



Vidya Vikas Education Trust's

# Universal College of Engineering

Gujarati Linguistic Minority Institution

Approved by AICTE, DTE, Maharashtra State Government and Affiliated to Mumbai University  
Accredited with "B+" Grade by NAAC



## The Benchmark

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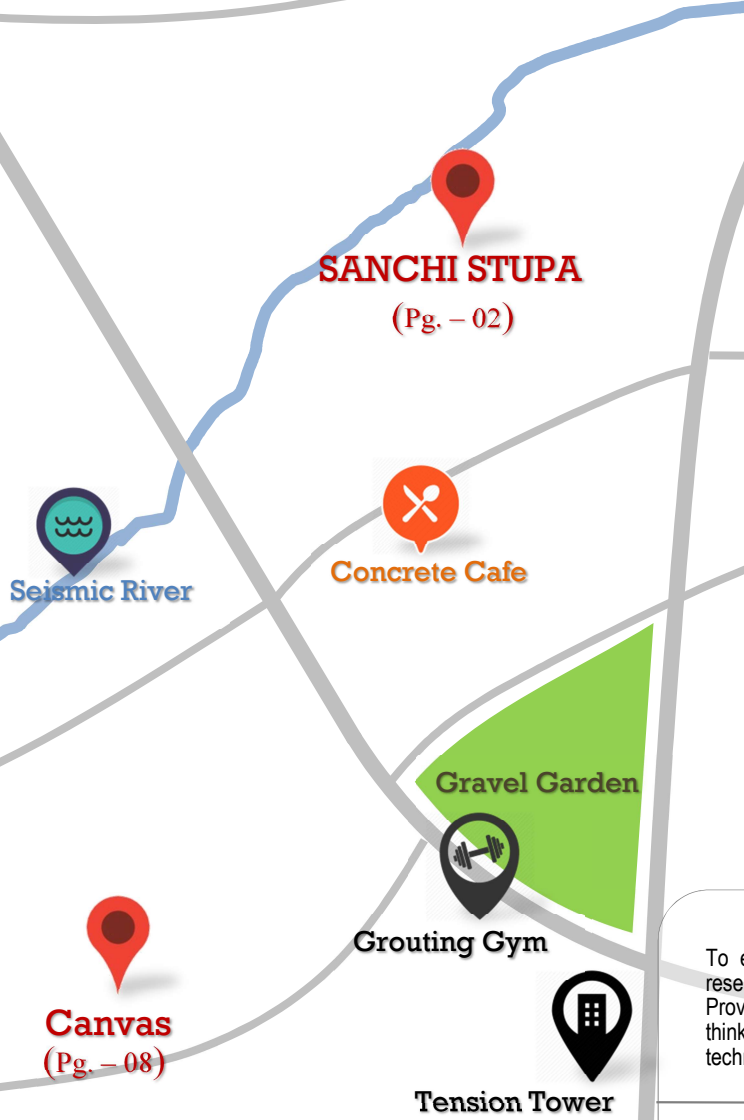
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The Great Stupa at Sanchi, Eastern Gateway.

#### 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.

#### Editor's Desk

We are pleased to present 'September 2020' edition of Benchmark. In this edition you all will find an article on "Sanchi Stupa". This edition focuses on Infrastructural Structures and design components. Other contribution by Faculties of Department of Civil Engineering highlighted in the month of August. One such highlight includes the Installation of new ACES body along with Independence Day celebration.

# Sanchi Stupa

## Overview

Sanchi Stupa is a Buddhist complex, famous for its Great Stupa on a hilltop at Sanchi Tower in Raisen District of the Madhya Pradesh state, India. It is located 46 km north-east of Bhopal, i.e. the capital of Madhya Pradesh.

