Sanghavi College of Engineering
Varvandi, Mhasrul Road,
Nashik – 422 202

AN INDUSTRIAL VISIT TO NASHIK ROAD RAILWAY STATION

Title: - Visit to understand Steel Structure & its Components.

Date of Visit: - 16/10/2024

Address of Site: - Railway Station Road, Shabhaji Nagar, Deolali Gaon, Nashik Road, Nashik

Guided by: - Mr. Manojkumar Tiwari (Station Manager)

No. of students visited: - 19

Name of visit coordinator: - Ms. Madhuri. Z. Khairnar

Photo 1*:* Group photo with students at Nashik Road Railway Station

❖ INTRODUCTION:

The Department of Civil Engineering of Sanghavi College of Engineering, Nashik organized one day visit to Railway Station, Nashik road, Nashik on 16th Oct. 2024 for thethird year student of Civil Engineering (BE) program.

The visit was organized with the prior permission of honorable Director of SCOE Dr. P. A. Zawar, Principal Dr. B. S. Shirole and HOD of Civil Department Mr. T. H. Boraste.

❖ OBJECTIVE OF VISIT:

1. The main objective behind the visit was to make the students aware about the various structures & Components of Railway.
2. Students should be able to understand components of steel structures and its arrangements.

❖ INTRODUCTION ABOUT NASHIK ROAD RAILWAY STATION

Nashik Road railway station (NK) is a major junction in Nashik district, Maharashtra, with 4 platforms. It's a busy station with good connectivity to various parts of India. Students see their various structure such as Railway Truss Bridge, roof truss, Transmission Tower. The student also learnt about types of connections, built-up columns, and gusset plate.

Photo 2: Felicitation of Mr. Manojkumar Tiwari who gave information about railway station to students

❖ TRUSS BRIDGE

A truss bridge is a bridge whose load-bearing superstructure is composed of a truss, a structure of connected elements, usually forming triangular units. The connected elements, typically straight, may be stressed from tension, compression, or sometimes both in response to dynamic loads.

The important parts of a truss bridge are the top and bottom horizontal members and the diagonal and vertical members that connect them. These parts work together to support the weight of the bridge and transfer it to the supports on each end.

Truss bridges have many benefits. The triangular design allows them to handle loads and handle different stresses well, making them strong and stable. They are also cheaper to build compared to other bridges because they use materials efficiently. The simple design of truss bridges also makes them easier to analyze and build.

Truss bridges are commonly used to cross rivers, canyons, and other bodies of water. They are also used in building roads and railways because they are a cost-effective solution for spanning long distances.

Types of Truss Bridges

Here is the list of types of truss bridges.

