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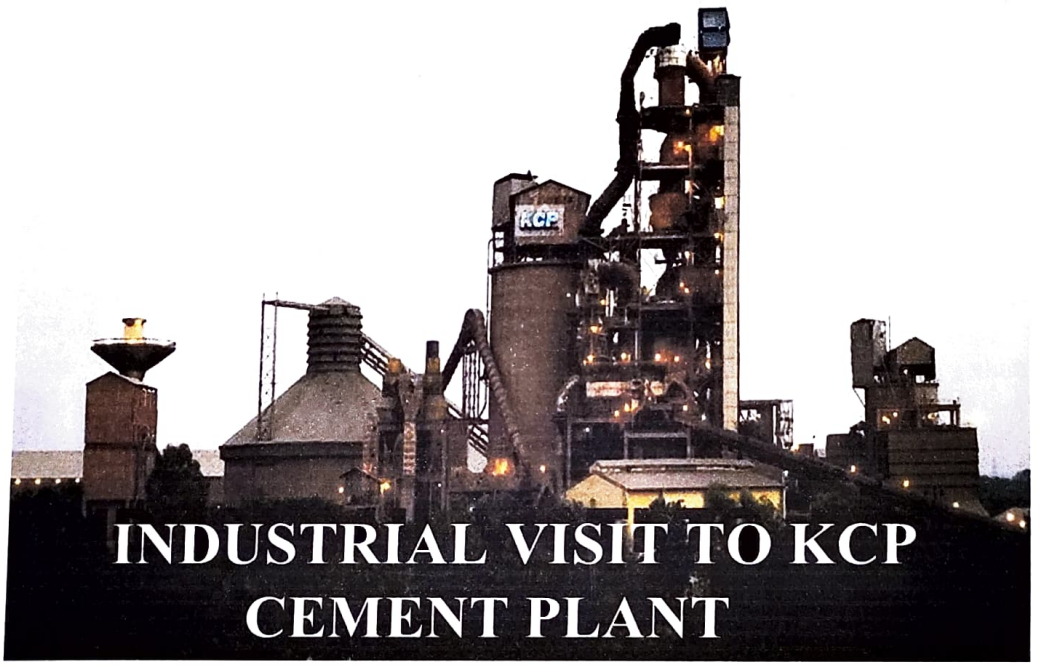

INDUSTRIAL VISIT TO KCP CEMENT PLANT

BY

II YEAR STUDENTS

CIVIL ENGINEERING DEPARTMENT

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NEC ENGINEERING COLLEGE
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DATE: 22/08/2019
PLACE: MACHERLA

A REPORT ON INDUSTRIAL VISIT TO MACHERAL KCP CEMENT PLANT

This is study report on industrial visit to Macherla KCP cement plant which is located in Guntur district of Andhra Pradesh state. We started in our campus on 22.08.2019 at 6.30 AM. We, 54 students of II CE along with our faculty members visited KCP CEMENT PLANT.

KCP cement is high grade limestone and producing a combined annual capacity of 2.2 million tons of the finest quality premium grade cement in India. Commissioned in 1958, it is one of India's oldest cement plant and south India's 1st dry process kiln with technology from KHD Humboldt, Germany. Starting with an annual capacity of 0.8 million tons with additional technology form Fives Lille, France and later FL Smith, Denmark (Fuller, USA). In 1999 a 8.25 MW Hydel power plant was setup on Nagarjuna sagar dam right canal generating clean & sustainable power. A 2.3 MW Waste Heat Recovery Power plant was setup by utilizing waste fuel gases exhausted from the pre-heater and cooler chimneys.

Acknowledgement

We take this opportunity to that our principal Dr.M.SRINIVASA KUMAR for giving permission to all of us to visit "KCP CEMENT PLANT" in Macherla by providing faculty and bus services. We would like to express our special thanks to head of the department Dr. T.G.K.VASISTA for giving us an opportunity for an industrial visit.

Special thanks to our faculty K.V.PRATAP & K.VENKATESH for accompanying with us and guiding during the visit.

Our heartfelt gratitude to other faculty members of CE department for encouraging us to gain practical knowledge.

Finally heartfelt gratitude also goes to our classmates for making this trip a memorable one.

INTRODUCTION

Industrial visit to the industry before completing studies i.e, while you are studying in order to understand the reality and get prepared for it.