The Great Stupa of Sanchi is one of the oldest stone structures in India and an important monument of Indian Architecture. It was originally commissioned by the emperor Ashoka in the 3<sup>rd</sup> century BCE. Its nucleus was a simple hemispherical brick structure built over the relics of Buddha. It was crowned by the chhatra, a parasol-like structure symbolizing high rank, which was intended to honor and shelter the relics. The original construction work of this stupa was overseen by Ashoka. Sanchi was the birth place of Ashok's wife as well as the place of their wedding. The Sanchi Stupa was built during Mauryan period was made of bricks. The composite flourished until the 11<sup>th</sup> century.

The original Stupa only had about half the diameter of today's stupa, which is the result of enlargement by the Sungas. It was covered in brick which now contrast to the stones used now to cover it. The sandstone out of which the pillar is carved came from the quarries of Chunar several hundred miles away, implying that the builders were able to transport a block of stone over forty feet in length and weighing almost as many tons over such a distance. They probably used water transport.

The monuments at Sanchi today comprise a series of Buddhist Monuments starting from the Maurya Empire period continuing with the Gupta Empire period and ending around the 12<sup>th</sup> century. It is probably the best-preserved group of Buddhist monuments in India.

Simultaneously, various temple structures were also built, down to the Gupta Empire period and later. Altogether, Sanchi encompasses most of the evolutions of ancient Indian Architecture and ancient Buddhist Architecture in India, from the early stages of Buddhism and its first artistic expression, to the decline of the religion in the subcontinent.

Sanchi, especially stupa no.1, has a large number of Brahmi inscriptions. Although most of them are small and mention donations, they are of great historical significance. James Prinsep in 1837, noted that most of them ended with the same two Brahmi characters. Prinsep took them as "Danam" (donation), which permitted the decipherment of the Brahmi script.

An analysis of the donation records shows that while a large fraction of the donors were local, a number of them were from Ujjain, Vidisha, etc. Three inscriptions are known as Yavana donors at Sanchi, the clearest of which reads "Setapathiyasa yonasa danam", Setapatha being an uncertain city.

## Photos



The Great Stupa (Stupa No.1), started in the 3<sup>rd</sup> century BCE

*Sanchi is the center of a religion with a number of stupas, all within a few miles of Sanchi, including Satdhara now in the new Vihara. Bhojpur (also known as Morel Khurd) and Andher as well as Sonari. Further south, about 100 km away, is Saru Maru. Bharhut is 300 km to northeast.*



Plan of the monuments of the hill of Sanchi, numbered 1 to 50.

## DID YOU KNOW?

*Santa Claus was given an official pilot's license in 1927.*

*When Santa Claus makes his trip around the world on Christmas Eve, you can rest assured that he's legally allowed to drive his sleigh—at least in the United States. In 1927, the jolly man in the red suit was given a pilot's license from the Assistant Secretary of Commerce for Aeronautics William P. MacCracken.*

*To know more about Sanchi Stupa, Scan the QR Code*



## ***Page 03: - Industry Institute Interaction Activities***

The Department of Civil Engineering under Industry Institute Interaction (III) cell in a view to create employable and readily absorbable aspirants for the Industries have connected and collaborated with Industry personnel from various domains of Civil Engineering. Department has altogether conducted V sessions for Three different courses till date and the VI session is scheduled on 5<sup>th</sup> September 2020.

III is a result of a series of meetings and discussions carried out in the past seven months. The first meeting was carried in the month of February 2020, which was held with Industry representative Mr. Nikhil Sanghvi CEO at Shanghvi and Associates Consultants Pvt. Ltd and Mr. Girish Dravid, Director at Sterling Engineering Consultancy Services Pvt. Ltd. It was decided to involve Principals and Senior faculties from University of Mumbai and the succeeding meeting was scheduled in the month of April 2020. The causes of latest Knowledge gaps between Industries and Institute Curriculum were discussed.

These Series of meetings were further continued on the Online Platform during the lockdown. As suggested by Industry personal, the course on Revit Structures was planned and all the students from Universal college of Engineering were invited. Students of Batch V of Civil Department were assigned with task work and the course was concluded after successful completion of assigned work by a small group of Eight students approximately.

