



# Gandhinagar Institute of Technology

A Report on

“Innovation in Concrete Construction”

Sponsored by GUJCOST and DST

(6 -7 November, 2020)

## Objective:

The objective of the webinar was to share the new developments in the field of concrete and to enhance the knowledge of students in the area of Construction Industry. It was also aimed to understand the design standards of Indian standard code and to inculcate its practical uses in Construction Projects.

## About Webinar:

The understanding and practice of technicalities involved in civil engineering construction & effective use of innovative material like cement concrete plays a vital role in building a well-planned and sustainable society. Also, there is continuous upgradation that is happening in civil engineering material. Civil engineering students during their classroom academic courses have a very limited exposure regarding these constructions’ practices & innovative material. This two-day webinar will be discussing the innovation in concrete technology with the development of new trends. It will also aim to understand the design standards of Indian Standard Code, sustainable concrete, advance construction materials. The program will provide a valued platform for the industry specialists and academicians from institutes to exchange and explore the latest views on technological developments in the field of Concrete Technology. This webinar has provided theoretical & practical knowledge regarding this subject. Total 55 participants from different colleges & consultancies like Bataan Peninsula State University, BVM, Dr. D Y Patil Institute of technology Pimpri, Gujarat Technological University, L.D.R.P, MOUN CONSULTANTS, S.R. Patel University, Mehsana and many more. We at GIT, i.e. department of civil engineering realized the need & urgency of the topic well before. However due to pandemic situation it could not materialized. But with the initiative of the Director & Head of the department this event was finally conducted successfully. The presentations were very informative and enlightened the participants, the topics covered during the online session were Introduction to Concrete Technology, Characterization and microstructure properties of concrete materials, Utilization of Industrial waste in Sustainable Concrete, Modern Tendency in Concrete Technology, Concrete Technology- Mix design (New Code) & Latest Development for sustainable Construction in India. The attendees have actively participated, appreciated and their feedback was collected at the end of each session and E-certificates were provided to all participants. To our surprise in the first attempt of organizing such kind of webinar we received overwhelming response across the country. At the end of webinar students raised several queries and expert answered their all questions satisfactorily. The webinar was successfully concluded with a formal vote of thanks to all the participants and the dignitaries present during the webinar.

A leader is one who knows the way, goes the way, and shows the way. It was the dedication and enthusiasm of the coordinators Prof. Sumedha Mahajan and Prof. Sandip Kapadiya who have successfully coordinated the whole webinar under the patronage of Dr. H N Shah, Director. Above and beyond, let’s not forget the backbone of this event convener Prof. Neel Shah (HOD, CL), Prof. Madhuri R. Chopade (GIT, IQAC) and departmental faculties. Prof. Manisha Parmar & Prof. Pooja Patanwal has well moderated the overall program. GIT is highly obliged with GUJCOST and DST Sponsors of this entire two-day webinar. The event got enlighten with knowledge of experts Dr.

Bhavin G. Buddhdev (Assistant Professor, Applied Mechanics Department, VGEC), Dr. Jayeshkumar R. Pitroda (Associate Professor, Civil Engineering Department, BVM Anand), Dr. Piyushkumar J. Patel (Professor & HOD, Civil Engineering Department, V.S Institute Kadi) & Dr. L. R. Manjunatha (Associate Vice President, JSW Cement Limited). The entire event was not possible without support of honorable trustees and management of Gandhinagar Institute of Technology.

