Vidya Vikas Education Trust's
Universal College of Engineering
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The Benchmark

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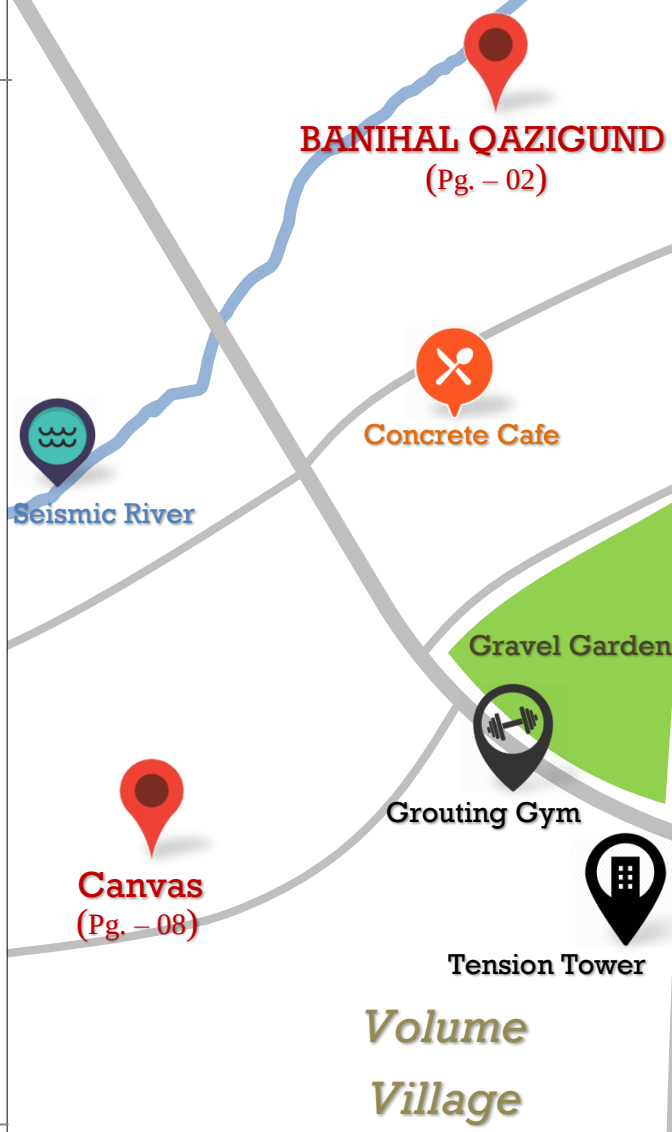

Editor's Desk

we are pleased to present November 2020 edition of benchmark.In this edition you all will find an article on "Banihal Qazigund Road Tunnel". This edition focuses on infrastructural projects and other contribution by faculties of department of civil engineering highlighted in the month of October. It also includes the news bulletin and departmental activities.

Department Vision

To excel in every area of Civil Engineering, inculcate research oriented study to explore hidden talent.
Providing Opportunity to display creativity, out of the box thinking & innovativeness, aimed at providing cutting edge technology for sustainable development.

Department Mission

Providing qualified, motivated faculties to deliver the content using updated teaching methodology, inviting industry experts from various areas to disseminate subject knowledge in Civil Engineering.
Motivating students to undertake the Research Oriented studies, participate in competitions at all levels, grasping new techniques and methods which can be improved on further.
Conducting and participating in seminars, workshops and training programs with a view to make the students industry ready and improve their employability factor for global career ahead.
To create quality professionals capable of planning, designing and analytical skills for better infrastructural development in the field of Civil Engineering.

Banihal Qazigund Road Tunnel

Overview

Banihal Qazigund Road Tunnel is an 8.5 km road tunnel at elevation of 1,790 m in the Pir Panjal range in the Indian Union Territory of Jammu and Kashmir connecting Banihal and Qazigund. It is a double tube tunnel consisting of two parallel tunnels - one for each direction of travel. Each tunnel is 7 m wide and has two lanes of road. The two tunnels are interconnected by a passage every 500 m for maintenance and emergency evacuation. The tunnel will have forced ventilation for extracting smoke and stale air and infusing fresh air. It will have state of the art monitoring and control systems for security. It is expected that vehicles will have to pay a toll to use the tunnel.