The concept of industrial visit is as beneficial to the student as it provides as deep understanding about the corporate world. It always helps us in paining if we know how it is going to be once we reach there.

A student's life is very different from those who are working. The change from student's routine to a routine of working person is made easy when we know what the change and through this industrial visit. This helps students to the daily routine and the responsibilities of a person in an industry.

In books we read about ideas, thoughts and experience of other man the knowledge thus acquired is theoretical. In today's life we cannot be successful with the mere theoretical knowledge.

We must also know about the habits, manners and ways of living of the corporate world. We can learn about them by coming in contact with them through the industrial visit. These visits take us from bookish knowledge to the field of practical knowledge.

HISTORY

A multi-product company with two sugar mills, a downstream distillery, a cement plant and an engineering division, KCP was initially a sick sugar unit(cap:600tpd).It was taken over by the late Velagapudi Ramakrishna in 1941. The merger of challapalli sugars-a BIFR company- with it in 1988 and expansions have increased its sugar capacity tenfold to 6300 tpd over the last five decades. The cement factory, set up in 1958, was the first dry process plant in India. The engineering division was set up in 1955 as an in-house venture to manufacture sugar machinery required by the company. Manufacture of machinery required for cement,chemicals,steel castings,etc, were later added to this division . Both the cement and engineering division have been accredited with the ISO 9002 and ISO 9001 certification respectively in 1994. KCP hived off its sugar and industrial alcohol business, which was transferred to a new company, KCP sugar Industries corporation. The Company also undertook a joint venture with v=Vantech Industries for the manufacture of specialized insecticides.
KCP promoted FCB-KCP, a joint venture with Vantech Industries for the manufacture of specialized insecticides. KCP promoted FCB-KCP, a joint venture with FCB,France,in a 40:40 equity participation. Then new company is to manufacture and supply state-of-the-art machinery and technology to clients in the sugar industry both in India and abroad.

The cement unit of the company continues to retain the ISO 9001 certification while the engineering unit was accredited to use the symbol 'S' and 'U' of American society of Mechanical Engineering (ASME) for the manufacture and assembly of poer boilers and pressure vessels, respectively on 15 May '96.

KCP has also received the certificate of merit for outstanding export performance during 1944-95 among Non-SSI exporters in industrial machinery panel for manufacture of sugar , paper,chenical,cement and pharmaceuticals. The company

had set up 5 mini-hydel units aggregating 8.25 MW capacity in the GUNTUR branch canal of Nagarjuna sagar Dam. Electricity generated in this unit is wheeled to the cement unit for use. During 2001-02 the company entered into agreement into an agreement with ANDHRA PRADESH Transmission
Corporation Limited (APTRANSCO) for wheeling the generated energy at HYDEL station to the cement plant with wheeling charge of 2% fixed for a period of 20 years.

AWARDS AND RECOGNITION

- "NCB Best Electrical Energy performance Award to Muktyala Cement Plant for the year 2013-14 and 2014-15.
- CII National Award for Excellence in Energy Management (2015).
- Best Management Award for Initiating best Industrial Relations and Human Resources Practices(2015).
- CII National Award for Excellence in Energy Management (2014).
- National Energy Conservation Award (2014).
- International Safety Award (2010).

ABOUT KCP FOUNDER

Sri.V.Ramakrishna
Founder
1896-1968

KCP is a 75year old diversified business group with a turnover over 200 million USD with interests in Cement, Heavy Engineering, Sugar and power.

It has 9 Manufacturing locations over various geographies in India and Vietnam.

KCP started as a small cooperative sugar plant in 1941 by its founder **Sri.V.Ramakrishna;** it has over the years expanded rapidly enthused by the leadership of its founder and inspired on the lines of the technological foresight into Ares other like **Heavy Engineering (1955),Cement (1958), Power(1998) and Hospitality(2016).**

Technology provides the cutting edge to our services, state of the art facilities and latest process trends that are applied in Ares such as critical industrial equipment for miners processing and chemical industries, steel, plants, space research application and Nuclear / Hydro Power installations. **KCP,** with its technology & project management capability, has set up over 40 sugar plants and 12 cement factories in India and overseas.