In continuation, a seminar was conducted by Mr. Shantilal Jain, Structural Design Engineer at Struct Bombay Consultants arranged by Industry representatives for the students of Civil Engineering on “Future Prospects of Graduate Engineers post-COVID 19’ where more than 150 students attended this session. A software training session was then arranged by Industry Representative on Building Information Modelling for all the Final year students in the year 2019-20 of University of Mumbai. The course on BIM was completed by 13 students after successful registration and completion of all the sessions.

The Department of Civil Engineering join forces with Industry personal to start the courses on Real time practices (on-field) by online mode and the same was accepted by the Industry representatives. The syllabus suggested by the Industry representatives for “Structural Engineering Practice” was formally put up in the shape of VI courses (one course per semester) so as to start with 3<sup>rd</sup> Semester and end it by the 8<sup>th</sup> semester. But Later as per discussion with Industry representatives Mr. Nikhil Sanghvi and Mr. Girish Dravid on 20<sup>th</sup> July 2020, it was decided to immediately start the course for the third year. It was also decided that the Former content will be delivered in such a way that original Six Semester content will be delivered in four Semesters.

Department of Civil Engineering conducted meeting with all the Parents and Students of the third year Engineering. The Idea of Industry Institute Interaction and course on “Structural Engineering Practice” with all the development till then was informed to the students on 22<sup>nd</sup> July 2020. Around 82 students of the third year had shown their consent for the same. The Parents meet of those interested students was addressed by Dr. Jitendra Patil, Mr. Rajesh Dubey, and Mr. Asir Khan along with all the faculties of the Civil Engineering Department. Parents were requested to supervise and motivate their students while they are attending online sessions for the Industry Institute Interaction. Further, Mr. Girish Dravid and Mr. Nikhil Sanghvi suggested the Department for involving final year students for the course “Structural Engineering Practice”. The Civil Engineering Department decided to conduct the course after incorporating the meeting with Students of Final year 2020-21 and their Parents by 30<sup>th</sup> July 2020.

On Progress of “Structural Engineering Practice” course and connecting good response. Mr. Nikhil Sanghavi suggested to initiate a similar course on “Concrete technology practices” and “Formwork design”.

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*“If I had nine hours to chop down a tree, I’d spend the first six sharpening my axe.”  
- Abraham Lincoln*



The table shows a summarized activities table.

Month	Description
February	First meeting with Mr. Nikhil Sanghavi and Mr. Girish Dravid
April	Meeting with Principals and senior faculties along with Industry representatives
May	Course on Revit Structures (Online) free
June	Seminar on future Prospects of Engineers
June	Course on BIM (paid)
July	Designing of Structural Syllabus
August	Starting course on Structural Engineering Practices
August	Starting Course on Concrete Technology Practices
August	Starting the course on Formwork Design Practices

## *News Bulletin*

### ❖ **Final Year Exams Latest News Today: Mumbai University to Conduct Tests Online in MCQ Format**

The University of Mumbai has decided to conduct the exam for 50 marks, for which the students will be given an hour. The paper will be in Multiple Choice Questions (MCQ) format and only part of the syllabus taught until March 13 will be asked. Besides, the practical and viva examinations will also be conducted online.

The Practical, Project, Viva-Voce for Final year students' exams will start from 15<sup>th</sup> Sept 2020 through Online Platform (Zoom App., Google Meet, Skype). Backlog theory papers for final-year students will be conducted in between 25<sup>th</sup> -30<sup>th</sup> September 2020 and Regular theory papers likely to be held between 1<sup>st</sup> and 17<sup>th</sup> October

No provision for Revaluation after the declaration of result, as the pattern of Examination is Multiple choice Questions.



