



**KALYANI CHARITABLE TRUST'S**  
**LATE G. N. SAPKAL COLLEGE OF ENGINEERING**

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Date: 21<sup>st</sup> October 2022

**Industrial Visit Report**

TE-Civil

**A VISIT REPORT ON DESIGN OF STEEL STRUCTURES**

**Department of Civil Engineering**

**Late G. N. Sapkal College of Engineering, Nashik.**



***DSS Industrial Site Visit Unique Industry Handlers Pvt. Ltd***

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**Venue:** Unique Industry Handlers Pvt. Ltd, Igatpuri, Nashik.

**Date:** 21<sup>st</sup> October 2022, Friday at 10:00 am.

**Class:** TE

**Faculty coordinator:** Prof. Kiran Deore,

**Number of Students:** 64

**No. of Teachers:** 02

**Mode of Transportation:** Bus

**Travelling Distance:** 45 km (One Side)

**Guided by:** Mr. Vinod Ingale  
Mr. Sahil Shindore  
Mr. Vijay Patil



***Figure 1: Group photo along with team Unique Industry Handlers***

## **Introduction**

The Department of Civil Engineering of Late G. N. Sapkal College of Engineering, Nashik organized one day visit to Unique Industrial Handlers Pvt. Ltd. on 21<sup>st</sup> Oct. 2022 for the third year student of Civil Engineering (BE) program.

The visit was organized with the prior permission and guidance of Respected Principal Prof. Dr. S. B. Bagal and HOD of Civil Department Prof. R. M. Jadhav. Along with the staff members, students of BE. Prof. Kiran Deore have taken hard efforts and initiative for the visit.

This visit was organized by Sapkal College of Engineering for the third year students of Civil engineering along with course instructors Prof. Kiran Deore and Prof Bhushan Tatar at Unique Industrial Handlers Pvt. Ltd. in order to get knowledge about Manufacturing of steel Members, Cranes and Gantry Girders

Unique Industrial Handlers Pvt. Ltd. started operations in 1983. The brain child of three entrepreneurs; Mr Jetha Tahiliani, (Late) Mr Arjan Vaswani, and Mr Jagdish Badlani, it started as a manufacturer of small capacity EOT, GOLIATH, & SEMI GOLIATH cranes.

Today there are more than a thousand cranes which bear the UNIQUE name.

Unique Industrial Handlers Pvt. Ltd. undertakes the primary functions of complete design, manufacture, supply and maintenance of all types of cranes.

## **Objectives of the Steel Industrial Site Visit**

1. To provide students with the practical knowledge of the various mechanisms involved in making of steel structure thereby leading to better understanding of the subject.
2. This course is designed to provide understanding of IS code provisions, fundamentals of structural steel design and its applications for design of various components.
3. Students should be able to understand components of steel structures and its arrangements
4. Student should be able to design beams, columns, column footings, roof trusses, gantry girder and plate girders



## Permission for the Visit

The college wrote a permission letter to The Director of Unique Industrial Handlers Pvt. Ltd. to obtain permission. This process took about 4-5 days.

Kalyanii Charitable Trust's  
**LATE G. N. SAPKAL COLLEGE OF ENGINEERING**  
(Accredited with Grade 'B' by NAAC)

**Dr. Sahebrao B. Bagal**  
M.E. (E & TC), Ph.D. (E & TC)  
Principal

**SAPKAL KNOWLEDGE HUB**  
Chairman & Managing Director  
Kalyanii Charitable Trust

**Dr. Ravindra G. Sapkal**  
Chairman & Managing Director  
Kalyanii Charitable Trust

Affiliated to > Savitribai Phule Pune University (ID. No.PU/NA/Engg./152/2009 Ref.No.-CA/6501 Dated- 18/11/2009)  
Approved by > A.I.C.T.E., New Delhi (F.N: 06/07/MS-Engg/2008/O-17, Dated- 11th June 2009)  
> Govt. of Maharashtra (No. GEC-2009/(67/09)/T.E.-4, Dated- 15th June 2009)  
> D.T.E., M.S., Mumbai (No.2/NGC/Engg./Approval/2009/535, Dated - 23rd July 2009)  
> AISHE CODE : C-42196

Ref: KCT's/LGNSCOE/Civil/Visit/2021-22/ Date: Oct. 17, 2022

To,  
**The Director,**  
**Unique Industrial Handlers PVT LTD.,**  
**206-207, Nahar and Seth industrial State,**  
**Chakala, Andheri (E), Mumbai- 400099.**

Subject: Help for academic site visit.

Respected Sir,

We would like to introduce ourselves as an emerging organization in Nashik district. We are affiliated to Savitribai Phule Pune University and we offer five engineering courses viz. Bachelors in Civil Engineering, Computer Engineering, Electronics and Telecommunication, Mechanical Engineering and Electrical Engineering.