1. Warren Truss
2. Pratt Truss
3. Howe Truss
4. Parker Truss
5. K-Truss
6. Bowstring Truss
7. Lattice Truss

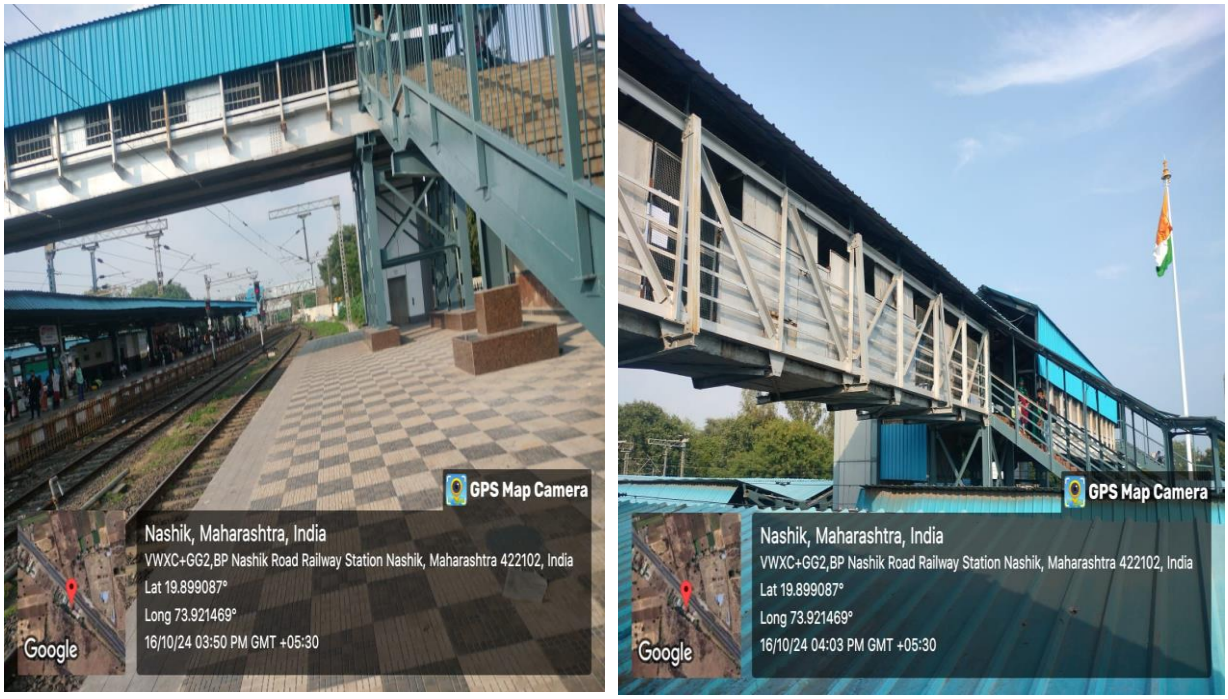

Photo 3: Railway Truss Bridge

❖ ROOF TRUSS

The students learned about the different types of roof trusses used in steel structures. They also learned about the design considerations for steel roof trusses, such as the type of load, the span of the truss, and the deflection of the truss.

Types of roof trusses used in steel structures

The most common types of roof trusses used in steel structures are:

a) **Truss with parallel chords:** This is the simplest type of truss, with two parallel chords (top and bottom) and a series of diagonal members connecting the two chords.
b) **Truss with inclined chords:** This type of truss has inclined top and bottom chords, which gives it greater strength and stiffness.
c) **Truss with multiple chords:** This type of truss has more than two chords, which makes it stronger and stiffer than trusses with two chords

The type of roof truss used will depend on the span of the truss, the loads that it must support, and the desired aesthetic appearance.

Design considerations for steel roof trusses

When designing a steel roof truss, the following factors must be considered:

i. **Type of load:** The type of load that the truss will be carrying will determine the required strength of the truss. Common types of loads include dead loads (the weight of the truss and the other structural elements it supports), live loads (the weight of people, furniture, and other objects placed on the truss), and snow loads.
ii. **Span of the truss:** The span of the truss is the distance between the two supports. The longer the span, the stronger the truss must be.
iii. **Deflection of the truss:** Deflection is the amount that the truss will bend under load. The deflection of the truss must be limited to prevent damage to the truss and the other structural elements it supports.