### ❖ **Himalayan day 2020**

Himalaya Diwas is an initiative that was started in 2010 by a group of noted environmentalists and activists including Sunder Lal Bahuguna, Anil Joshi and Radha Behan to spread the message that solutions for sustainable development and ecological stability for the Himalayas must be as unique as the Himalayan ecosystem itself. Though, the whole hearted support of Shri. Ramesh Pokhriyal Nishank, Minister of Education has been the greatest driving force behind the same. Himalayas since ages has been source of life supporting resources.

The Climate change is one of the biggest threats facing the Himalayan ecosystems, the major challenges facing the Himalayas are increasing population, rampant urbanization, unchecked deforestation, melting of glaciers, construction of roads, establishment of hydroelectric projects etc. This year Himalaya Divas is being celebrated at National level. 9th September, 2020 at 3:00 pm has been earmarked for celebration of 11th Himalaya Divas to bring stakeholder including Government, environmentalists, scientists, politicians, faith leaders etc. to sensitize people about the importance of the subject and to discover how everyone can support in this initiative. The chief guest of the event is our Honorable Vice President of India - Shri M. Venkaiah Naidu. This initiative has been organized under the guidance of our Honorable Minister of Education - Shri Ramesh Pokhriyal

#### *Scratch Your Head!!*

1) *Fathometer is used to measure.*

A. *Rainfall*

B. *Ocean Depth*

C. *Sound Intensity*

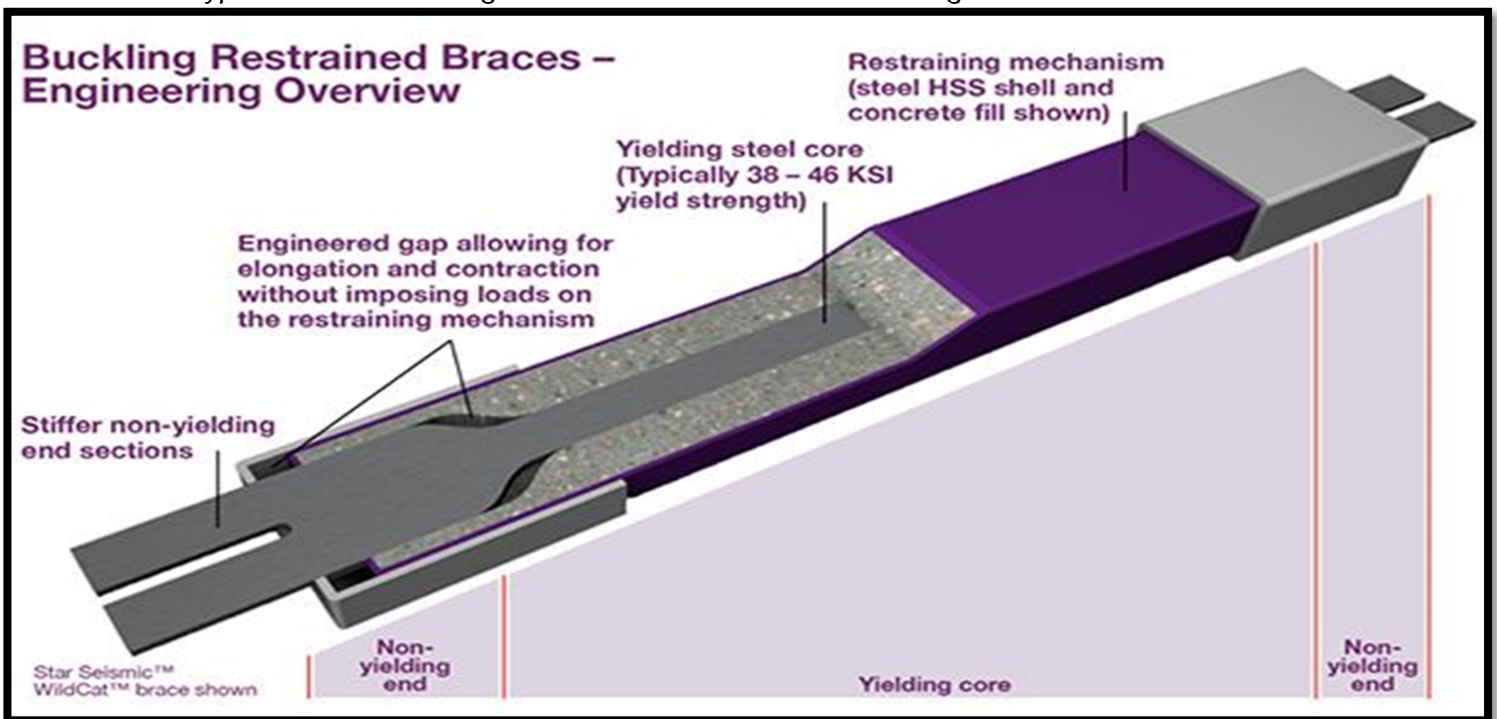
D. *Earthquakes*



# Page 05: -Buckling Restrained Braces

Lateral displacements on structural buildings have been of great concerns for engineers. In order to minimize the effect of earthquake and wind forces, special diagonal members, called braces, have been used successfully. However, these members when subjected to compressive forces exhibit buckling deformation and show unsymmetrical hysteretic behavior in tension and compression. If buckling of steel brace is restrained and