Construction of this tunnel started in 2011 along with the project to widen NH 44 (which was known as NH 1A before all the national highways were renumbered in the year 2010) to four lanes. The existing road tunnel below the Banihal pass (Jawahar tunnel), has been a bottleneck on the road due to its elevation of 2,194 m (7,198 ft) and limited traffic capacity.

In 2011, the National Highway Authority of India (NHAI) commissioned construction of two tunnels namely Chenani-Nashri and Qazigund-Banihal along the Srinagar-Jammu National Highway to reduce travel and make it motorable for all seasons. Even as the 10.5 km Chenani-Nashri tunnel was thrown open by the end of 2018, the 8.5 km Qazigund-Banihal is still incomplete.The excavation work inside the tunnel was completed in May 2018 and the NHAI officials had assured the government that its twin tubes would be made operational by January 2019. However the financial issues again delayed the project. “Due to COVID, the work was suspended from March to June,” said the general manager. Even now, they are short of skilled labour. Most of the labourers are non-locals and due to pandemic it’s not conducive for them to travel to J&K.

According to another NHAI official, who spoke on the condition of anonymity, Construction has only been started on the 10km stretch of the Ramban-Banihal, while the remaining 20km stretch has been left out.“The untouched part needs to be realigned again as the construction is getting obstructed by landslides,” the official stated. The soil in the Ramban-Banihal stretch is sedimentary resulting in erosion and falling of debris, he said. “The rocks can fall anytime because of which we are not able to break the tunnel from inside.”

Photos

The new tunnel’s average elevation at 1,790 m is 400 m lower than the existing Jawahar tunnel’s elevation, which would make it less prone to avalanches. When completed, the tunnel would reduce the road distance between Banihal and Qazigund by 16 km (10 mile).

DID YOU KNOW?

The Great Pyramid of Giza is the earliest extant example of civil engineering, and the only one remaining of the Seven Wonders of the World.

To know more about Banihal Qazigund, Scan the QR Code

Page 03: - Structural Considerations for Openings in Composite Floor Decks

Composite floor deck construction has become very popular. It combines structural efficiency with a speed of construction that offers an economical solution for a wide range of building types, including commercial, industrial, or residential buildings. Composite slabs consist of profiled steel decking with an in-situ reinforced concrete topping. The decking not only acts as a permanent formwork to the concrete but also provides sufficient shear bond with the concrete so that, when the concrete has cured, the two materials act together compositely to resist the loads on the deck. Openings in composite floor decks are a common part of any building. These openings can range from small holes for pipes and conduits to larger openings for mechanical ductwork, storm drain pipes, or a group of small holes. These openings allow contractors to install relevant building systems such as heating, ventilation, and plumbing. Openings can have a significant impact on the structural performance of decks. It is essential that all openings are examined by a professional engineer to determine their influence on the deck and whether reinforcement around the opening is needed. This article provides an overview of the various methods of creating small and medium-sized penetrations and their impact on the structural performance of composite decks.

Creating Openings

There are two main methods to create small and medium openings in composite floor decks: core-drilling holes and sleeving or boxing-out openings. Concrete core drilling involves drilling rounded holes in concrete walls or floors. Diamond concrete-core drills are the most commonly used tools for this process. The core drill bit tends to consist of a steel tube with a matrix impregnated with diamond segments welded to the drilling end. The concrete coring bit is mounted on a rotating shaft of a concrete core-drilling machine and is secured to the wall or floor. A solid cylindrical concrete core or “slug” and metal deck under the cured concrete are removed from the hole once the drilling is complete. Due to the possible close spacing of existing floor slab reinforcement, reinforcement could likely be unintentionally cut during this process

Figure 2. Schematic configuration of sleeving and boxing-out openings.