### **Day-1 (06/11/2020)**

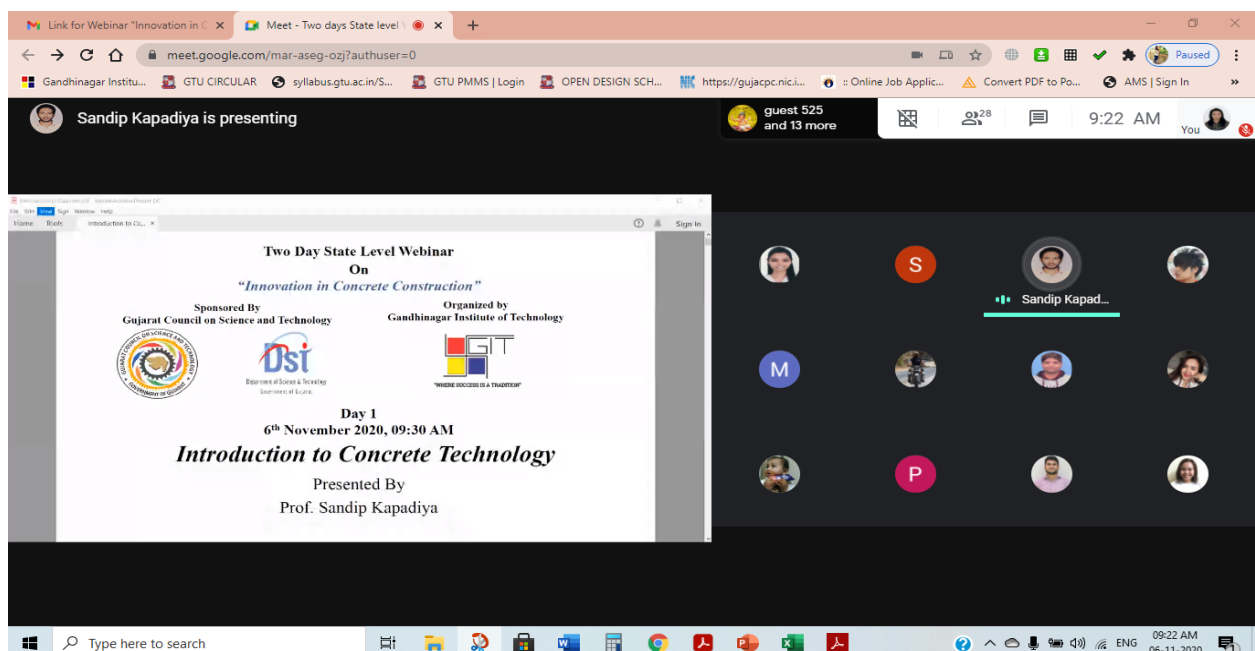
**Time (09:00 am to 03:45 pm)**

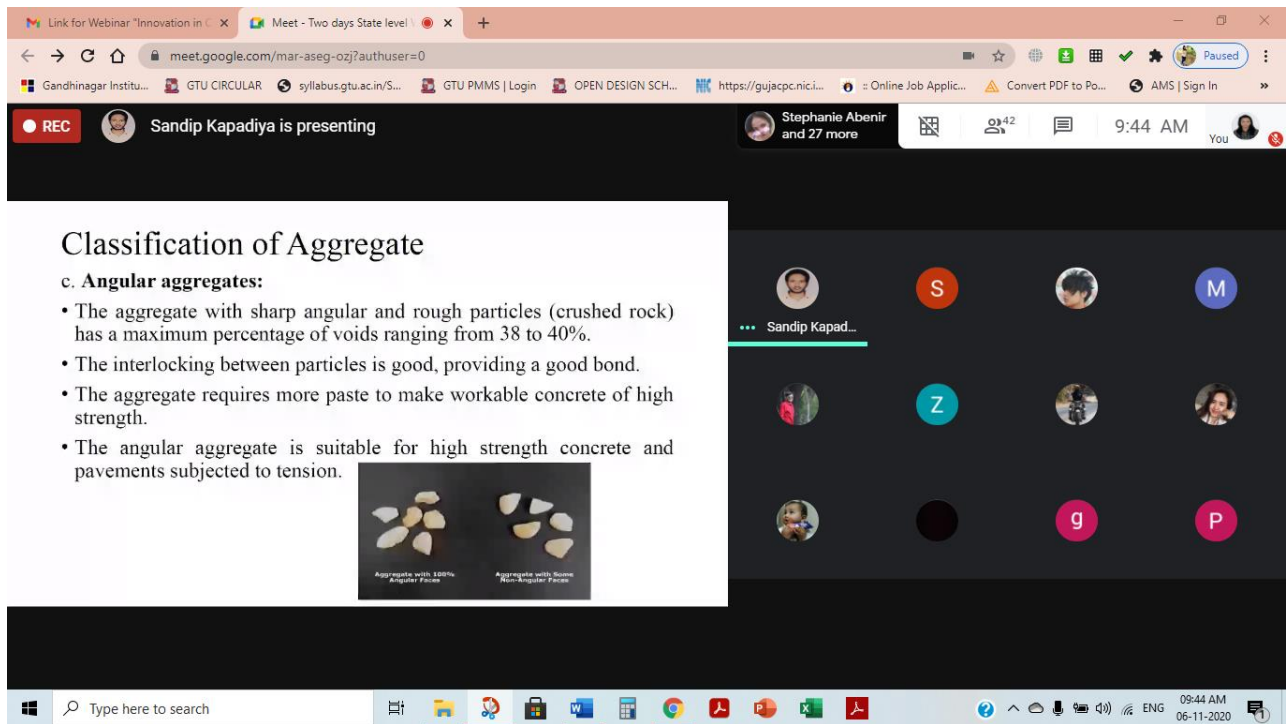
Webinar started with the introductory speech by Prof. Manisha Parmar, Assistant Professor, Gandhinagar Institute of Technology. She welcomed all the dignitaries & participants. Prof. Neel Shah, HOD CL briefed the participants about Concrete construction and different types of admixture use in concrete technology, which helps to improve properties and strength of concrete. Despite his busy schedule, Director Dr. H N Shah passed his message to encourage active participation in the webinar. This webinar will be discussing the innovation in concrete technology with the development of new trends. It will also aim to understand the design standards of Indian Standard Code, sustainable concrete, advance construction materials & different properties of concrete materials using industrial waste.