In the third year of Civil Engineering of Savitribai Phule Pune University, there is a subject Design of Steel Structures. This is a very important subject in Civil Engineering and Different steel structures are studied in this subject like welded connection, bolted connection, beam design, column design, base plate design, roof truss design, gantry girder, plate girder etc.

For that we need to visit some industrial sites, and for that the students will get all this in your company, so we humbly request you to give us an opportunity to study in your company.

Kindly allow us on one of the 19<sup>th</sup>, 20<sup>th</sup> and 21<sup>st</sup> of October 2022 for the site visit at your company. A total of 60 students will come for the visit and 3 professors will accompany the students to maintain discipline and safety.

We hope that you will give us full cooperation and guide the aspiring and ambitious civil engineering students.

**Details of Visit Coordinators:**  
Prof. K. M. Deore, 7249739924  
Prof. T. R. Shinde, 8975679390

Thanking You.  
Yours Sincerely,

**Prof. R. M. Jadhav**  
HoD, Department of Civil Engineering

**Prof. Dr. S. B. Bagal**  
Principal, LGNSCOE, Nashik

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Figure 2: Wrote requesting letter to The Director of Unique Industrial Handlers Pvt. Ltd. for visit permission

### **Purpose of visit:**

The main purpose for this visit is to be familiar with industrial environment and to get practical knowledge of Construction process. With the need of steel in construction industry due so many reason which should be economical, Eco- friendly, safe and efficient. The other reason was to figure out the joint bolted connection, welded connection, gantry girder, plate girder, roof truss, etc. which used in steel structure as a civil engineer how these structures are constructed is always interesting. Some other purpose was to know about different members of roof truss and how they erected.



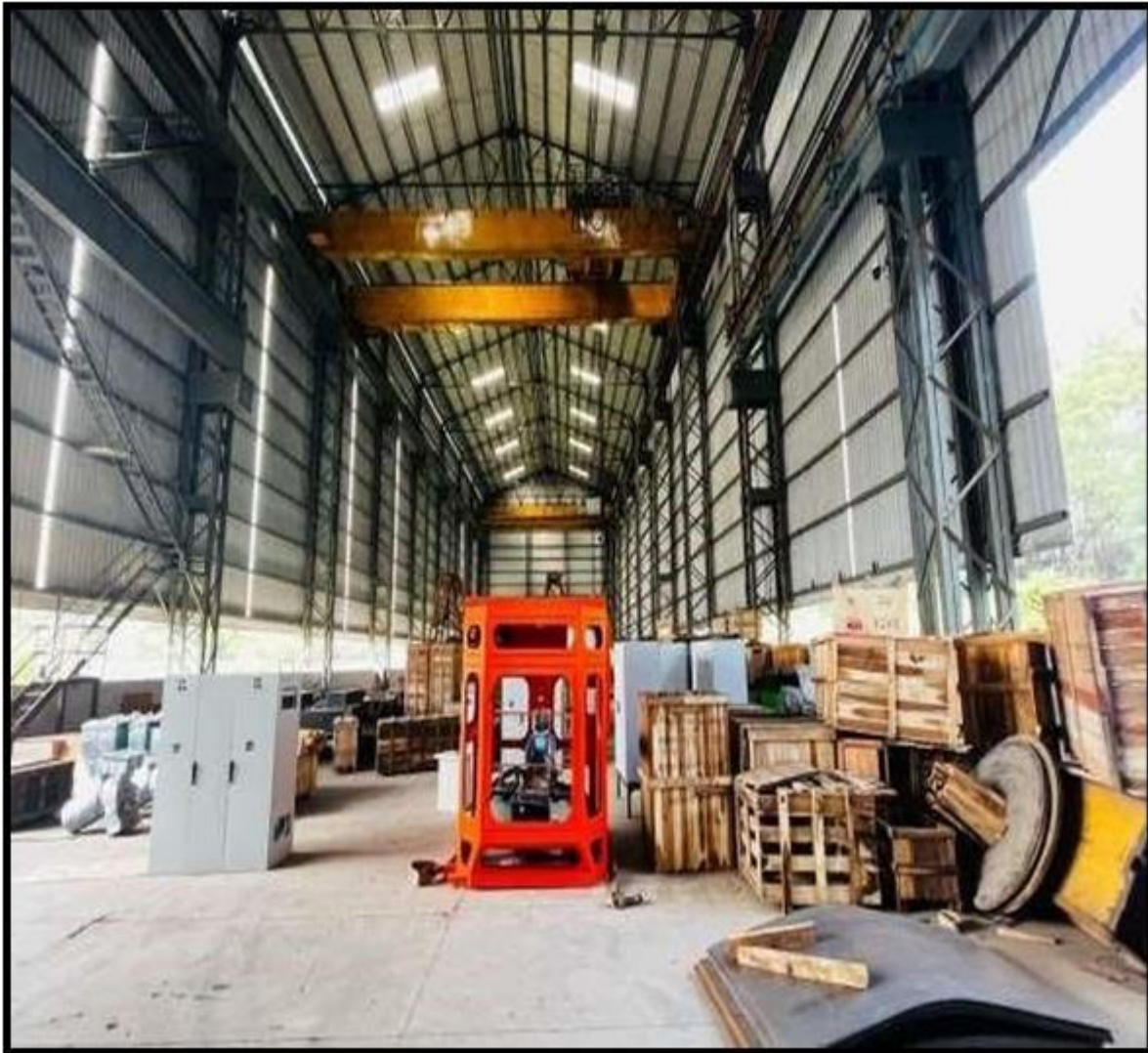
*Figure 3: Students learnt how to design components of Gantry Girder and Crane*