Therefore, the location of the holes and the reinforcement should be coordinated with the structural engineer before coring. A scanner can be used to help locate the existing reinforcement steel to assist in avoiding it during the coring operation. Sleeving or boxing-out is another approach to creating an opening. In this method, the opening is formed by setting sheet metal sleeves in the deck (Figure 2). Alternatively, there are some cast-in firestop systems, including firestop cast-in sleeves, that can improve and simplify the entire installation process and increase the productivity and efficiency of contractors. Check with your local regulations and project requirements on whether it is permissible to cut the deck. The Steel Deck Institute (SDI), Manual of Construction with Steel Deck (SDI-MOC3), provides some examples of decked over floor opening closures, as illustrated in Figure 3.It is highly recommended to leave the steel deck intact until the concrete has cured. However, contractors may cut the opening through the steel deck before the concrete is poured; they see this as a more straightforward installation with less labor, allowing immediate access to the openings before the concrete is poured. However, cutting out the slab before the concrete is cured can prevent the deck from properly acting as a form. The steel deck must be examined by a professional engineer to determine if additional steel elements or temporary shoring are needed.

“One has to watch out for engineers – they begin with the sewing machine and end up with the atomic bomb.”
-Marcel Pagnol

Composite floors consist of a concrete topping cast onto a metal deck. The topping can be light-weight or normal-weight concrete. The steel deck is a cold-formed corrugated steel sheet that spans between steel joists or beams and serves a dual purpose. It serves as a form during the construction phase while the concrete is poured and cured and serves as reinforcement to act compositely with the concrete to support the floor loads. Therefore, there are two main structural functions to be considered for the design of composite decks; (a) design the steel deck as a form to support construction loads, and (b) design the composite slab for superimposed floor loads after the concrete hardens. However, the design of the steel deck to serve as a form is usually more critical than the design of the composite floor to sup-port superimposed floor loads. The steel deck profile and thickness need to be chosen such that the unshored span of the steel deck can support the construction loads. As a formwork during concreting, the steel deck should be designed to resist anticipated construction loads. This design must meet the minimum design loads specified in the American National Standards Institute's and the Steel Deck Institute's Standard for Composite Steel Floor Deck-Slabs, ANSI/SDI C-2017. It also must evaluate three separate load combinations: (a) the dead weight of concrete and steel deck plus a 20 pound per square foot (psf) uniform construction live load, (b) the dead weight of concrete and steel deck plus a 150 pounds (lb.) concentrated load per foot width of the deck and (c) the dead weight of steel deck plus not less than 50 pounds per square foot (psf) uniform construction live load. The engineer should also check the deflection of the deck at the construction stage to limit excessive deflections, which can lead to ponding of the concrete. Ponding can cause unintended dead load on the structure. After the concrete is poured and cured, the deck acts compositely with the concrete to resist superimposed loads. Composite action is obtained by the shear bond between the concrete and the deck. The design of composite steel deck-slab systems reflect the engineering concepts used to design reinforced concrete beams.

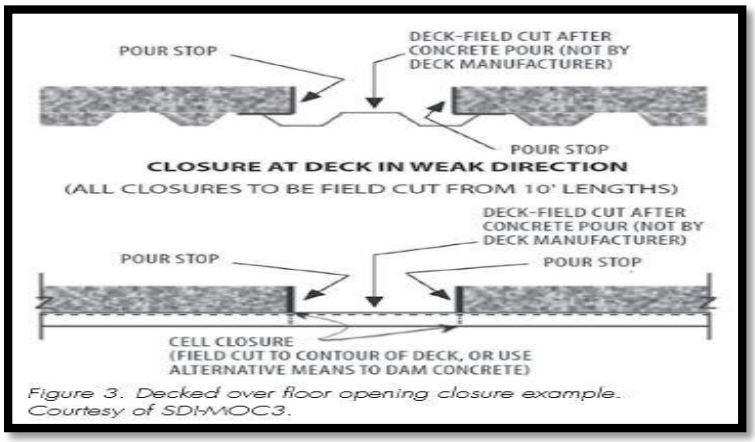

Figure 3. Decked over floor opening closure example. Courtesy of SDI-MOC3.