the same strength is ensured both in tension and compression, the energy absorption of the brace will be markedly increased and the hysteretic property will be simplified. These requirements motivate researchers and engineers to develop a new type of brace, the buckling-restrained brace (BRB). The concept of the BRB is simple, restraining the buckling of the brace so that the brace exhibits the same behavior in both tension and compression.

The main characteristic of a BRB is its ability to yield both in compression and tension without buckling. A BRB is able to yield in compression because it is detailed and fabricated such that its two main components perform distinct tasks while remaining de-coupled. The load resisting component of a BRB, the steel core, is restrained against overall buckling by the stability component or restraining mechanism, the outer casing filled with concrete. The typical view of Buckling Restrained Brace is as shown in fig. below.



Bonding of the steel core to the concrete is not allowed to ensure that the BRB components remain separate and composite action not allowed to takes place. The BRB brace is placed in a concentric braced frame and becomes a buckling-restrained braced frame (BRBF) system. The braces are typically used for structures where seismic activity may be encountered, regardless of whether wind or seismic loads govern the design of the structure. Thus the core in Buckling-Restrained Braces can undergo considerable yielding, under both tension and compression, and absorb considerable energy, unlike conventional bracing as in fig. below.

Testing performed on BRBs has suggested that BRBs may be capable of withstanding multiple seismic events without failure or loss of strength. Though the construction of the BRB appears to be simple, poor design of a BRB can result in casing buckling, connection failure, and poor BRB performance, so it is important to incorporate only fully tested products manufactured at facilities with personnel who are trained in BRB manufacturing and incorporate rigorous quality procedures.

