load operation from synchronization in less than 4 days.

✓ NABL accredited P&M lab established at Mundra.

❖ ACHIEVEMENTS

✓ Have been certified for all the three standards under the umbrella of IMS

- QMS 9001:2008 certification
- ISO 14001 Environmental management system
- IS 18001 certification for OSHAS

✓ ISO 50001 Energy management system

✓ NECA awards received from Ministry of Power and BEE for 2 subsequent years from Hon'ble President of India

✓ Greentech safety award

✓ Safety Innovation award

✓ Golden Peacock award

✓ Received 5 S certification in Excellence Category.

❖ FUEL

The fuel requirement of the plant is met majorly through sourcing of imported coal. It also has an operational Fuel Supply Agreement of 6.405 MTPA with subsidiaries of Coal India Ltd.

❖ WATER

Mundra is India's largest TPP to function off a sea-water based closed- cycle induced draft circulating cooling water system. The system draws on sea water that is recycled upto 4 times, conserving water & requiring a smaller discharge pipeline into the sea than an open- circuit cooling system.

Though seawater is used for the cooling system, other Auxillary systems use sea water purified by a reverse osmosis plant, that can produce 47 Million litres of fresh water every day. Boilers require Demineralized water that is produced in Demineralization plants. Each 660 MW Boiler can convert more than 2000 MT of water per hour into Steam that is 250 times the atmospheric pressure & at a high of 566 Deg. C steam is send to the turbine through high pressure pipes, after which it is collected & indirectly cooled in a condenser with sea water & recycled back to the boiler.

❖ ASH MANAGEMENT

We established and commissioned an Ash bagging unit to achieve 100% Fly Ash utilization. For ensuring 100% utilization of Fly Ash, we have established a fine Ash bagging unit at Mundra for bagging and disposal of fly ash generated due to our process. Each machine has an operational capacity of 18 TPH and the unit operates three such machines giving it a total capacity of 54 TPH.

The technical visit to Adani Mundra port started at 16th January 2018 at 8:45 pm from Surat. There were two buses containing total 75 students (Final year Civil) and 4 faculties (Prof. Anuj Chandiwala, Prof. Aditya Bhatt, Prof. Bijal Chaudhary and Prof. Khyati Mistry). The private buses were boarded up to Ahmedabad. The buses reached CTM cross road at Ahmedabad around 3:00 am.

Day-1

17th January 2018

The journey started from Ahmedabad. The 76 students along with 4 faculties were ready for an exciting visit. Sharp at 4 o'clock early in the morning two buses of Adani 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.

7:15 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 breakfast. And after that the journey resumed and we started to play fun games like cards on the way. 12.15 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 three. We found out the rooms very spacious and equipped with all the basic amenities that an individual needs.

1.00 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.

2.45 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 ml Soya bean oil bottle as a token of love from Adani Willmar.

6.00 pm

We were taken back to our accommodation in the evening. After a quick break we were shown a presentation on Adani industry. The presentation gave a nice visualization of their whole infrastructure and planning. And this presentation ended with Adani caps and t-shirt on our head

which was given to us as a gift.

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 on the 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. After dinner we went in gallery and played games.

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

18th January 2018

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.

9:30 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.

12:30 pm

We went back to accommodation for lunch. The visit was about to end but without a group photo it was incomplete. After the photo-session we left for Ahmedabad at 2:30 pm. The visit ended quite comfortably.

6:45 pm

We took our halt at a hotel at Halvad and we were served breakfast. The breakfast also so tasty and healthy. We reached Ahmedabad at 11:00 pm. After takig diner at hotel Mony near Narol cross road our journey started towards Surat in our bus. We reached Surat at 6:30 am on 19th January 2018.

- We are very much thankful to Dr. N.C. Shah sir (Director- CGPIT) for a kind of permission.
- We are thankful to Mr. Kamlesh Gandhi (Head of the department, Civil Engineering) for always motivating us in curricular and activities.
- We are very much thankful to M/s Adani Corporation and Civil Engineering Department, CGPIT 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.

CONCLUSION: -

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 to improve decision making and efficiency. Industry visit proved to be learning and fruitful experience for both students and FACULTY MEMBERS.