KCP's focus has always been towards contributing it the nation's lifelong infrastructure. Its Cement Plant in Macherla was setup to supply cement for the construction of the mighty Nagarjunasagar Dam. This stand as a testimony to the quality of KCP Cement. Then dam continues to provide irrigation and power to state of ANDHRA PRADESH.

Fives-Cali KCP Limited is a joint Venture with Fives Group France to execute turnkey sugar plants.
KCP has been a pioneer in developing the sugar industry in Vietnam since 1990's as a supplier of sugar machinery to plants in Vietnam. On the invitation of the Vietnam Government to develop by **KCP Vietnam Industries Limited a** sugar manufacturing subsidiary located in Vietnam in 1999. Since then it has expanded its capacity to 6000 TCD.
Quality is a underlying final word to the products we produce and all Our Business are ISO 9000 certified.

ABOUT MILESTONES

2019 – 18th February – Commencement of Commercial operations at Line 2, Muktyala Cement Plant, Ramakrishnapuram, Muktyala, Andhra pradesh.

2016-Launch of Mercury Hotels Hydra bad KCP,Hyderabad

2014- commissiong of 15 MW Thermal Power Plant at Muktyala cement plant, Ramakrishnapuram, Muktyala, Andhra pradesh.

2013- Commissioning of 1.15 MW Solar at Muktyala Cement Plant, Ramakrishnapuram, Muktyala, Andhra Pradesh.

2011-Cement plant II commissioned at Ramakrishnapuram , Muktyala,Andhra pradesh.

2006-Wind Power generating unit setup at Uthumalai village in Tirunelveli District of Tamil Nadu.

2001-Heavy Engineering Plant II setup at Arakonam near Chennai, to execute medium to large sized Fabrication Projects.

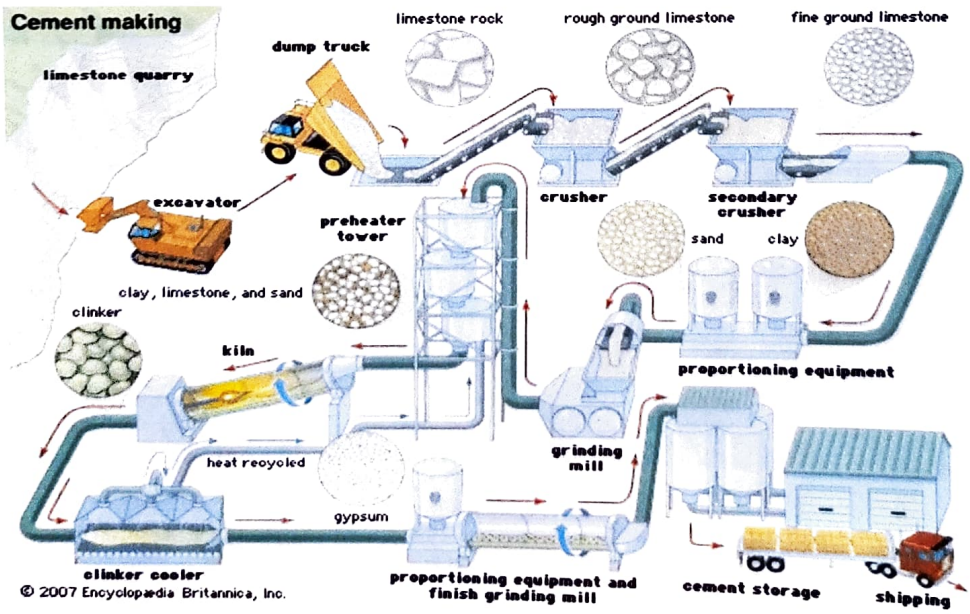
2000-KCP Technologies Limited setup to provide high quality IT solutions & Engineering Technical Services.

1999-Hydel Power Division setup at Nekkarikallu, Andhra Pradesh on the Guntur canal of Krishna river to generate 8 ME of power.
1995-KCP Sugar Manufacturing Division demerger into a separate company, KCP sugar & Industries Limited.

MANUFACTURING OF CEMENTMATERIALS AND MANUFACTURING PROCESS OF PORTLAND CEMENT

Manufacturing of cement involves raw materials and processes. Each process is explained chemical reactions for manufacture of Portland cement.

Cement is a greenish grey colored powder, made of calcined mixtures of clay and limestone. When mixed with water becomes a hard and strong building material.