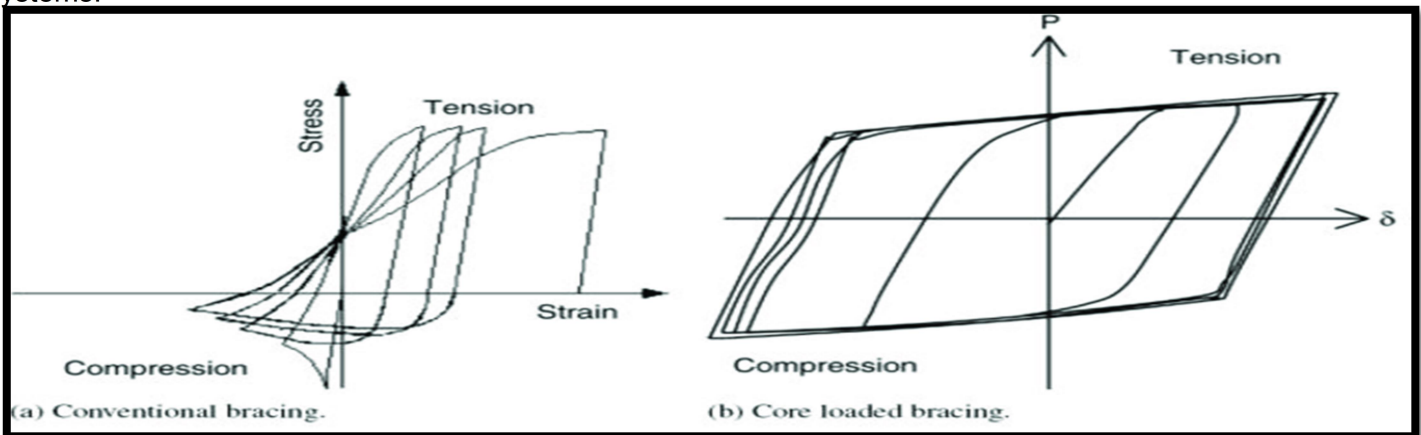
The rapid expansion of the use of the BRB in all types of projects has occurred due to the clear cost savings of the overall system and the simplicity of design and erection. Many cost studies have been performed comparing BRBF frames to Eccentrically Braced Frames (EBF) and ductile Concentrically Braced Frames (CBF). The majority of the savings found was due to the smaller, simpler gusset plates, but there were also significant savings on beams, columns, and foundations.

The concept of buckling-restrained braces was introduced about thirty years ago in Japan by Nippon Steel Corporation. The idea behind a buckling-restrained brace is to fabricate a structural element that is able to work in a stable manner when subjected to compressive deformations. Because, braces are normally able to behave in a stable manner when subjected to tensile forces, a buckling-restrained brace is capable of dissipating large amounts of energy in the presence of multiple yield reversals.

### Advantages of BRB

Comparative studies as well as completed construction projects confirm the advantages of Buckling Restrained Braced Frame (BRBF) system. BRBF can be superior to other common dissipative structures with global respect to cost efficiency due to the following reasons:

- Superior ductile and energy dissipative behavior.
- Low seismic loads (due to high behavior factor and usually increased fundamental period).
- Larger efficient plan area of the building, which also increases the real estate value.
- Larger efficient plan area of the building, which also increases the real estate value.
- It yields in both tension and compression.
- It is easy to adopt in seismic retrofiting.
- Braces can be designed for controlled strength and stiffness.
- BRBs are lightweight, compact elements which can be designed and detailed with a variety of end connection configurations (pinned, welded, bolted).
- Damage in a seismic event is concentrated in the BRB element.
- The BRB element can if necessary be replaced after a major seismic event.
- Depending on the configuration used, BRBF's can give lower foundation loads than comparable shear wall Systems.



### Need of Buckling restrained brace

Based on many research studies, it is proven that in high seismic zones common RCC buildings are failed to perform up to the desired life span of the structure. To get rid over this problem, bracing system is now a day looks better option. It not only stabilizes the structure but also gives more stiffness to it.

This modified brace called Buckling-restrained brace have much more advantages over conventional braces, such as it is very cost effective, higher stiffness value, low maintenance, easily replaceable, and many more. Keeping these points into consideration, this research work leads to study of behavior of BRB frame structure with commercial software ETABS v2015.

From the comparative study between the buildings with and without buckling restrained braces and from the analysis of results of various parameters, it can be concluded that in the seismic events the Buckling restrained brace building shows better performance over the building with conventional bracing. BRB reduces the story forces in the building which provides the stability of the building. Hence the use of BRB is considered safer than the conventional bracing in the building

-Mr. Nikhil Sontakke  
Asst. Professor UCoE

### DID YOU KNOW?

*The first self-proclaimed civil engineer was John Smeaton who constructed the Eddy stone Lighthouse.*



# Page 07: - Departmental Activities

## INDEPENDENCE DAY CELEBRATION AND INSTALLATION OF ASSOCIATION OF CIVIL ENGINEERING STUDENTS (ACES) BODY

Installation ceremony, conducted virtually for the Department of Civil Engineering on the Independence Day i.e. 15<sup>th</sup> August 2020 which was hosted by Mr. Asir Khan, Faculty in charge of Institute of Engineers, India (IEI); student chapter and Association of Civil Engineering.