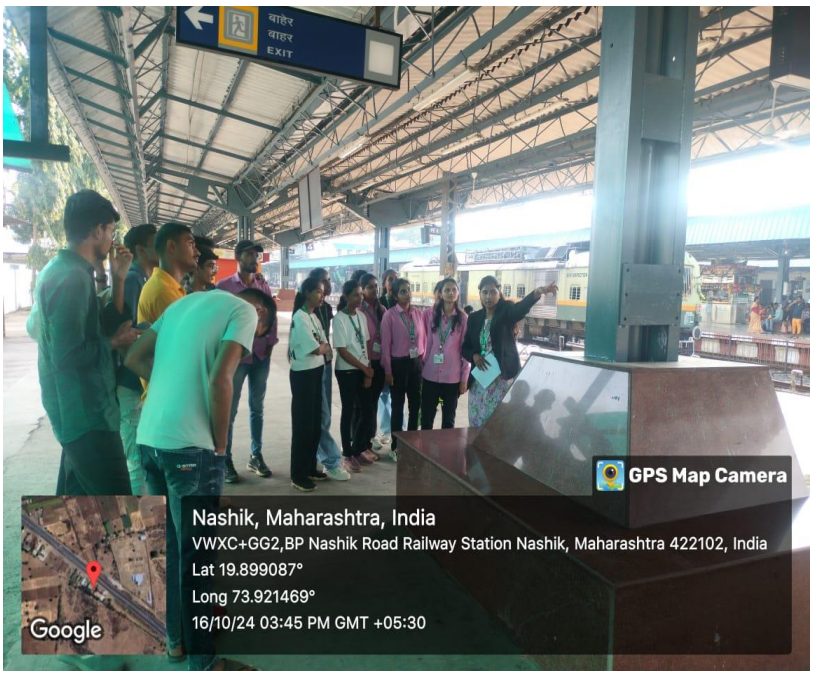

Photo 4: The students learned about the column section and its connection

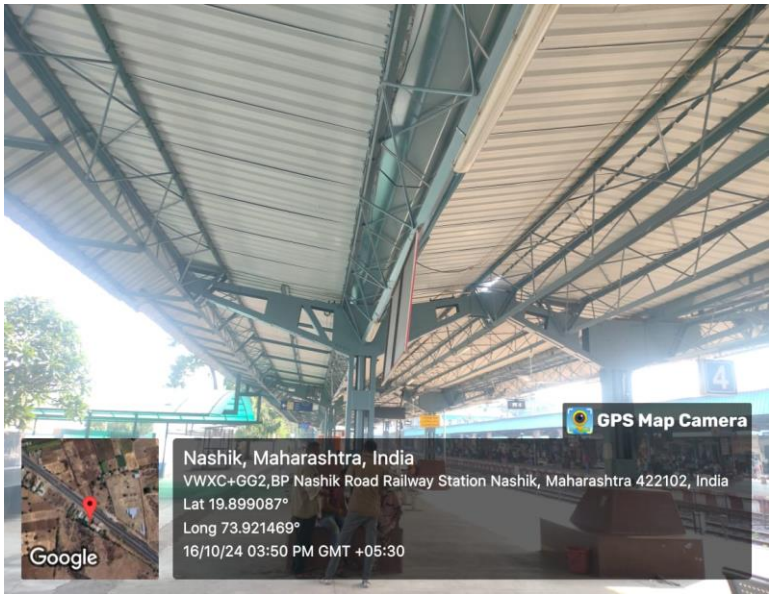

Photo 5: Components of Roof Truss

In addition to the above factors, the following design considerations must also be taken into account:

i. **Material properties:** The type of steel used in the truss will affect its strength, ductility, and resistance to corrosion and fire.
ii. **Fabrication methods:** The methods used to fabricate the truss, such as welding and cutting, can affect its strength and fatigue resistance.
iii. **Connection details:** The way in which the truss members are connected together can also affect its strength and performance.

Here are some additional design considerations for steel roof trusses:

i. **Wind loads:** Roof trusses must be designed to resist wind loads. The engineer must calculate the wind loads that the truss will be subjected to and design the truss to have sufficient strength and stiffness to resist these loads.
ii. **Snow loads:** Roof trusses must also be designed to resist snow loads. The snow loads that the truss will be subjected to will depend on the geographic location of the structure. The engineer must use a snow load map to determine the snow load that the truss must be designed to resist.

iii. **Camber:** Roof trusses are often designed with a slight camber, which is an upward curvature of the top chord. This camber helps to offset the deflection of the truss under load.

❖ TRANSMISSION TOWER

A transmission tower (also electricity pylon, hydro tower, or pylon) is a tall structure, usually a lattice tower made of steel that is used to support an overhead power line. In electrical grids, transmission towers carry high-voltage transmission lines that transport bulk electric power from generating stations to electrical substations, from which electricity is delivered to end consumers; moreover, utility poles are used to support lower-voltage sub-transmission and distribution lines that transport electricity from substations to electricity customers.

There are four categories of transmission towers: (i) the suspension tower, (ii) the dead-end terminal tower, (iii) the tension tower, and (iv) the transposition tower. The heights of transmission towers typically range from 15 to 55 m (49 to 180 ft) although when longer spans are needed, such as for crossing water, taller towers are sometimes used.

Photo 6: Transmission Tower

❖ CONCLUSION

The visit to railway station was a valuable educational experience for the students, bridging the gap between theoretical knowledge and practical application in the field of civil engineering. The visit was very helpful as it improved students knowledge about Steel Structure such as roof truss , truss bridge and transmission tower

Prof. M. Z. Khairnar

Visit Co- ordinator

Prof. T. H. Boraste

HOD

Prof. Dr. B.S. Shirole

Principal