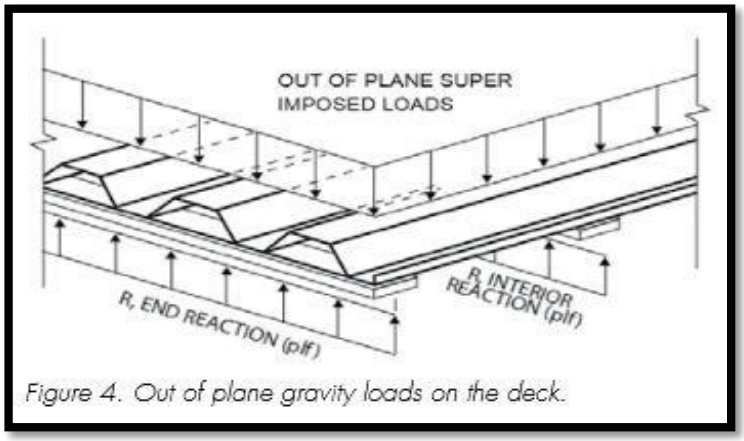

Figure 4. Out of plane gravity loads on the deck.

The concrete acts as the compression material and the steel deck bonded to the bottom of the concrete acts as the tension reinforcing steel. The bending capacity of the composite steel deck must be sufficient to resist out of plane gravity loads on the deck, which are typically superimposed dead and live loads in addition to the concrete and deck self-weight (Figure 4).Composite decking is also used as a horizontal shear diaphragm to stabilize the building and to transfer in-plane shear loads (such as wind and seismic forces) to the building's main frame lateral resistance system (Figure 5, page 10). For this purpose, the composite deck shear diaphragm is modeled as a horizontal beam with interconnected floor deck units that act as the beam web. Intermediate joists or beams function as web stiffeners, and the perimeter beams act as the beam flanges. A detailed design guide can be found in the Steel Deck Institute's (SDI) Diaphragm Design Manual, Edition 4 (SDI-DDM04). Due to the complexity of the design procedures of composite floor decks, deck manufacturers usually provide tables summarizing permissible loads, section properties, maximum unshored spans, superimposed loads, and diaphragm shear loads. However, these tables consider the deck as a solid uniform platform with no openings or penetrations. Since openings can impact the deck performance, the engineer must independently examine the penetrations and their effects on deflection, bending, and shear strength of the deck to determine if reinforcement for the deck is needed.

Scratch Your Head!!

1) **There are 20 different socks, of two types, in a drawer in a completely dark room. What is the minimum number of socks you should grab to ensure you have a matching pair?**

A.10 **B.12**
C. 11 **D. 13**

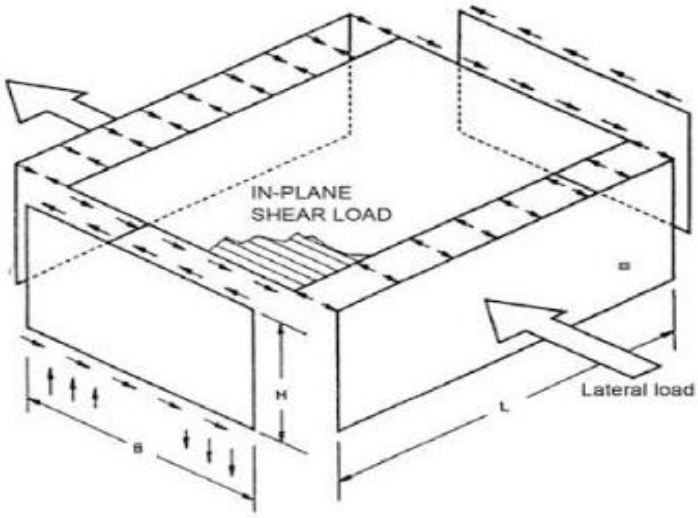

Figure 5. In-plane shear loads on the deck.