### **Crane:**

A crane is a type of machine, generally equipped with a hoist rope, wire ropes or chains, and sheaves, that can be used both to lift and lower materials and to move them horizontally. It is mainly used for lifting heavy objects and transporting them to other places. The device uses one or more simple machines to create mechanical advantage and thus move loads beyond the normal capability of a human. Cranes are commonly employed in transportation for the loading



and unloading of freight, in construction for the movement of materials, and in manufacturing for the assembling of heavy equipment.



*Figure 4: Students studied the grade and quality of steel required to design gantry girder*

### **Plate Girder:**

1. A plate girder is a steel beam that is widely used in bridge construction. Depending on the design requirements and as per the nature of the structure; metal thicknesses for web, flanges, stiffness, etc. are determined.
2. The use of the correct material (steel) is having the specified strength and doing the welding are the two main factors to be attended to when developing the plate girder.
3. A plate girder is used when we need deeper sections having higher stiffness to carry heavy loads.



*Figure 5: Components of Plate Girder*

### **Components of Plate Girder:**

1. Web
2. Flanges
3. Stiffeners



*Figure 6: Components used to joined steel members*



**Web:**

The deep central vertical plate is called as a web in plate girder. It separates the two flange plates by a required distance. Web is responsible to resist shear developed in the plate girder.



**Figure 7: Components of Plate Girder**





**Figure 8: Components of Gantry Girder**



**Figure 9: Components of Gantry Girder**

### **Flanges:**

Flanges or flange plates are horizontal elements of plate girder which are provided at the top and bottom and they are separated by the web. The main purpose of flange plates is to resist the bending moment acting on the girder.

The top flange resists the bending moment by developing compression and the bottom flange resists the tensile force. They should be provided with a required width and thickness to offer good resistance against bending moment.

### **Stiffeners:**

Stiffeners are classified into two types:

1. Vertical Stiffeners
2. Horizontal Stiffeners

#### **Vertical Stiffeners:**

Vertical stiffeners are provided at right angles to the flanges and they are also called as transverse stiffeners. These are again classified into two types namely end stiffeners and intermediate stiffeners based on their position in the plate girder.