Mr. Asir Khan introduced himself and welcomed Dr, Jitendra Patil, Campus Director of Universal College of Engineering, Mr. Rajesh Dubey Head of Department of Civil Engineering and a Guest Speaker, Mr. Rishi Zoting who is an active volunteer of art of living and an entrepreneur. He is currently pursuing his B-Tech in Aerospace engineering from Indian Institute of Technology, Bombay.

Mr. Rishi Zoting started his interactive session on Study Sutras. The Study Sutras included were ----- 1) Learning, 2) Group study, 3) Mind Mapping, 4) Breaks, 5) Sticky Notes, 6) Revisit. He gave a detailed information about all the Sutras and also told how to apply them while studying. The Sutras introduced by him will be very effective for the students while studying and help them score good marks.

Further, Mr. Asir Khan gave a brief information about ACES including the work they have done till date. Further, Dr. Jitendra Patil spoke a few words and also appreciated Mr. Rishi Zoting for inspiring the students. He concluded by saying stay safe, stay healthy and follow SMS (S- sanitize, M- mask, S- social distancing).

Mr. Pranav Tawale, General Secretary of ACES for the year 2019-20 gave a brief information about the activities carried out by ACES in the previous academic year. He also shared his experience working in ACES.

Mrs. Mitali Poojary, Assistant professor highlighted the process of selection of new ACES body and started to announce the new team. She announced the Social Media Head, Public Relation Officer, Marketing Head and Hospitality Head. Mr. Sagar Butle, Assistant professor announced Discipline Head, Creative Head, Editorial Head and Documentation Head. Mr. Shreyans Dodia Assistant professor announced the Technical Head, Treasurer, Joint General Secretary, and the General Secretary.

Mr. Rahul Patil was selected as the General Secretary for the Academic year 2020-2021. He spoke a few words and expressed his happiness and Gratitude.

The installation ceremony commenced by a vote of thanks given by Mr. Asir Khan.

### THE 6 STUDY SUTRAS

1 LEARNING

2 GROUP STUDY

3 MIND MAPPING

4 BREAKS

5 STICKY NOTES

6 REVISIT

### *Scratch Your Head!!*

2) If you had a ton of feathers and a ton of stones which would be heavier?

- A. Feathers      B. Stones  
C. Both          D. Neither

*"Engineers like to solve problems. If there are no problems handily available, they will create their own problem."*

*-Scott Adams*



गणपती बाप्पा मोरया पुढच्या वर्षी लवकर या. प्रत्येक वर्षी गणपती बाप्पा येतात आणि निघून जातात. बाप्पण बदल आपल्याला भरपूर काही माहिती आहे. त्याला मोदक खायला आवडते. दुर्वा आवडतात. आणि अशा अनेक गोष्टी. पण आपण कधी हा प्रश्न नाही विचारला की हे सर्व का आवडते. काय कारण असेल. आज खरी गरज आहे हे कारण जाणून घेण्याची. त्यामागचा दृष्टीकोन समजण्याची. तर सर्वात पहिले कारण म्हणजे गणेशाला मोदक का बरे आवडतात. तर सर्वात पहिले कारण म्हणजे मोदक फारच स्वादिष्ट असतात आणि दुसरं म्हणजे ते आरोग्यास उत्तम. त्यात असलेले नारळ अन्नपचन क्रिया सुरळीत ठेवते. परत मेटाबोलिसम वाढविण्यासाठी मदत करते. शरीरात असलेल्या जिवाणूंची लढण्यास मदत करते. त्यात असलेले गुळ हे ताप सर्दी असे आजार नष्ट करतात. सर्वात महत्त्वाचे म्हणजे ते वाफेवर शिजवलेले असल्याने त्यात ९०% anti oxident शिल्लक राहतात. जे शरीरातील जीवन सत्व वाढवतात. जसे की जीवनसत्त्व ब, क आणि फोस्फेरस आणि झिंक.