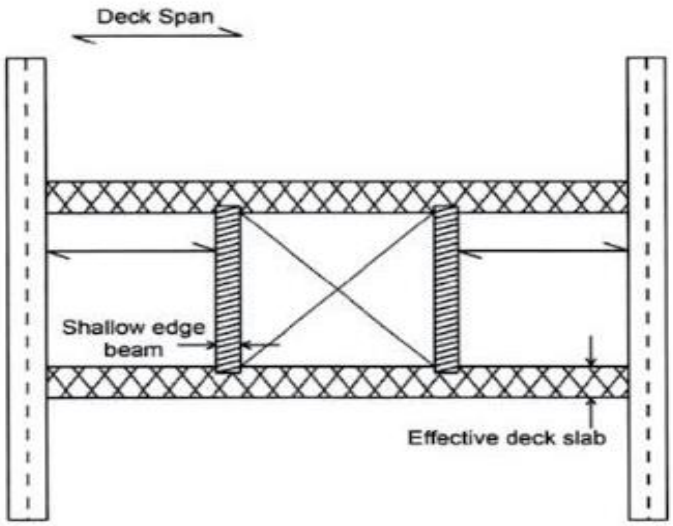

Figure 6. Unsupported opening model for small or medium openings. Courtesy of SDI-FDDM.

Structural Considerations

The size of openings in the deck may be categorized as small openings (up to 12 inches), medium openings (1 foot to 4 feet), and large openings (over 4 feet). Per the SDI Floor Deck Design Manual (FDDM), large openings should be designed to have all deck bearing edges supported by structural framing. Openings that are of medium or small size may be accommodated with-out structural frames. It is highly recommended that the deck not be removed from the opening before the concrete is cured. Additionally, non-compliance could lead to potential safety issues. Check with your local regulations and project requirements on whether it is permissible to cut the deck. Cutting the deck before the concrete is poured and cured reduces the flexural capacity of the deck and can induce excessive deflection. This can lead to concrete ponding during construction. An associated increase of the dead load on the deck may result from additional concrete poured to provide a level floor elevation. Also, cutting the web of the steel deck before the concrete is poured can reduce the steel deck's vertical shear capacity locally around the opening and may result in deck web crippling under concentrated loads such as the weight of people or equipment on the deck during construction.

SDI-FDDM provides a method for the design of the small or medium openings in composite steel decks. In this method, the concrete above the top of the deck along the opening's edges, perpendicular to the ribs, is assumed to act as a shallow beam, as illustrated in Figure 6. This beam can be designed as a reinforced beam or as a structural plain concrete beam to carry the sum of the dead weight of the deck-slab plus the superimposed design loads. The end reaction from this shallow beam must be supported as a point load on the composite deck-slab adjacent to the opening. Note that closely-spaced openings may need to be treated as a medium or large opening. When the group of small or medium openings runs perpendicular to the span of the deck, the width of the hole should be considered to be the overall length along the string unless there is adequate deck remaining between the holes. However, when the groups of openings run parallel to the bearing direction of the deck, the width of the opening can be considered as the width of a single hole (Figure 7).

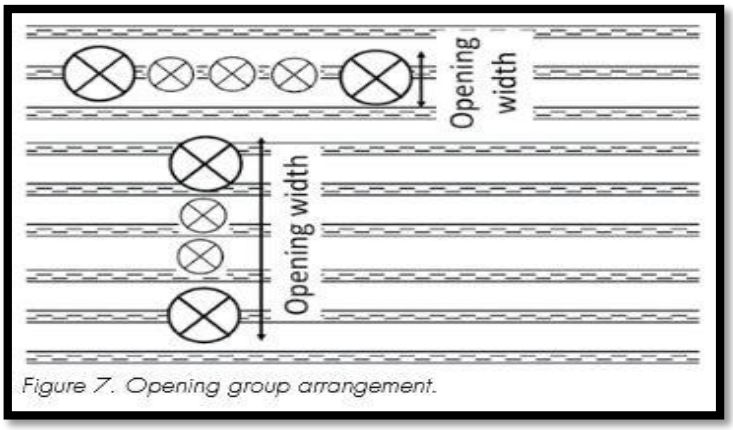

Figure 7. Opening group arrangement.