MANUFACTURING PROCESS OF CEMENT

The manufacture procedures of Portland cement is described below.

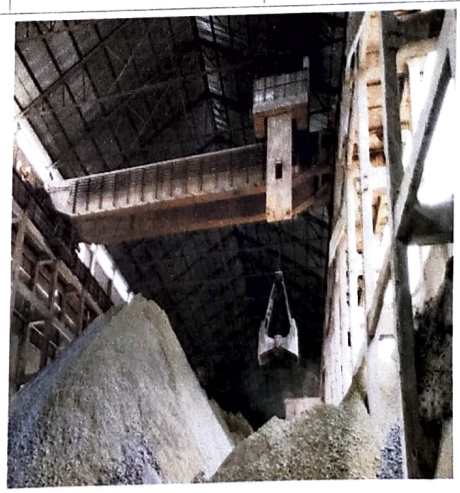
1. Mixing of raw material
2. Burning
3. Grinding
4. Storage and packaging

1. MIXING OF RAW MATERIAL

The major raw materials used in the manufacture of cement are Calcium, Silicon, Iron and Aluminum. These minerals are used in different form as per the availability of the minerals.

Table shows the raw materials for Portland cement manufacturing

Calcareous Materials	**Argillaceous Materials**		
Calcium	**Silicon**	**Aluminum**	**Iron**
Limestone	Clay	Clay	Clay
Marl	Marl	Shale	Iron ore
Calcite	Sand	Fly ash	Mill scale
Aragonite	Shale	Aluminum ore refuse	Shale
Shale	Fly ash		Blast furnace dust
Sea Shells	Rice hull ash		
Cement kiln dust	Slag		



Adding a lime rock to crusher

The mixing procedure of the manufacture of cement is done in 2 methods

a) Dry process b)Wet process

a) Dry process

The both calcareous and argillaceous raw materials are firstly crushed in the gyratory crushers to get 2-5cm size pieces separately. The crushed materials are again grinded to get fine particles into ball or tube mill.

Each finely grinded material is stored in hopper after screening. Now these powdered minerals are mixed in required proportion to get dry raw mix which is then stored in silos and kept ready to be sent into rotary kiln. Now the raw materials are mixed in specific proportions so that the average composition of the final product is maintained properly.

Adding rough ground limestone and fine ground limestone to crusher

Proportioning equipment

sand

clay

2. Burning of Raw Materials

Then burning process is carried out in the rotary kiln while the raw materials are rotated at 12rpm at its longitudinal axis. The rotary kiln is made up of steel tubes having the diameter of 2.5-3.0 meter and the length differs from 90-120 meter. The inner side of kiln is lined with refractory bricks.

The kiln is supported on the columns of masonry or concrete and rested on roller bearing in slightly inclined position at the gradient of 1 in 25 to 1in 30. The raw mix of dry process of corrected slurry of wet process is injected into the kiln from the upper end. The kiln is heated with the help of powdered coal or oil or hot gases from the lower end of the kiln so that the long hot flames is produced.

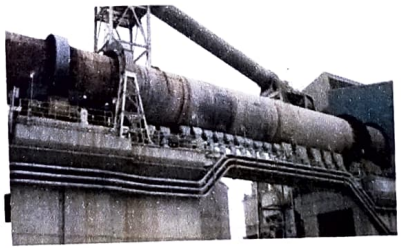
As the kiln position is inclined and it rotates slowly, the material charged from upper end moves towards lower end at the speed of 15m/hr. In the upper part, water or moisture in the material is evaporated at 4000C temp, so this process is known as Drying Zone.

Pre-heaters tower

The central part i.e. calcinations zone, the temperature is around 10000C, where decomposition of lime stone takes place. The remaining material is in the form of small lumps known as nodules after the CO2 is released.

The lower part (clinkering zone) have temperature in between 1500-17000C where lime and are react to yield calcium aluminates and calcium silicates. These products of aluminates and silicates of calcium fuses together to form hard and small stones known as clinkers. The size of the small and hard clinker varies from 5 to 10mm

The clinker coming from the burning zone is very hot. To bring down the temperature of clinkers, air is admitted in counter current direction at the base of the rotary kiln. The cooled clinkers are collected in small trolleys.