दुसरी आणि महत्त्वाची गोष्ट म्हणजे मुर्ती घरात का आणली जाते आणि विसर्जन का करावे? आधीचा काळात मूर्ती विशिष्ट प्रकारच्या मातीने किंवा हळद ने बनवली जायची.

खरं तर गणपतीच्या मुर्ती ने संपूर्ण वातावरण शुद्ध व पवित्र होते. एखाद्या गावातील नदीतील पाणी शुद्ध व भरपूर प्रमाणात असेल तर गावातील लोक आनंदाने जगू शकतात. तेवढेच नाही तर आपल्या सर्व मानवजातीचे कल्याण पाण्यावर अवलंबून असते. गणपती बनवताना जी माती वापरली जाते ती विशिष्ट प्रकारची माती जेव्हा पाण्यात विसर्जित केली जाते ती पाण्यात तळाशी जाऊन बसते. सोबत त्याही कणांना घेऊन जाते जे पाण्याबरोबर वाहत असतात. त्यामुळे सगळा गाळ खाली बसतो आणि शुद्ध पाणी वाहू लागते. त्याचप्रमाणे हळद जिचा आपण भरपूर प्रमाणात वापर करतो. ती तर एक प्रकारचे औषध म्हणून ओळखले जाते. हळद पाण्यातील सर्व प्रकारचे जंतू नष्ट करते. म्हणूनच गणपती विसर्जन केले जाते. कुणी तरी महान व्यक्तीने म्हटले आहे की देव आपल्याशी अनेक गोष्टींमधून बोलत असतो. गणपती बाप्पाला बुद्धीचे दैवत मानले जाते. कारण आत्ताच सिद्ध झाले आहे की हत्ती हा फार हुशार प्राणी आहे. माणसाच्या बुद्धीत ८६ बिलियन न्युरोन्स असतात. तर हत्तीच्या बुद्धीत २५० बिलियन पेक्षा जास्त न्युरोन असतात. हे सिद्ध जरी आत्ता झाले असेल परंतु परिणाम मात्र पहिल्या पासून दिसतात.

अशा अनेक गोष्टी आहेत ज्याचा विचार करणं आवश्यक आहे आणि केलाही पाहिजे. परंतु आज आपण कसे गणेशोत्सव साजरे करीत आहोत. खरंच त्यात काही अर्थच उरला नाही. त्याउलट असे वाटते की जणू स्पर्धाच लागली असावी. कोणाचा गणपती मोठा? कुठे कोणता अभिनेता आला? कोणी किती छान मुर्ती सजवली? कुठे किती जास्त सोनं जमा झालय? त्यात विसर्जन करताना होणारा ट्राफिक जाम. लाऊड स्पीकर चे मोठाले आवाज. कधी विचार केला काय आपण की माणूस एवढा स्वार्थी बनेल. निसर्गाकडून घेतलेली वस्तू निसर्गाला पुन्हा परत करावीच लागते. पण आपण मात्र फक्त घेणारेच बनलो. देणार्याला देणेच विसरलो.

-Ms. Suvarna Jadhav

## Upcoming Events

**Let's join with ACES to Celebrate Teachers Day & Engineers Day: -**

**"Let us remember: One book, one pen, one child, and one teacher can change the world." - Malala Yousafzai**



**On this Teachers day lets inculcate few events for teachers and appreciate their efforts on 5th September 2020.**

ANSWERS to "Scratch Your Head"

1) Ocean Depth 2) Neither

**This Engineers day let us celebrate Innovation and Creativity of the "Hard working and upcoming**



**Engineers" on 15th September 2020.**