-Mr. Sujit Tare
Asst. Professor UCoE

DID YOU KNOW?

The world's quietest room is located at Microsoft's headquarters in Washington state.

News Bulletin

➢ L&T wins its biggest order of ₹25,000 crore for bullet train project

Larsen & Toubro (L&T) has won its single biggest order of ₹ 25,000 crore from the National High-Speed Rail Corporation to execute a portion of the Mumbai-Ahmedabad bullet train project. The tender covers nearly 47% of the total 508-km-long corridor and the entire section falls in Gujarat. L&T has been mandated to complete the project in four years.

➢ Railways launch initiative for focused action on women passengers

Indian Railways has launched 'Meri Saheli' initiative to provide security to female passengers travelling by trains for their entire journey. Under this, a team of women RPF personnel will brief female passengers at starting stations about precautions undertaken and ask them to dial 182 if problem arises. Team will collect only female's seat numbers and convey them to stoppages en-route.

➢ India adds less than 50,000 new COVID-19 cases for 5 straight days

India added less than 50,000 fresh COVID-19 infections for five straight days while the active cases dropped below 6 lakh. The country recorded 48,648 new cases in 24 hours, taking the total tally to 80.88 lakh, according to Health Ministry's 8 am update on Friday i.e. 30 October 2020. Recoveries increased by 57,386 to reach 73,73,375.

❖ Webinar attended by Faculties in oct 2020

Sr. No.	Date	Name of the Faculty	Webinar/ Seminar
1	12/10/2020 to 17/10/2020	Ms. Shilpa Patil	Digital Teaching Techniques (ICT Academy)
2	12/10/2020 to 17/10/2020	Mr.Yuvraj Chavda	Digital Teaching Techniques (ICT Academy)
3	18/10/2020	Mrs. Mitali Poojari	Creating Student Profile with Google doc. (COUSERA guided project)
4	19/10/2020	Mrs. Mitali Poojari	Spreadsheets for Beginners using Google Sheets (COUSERA guided project)
5	19/10/2020	Mrs. Mitali Poojari	Engaging & Assessing students using Plickers (COUSERA guided project)
6	19/10/2020 to 20/10/2020	Mr. Sachin Pawar	FDP on "Engineering Pedagogy in Post Covid-19 Paradigm" sponsored by TEQIP-III
7	20/10/2020	Mrs. Mitali Poojari	Work smarter, not Harder : Time management for personal & proffesional productivity. (COUSERA guided project)
8	23/10/2020	Mrs. Mitali Poojari	Excel Skills for Business: Essentials (COUSERA guided project)

Scratch Your Head!!

2) Which of the following has more fire resisting characteristics?

A. Marble **B. Lime stone**
C. Compact sand stone **D. Granite**

WORLD HABITAT DAY

An event on "**WORLD HABITAT DAY"** was organised by IEI Belapur and was hosted by ACES (Association of Civil Engineering Students) UCOE on 5th October 2020 which was held on Google Meet. Guest speaker Colonel Sanjay Adsar along with Mr. Keshav K.Varkhedkar, Dr.Mohan B.Dagaonkar, Dr. Samir C Nimkar and Dr. Jitendra Patil were present.

Our event commenced with a host Mr. Rohan Talekar,giving an introduction on World Habitat Day, its significance and the motto behind its celebration. WORLD HABITAT DAY is celebrated every year on the first Monday of October and the purpose behind the event was to focus on the explanation of the state of human settlements and on the basic right of all to adequate shelter. It also aimed to remind people that they are responsible for the habitat of future generations. Campus director of Universal College of Engineering Dr. Jitendra Patil gave a short welcome speech and spoke a little on world habitat day and also thanked IEI and ACES for organizing event and the participants for participating in session.