Rotary Kiln

3. GRINDING OF CLINKERS

The cooled clinker are received from the cooling pans and sent into mills .The clinkers are grinded finely into powder in ball mill or tube mill. Powdered gypsum is added around 2-3% as retarding agent during final grinding. The final obtained product is cement that does not settle quickly when comes in contact with water.

After the initial setting time of the cement, the cement becomes stiff and the gypsum retards the dissolution of tri-calcium aluminates by forming tricalcium sulfoaluminate which is insoluble and prevents too early further reactions of setting and hardening.

$$3Cao.Al_2O_3+XCaSO_4.7H_2O=3CaO.Al_2O_3.XCaSO_4.7H_2O$$

Clinker Cooler

Proportioning equipment and finish Grinding mill

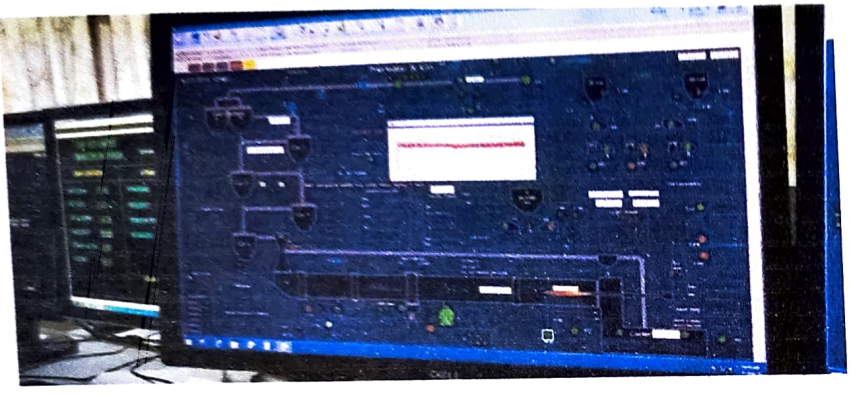
4. STORAGE AND PACKAGING

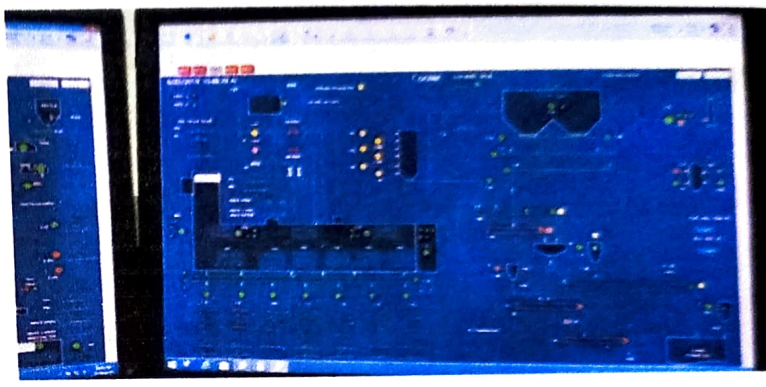
The grinded cement is stored in silos, from which it is marketed either in container load or 50kg bags.