#### **Horizontal Stiffeners:**

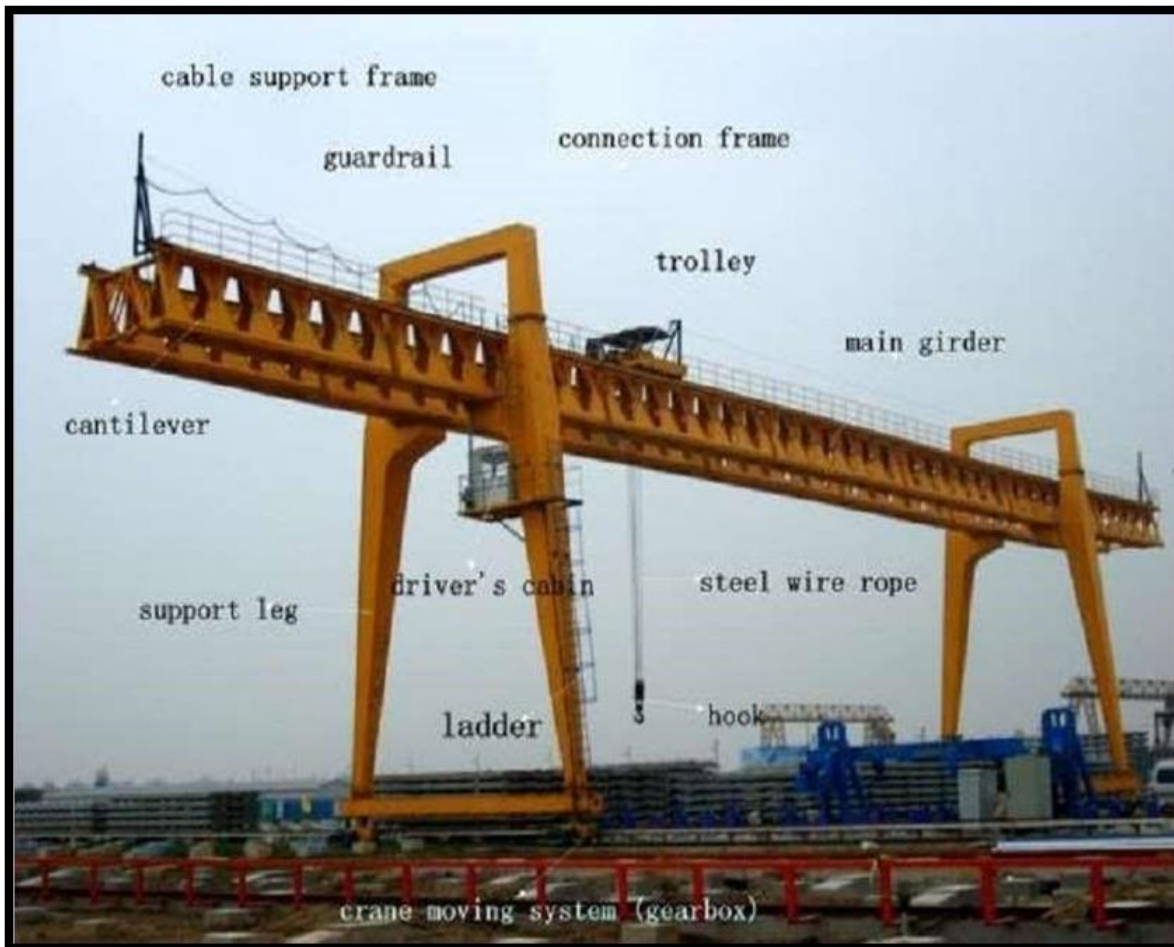
Horizontal stiffeners are provided in parallel to the flange plates. They are also called as longitudinal stiffeners. These stiffeners will improve the buckling strength of the web portion. Horizontal stiffeners are either continuous or discontinuous.

### **GANTRY GIRDER:**

Gantry girders, also known as crane girders, are used in industrial buildings like processing plants, workshops, steel production, and other similar establishments to carry overhead cranes that are either manually or electrically operated. These cranes are used to lift and transport heavy materials, equipment, and other such items from one location within the building to another.

The gantry's primary girder supports the load that is transferred via the travel wheels in gantry girder systems. The main girder reaches from one support column to another support column. When necessary, a walkway may be constructed at the peak of the girder so that it can be examined on a regular basis.

The topmost ridge of the gantry girder serves as the attachment point for the rail, which is secured using sturdy clips. The mounting of gantry girder cranes may be done either in accordance with the slow-speed type or the high-speed type standards.



*Figure 10: Components of Gantry Girder*

**Components of Gantry Girder:**

- 1) Cable support frame
- 2) Trolley
- 3) Cantilever
- 4) Support leg
- 5) Main girder
- 6) Connection frame
- 7) Steel wire rope and hook
- 8) Driver cabin





***Figure 11: Students learnt the process of Design and Construction Gantry Girder***

Students were addressed by the professional worker in the site. They gave a brief explanation about the various machines used for various processes like detailed overview and working of machines like drilling machine, hand grinder, bar bending machine etc. was given. The workers also explained about the various components and safe handling of the machine with the working. They also gave a brief description of the various sizes and types of drilling bits and their uses, for example type of drill used for 25mm hole.



***Figure 12: Drilling and bolted connection .***

## **What students learnt?**

### **On successful completion of the visit, the students will be able to:**

The students were taught various techniques of welding used for various orientations of jobs (structures), they were also given an onsite experience of welding, students under the supervision of the professional tried welding and drilling. A new instrument used for leveling of steel section was also introduced to the students, the instrument can show vertical, inclined and horizontal levels and accordingly adjustments to the section can be made. They also explained the reason behind the selection of particular type of member (sections) used in structures present there.

1. Demonstrate knowledge about the types of steel structures, steel code provisions and design of the adequate steel section subjected to tensile force.
2. Determine the adequate steel section subjected to compression load and design of built up columns along with lacing and battening.
3. Design eccentrically loaded column for section strength and column bases for axial load and uniaxial bending.
4. Design of laterally restrained and unrestrained beam with and without flange plate using rolled steel section.
5. Analyze the industrial truss for dead, live and wind load and design of gantry girder for moving load.
6. Understand the role of components of welded plate girder and design cross section for welded plate girder including stiffeners and its connections.



**Figure 13: Students are felicitating to the Chairman of the Construction Company**





***Figure 14: Along with academic visit Students visited to a beautiful Lakshmi Narayan temple for the purpose of offering devotion and spiritual upliftment to the students.***