Dr. Patil was followed by Guest speaker of the day Dr. Mohan B. Dagaonkar who is a council member of IEI. He gave the students a brief introduction on IEI. He mentioned that IEI was established in the year 1920 at Madras. There are total 125 centres including local centre of Belapur. The objective of the IEI is to promote the general enhancement of engineering and engineering science for the implementation of their ideas in India. It also facilitates the exchange of information among the members and person attached to the institution in India and also at an international level. IEI organizes many events such as workshops, seminars etc. Lastly Dr. Mohan B. Dagaonkar concluded his speech by informing the students that by becoming an IEI member they will have access to a huge platform to share their knowledge and research to the world and also have the opportunity to enhance own skills.

Mr. Keshav K Varkhedkar who is the Chairperson of IEI (BLC). He introduced the audience with the topic "**HOUSING FOR ALL".** He said that urbanization plays an important role for the economic growth of the country Sensex of 2011 says that urban population was 377 million in which 32% have residence and 68% does not have residence. Successive governments planned many housing schemes but they could not implement. He also told the reason why we don't have adequate houses because majority of people don't have basic communities such as drinking water, electricity etc. In 2015 PM launched "PM **AWAS YOJNA" which** helped many engineers implement their ideas in a apt manner.He further added that there has been an increase in housing infrastructure due to this scheme. This yojna focuses on the scheme to provide residence to maximum people and reduce the shortage of houses. Also the private players (contractors,builders) who concentrated on the higher middle and the middle class is now concentrating on the lower class and the EBC. Lastly he concluded his speech by saying that the determinant approach by all concerned authorities including the private players focus on innovation and sustainable technology which gives durable housing all specifications and reduces the completion period of construction.

After the Varkdedkar sir's speech we had our Guest Lecturer of the evening Col Sanjay Adsar whose topic was "**MITIGATING THE HOUSING SHORTAGE THROUGH PRECAST CONSTRUCTION"**. He explained the importance of precast construction. He also added that the Government of India has accepted that it is the best method to reduce the shortage of houses and also answered the question as to why we choose precast. The pros of precast such as it assures quality, removes shuttering and formwork and also reduces the dependence of workmanship were told. He also explained content of precast through a presentation and displayed a documentary video on construction and joining of prefab components. With this he ended his lecture and participants asked to share their queries which were then answered by him in an elaborate manner.

Lastly the event was concluded by a vote of thanks by Mrs. Mitali Poojari to the speakers for sharing their expertise with the participants and specially thanked the keynote speaker colonel Sanjay Adsar. She expressed her gratitude to Dr Samir Nimkar for being bridge between IEI and ACES. She also thanked our Campus Director Dr Jitendra Patil for his ever supporting role to the ACES. She also thanked our HOD Rajesh Dubey and ACES advisor Mr Asir Khan for aiding ACES to make their events successful. And last but not the least she thanked students from Different colleges for their active participation. We ended our event by asking the students to fill the feedback form.

The event on WORLD HABITAT DAY was a successful endeavour and participants from different engineering colleges were present for the event. It was an interactive session where students cleared their doubts. The students got to learn a lot from the collected expertise of the speakers about housing and precast construction which was very helpful for students.

"Scientists investigate that which already is; Engineers create that which has never been."

- Albert Einstein

CANVAS

-Ms.Shweta Bhadekar
B.E. CIVIL

-Ms.Shweta Bhadekar
B.E. CIVIL

Upcoming Events

Believe in yourself as you get ready for the exams. If you believe in yourself, nothing can hinder you from achieving success. All the best for your exams.Don't stress yourself.

Arm yourself with the can-do spirit and you shall pass this exam with flying colors. Good luck for your Internal Assessment Test- 2 (IAT-2).

Delightful Laddoos, Incandescent Diyas, Whole lot of Smiles and Laughter, A big stock of Masti, Lots of Mithai, Innumerable Fireworks. People all around the country are eagerly waiting for this day as it symbolises the victory of light over darkness and good over the evil.

May this Diwali Light up New Dreams, Fresh Hopes, Undiscovered Avenues, Different Perspectives, Everything Bright & Beautiful, And Fill Your Days with Pleasant Surprises & Moments. Happy Diwali

ANSWERS to "Scratch Your Head"
1) 11 2) Compact sand stone