CEMENT STORAGE

ELECTRONIC ROTO PACKER

SHIPPING





LABORATORY TEST

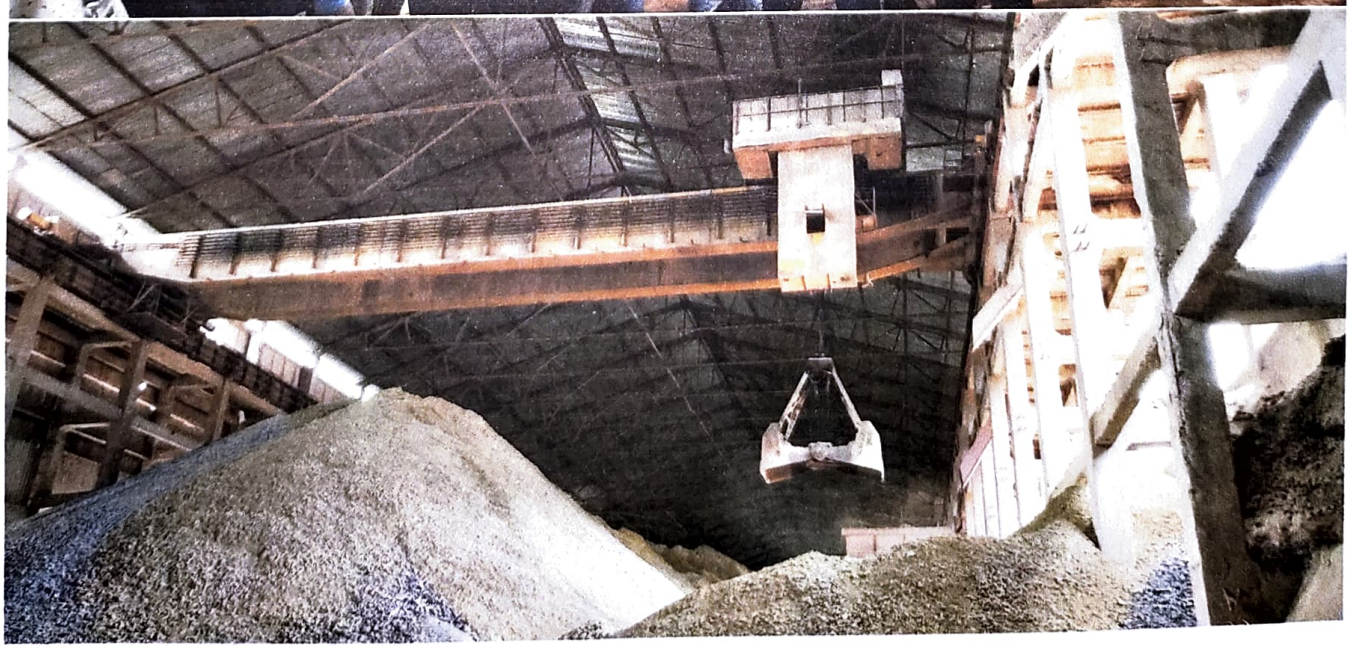
CURING

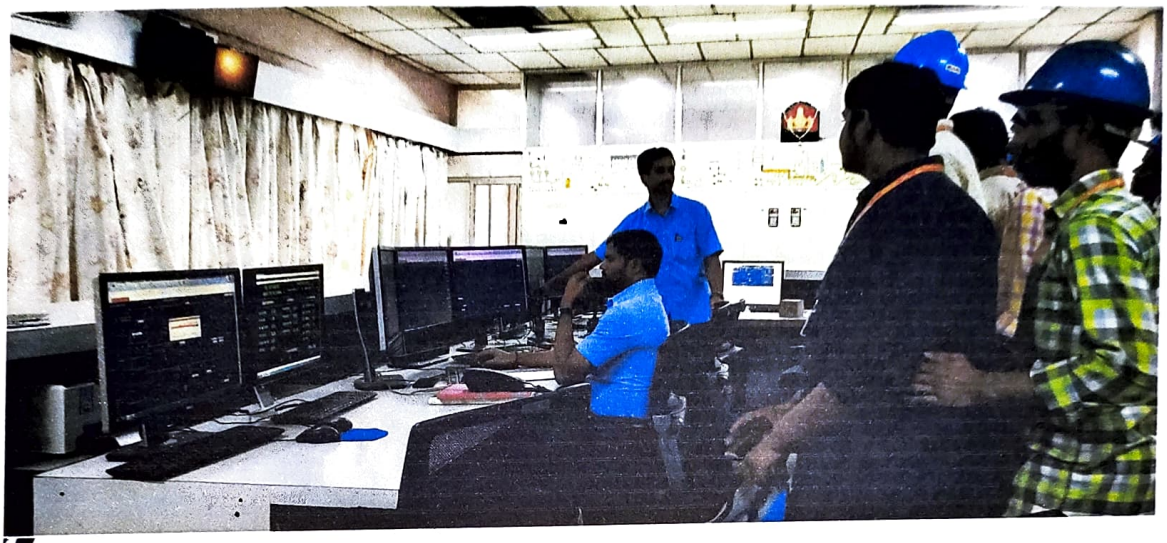
TENSILE TEST

COMPRESSIVE TEST

FURNACE

STUDENTS PARTICIPATED IN THE VISIT





CONCLUSION

Finally we conclude that Field visits are important for engineering students especially for Civil engineers. We learnt so much from this Field visit and it improved our knowledge and we are hoping to visit many great projects like this.