**Speaker 1: Prof. Sandip V. Kapadiya (Assistant Professor, Civil Engineering Department, Gandhinagar Institute of Technology)**

**Time: 9:30 am to 10:30 am**

Prof. S. V. Kapadiya has more than 7 years of experience in teaching and is currently pursuing his Ph.D. from SVNIT Surat. His area of Interest is Seismic Analysis, Dynamic Analysis, and Computer Aided Software Programs for Analysis and Design. He has published 1 national and 2 International paper. He is Life Member of Indian Society for Technical Education (ISTE). He is presently working as Assistant Professor of Civil Engineering Technology at Gandhinagar Institute of Technology. Starting with introduction, he briefed about Concrete Martials and its types. Then he introduced the different properties of Cement, sand and aggregates. He also talked about what are the different grades of concrete and how grades are used in structural elements. He also explained various ingredients of concrete and taught us how to get experimental data of materials. At last he concluded the session with the type of materials use in concrete technology satisfying BIS criteria.



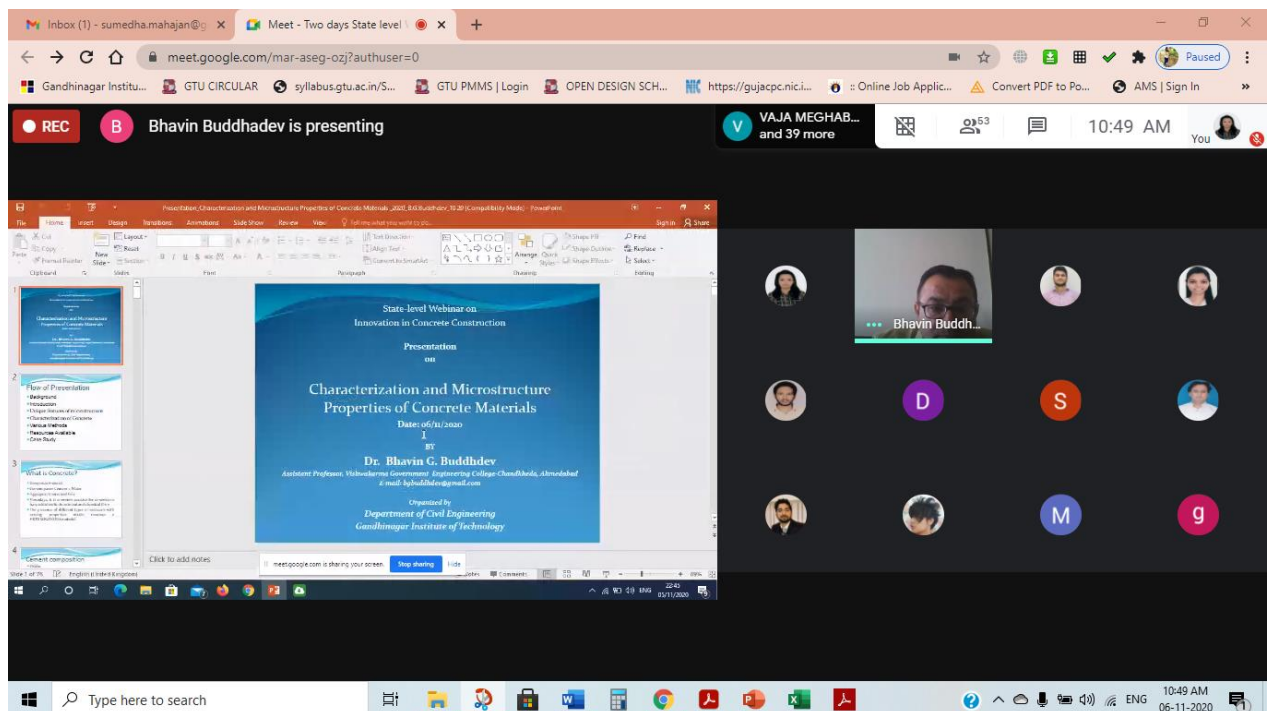


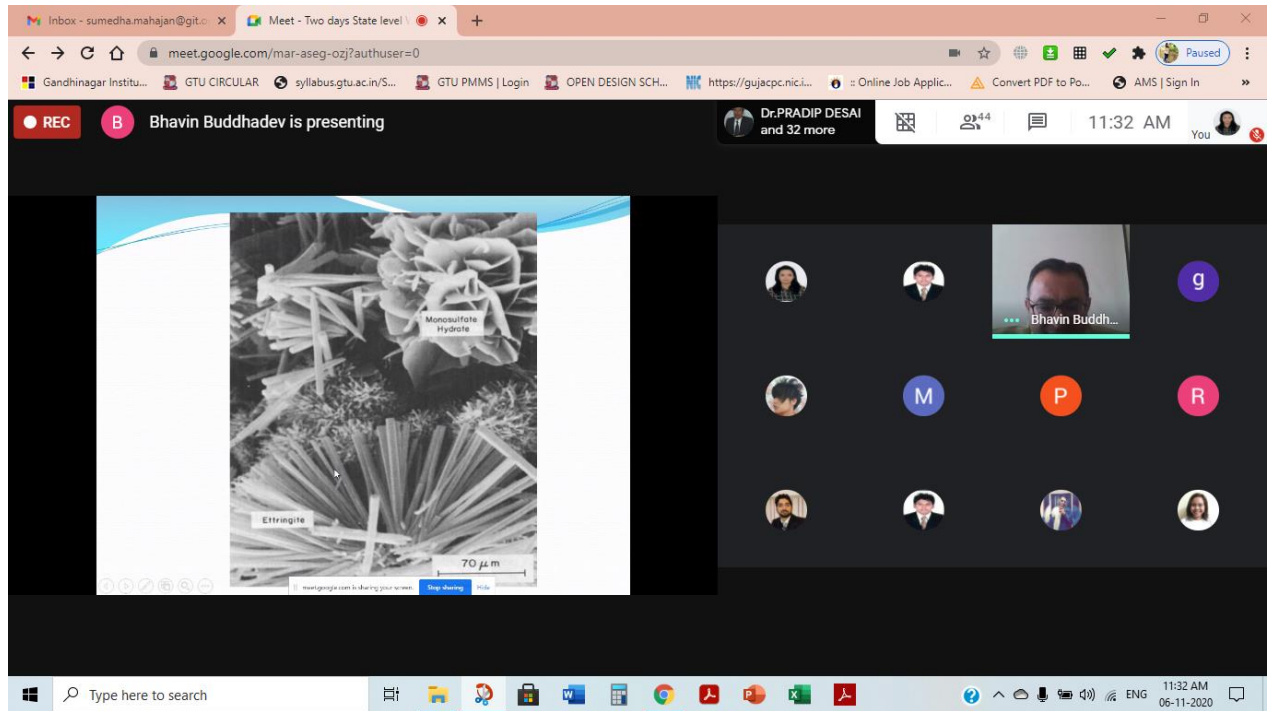
### Introduction to Concrete Technology Presentation

**Speaker 2: Dr. Bhavin G. Buddhdev (Assistant Professor, Applied Mechanics Department, VGEC)**

**Time: 10:30 am to 12:30 pm**

Dr. B. G. Buddhdev has more than 20 years of academic experience & around 2 years of experience in industry. He has published more than 15 papers in national and international journal. He is a lifetime member with Indian Society for Technical Education (ISTE), Institute of Engineers, India (IE), Life Member, and Indian Geotechnical Society (IGS). He is presently working as Assistant Professor, Applied Mechanics department at V.G.E.C, Chandkheda.





### Characterization and Microstructure Properties of Concrete Materials Presentation

Dr. Bhavin G. Buddhdev discussed about Characterization and Microstructure Properties of Concrete Materials. He briefed about Microstructure, its unique features and Microstructure of the Aggregate Phase. He also briefed importance of characterization of concrete. The unique features of the concrete microstructure are the interfacial transition zone, which represents a small region next to the particles of coarse aggregate. ITZ is generally weaker than either of the two main components of concrete. He also made us understand the different characterization of concrete like cement, cement replacements and admixtures, mix proportions types of deterioration. He also discussed the various method of characterization of concrete like Calorimetry, X-Ray diffraction, Thermal Analysis, Optical microscopy, scanning electron microscopy, Transmission electron microscopy, Scanning tunneling microscopy, Scanning probe microscopy, Infrared microscopy, Atomic Absorption Spectroscopy. At last he concluded with experimental study of the microstructural examination consists of preparation of concrete specimen mix with BFS of grade M40 and converted cylindrical specimen into slices and the crushed BFS to utilized as full replacement of fine aggregate (sand) in concrete production and cured the prepared specimen of concrete for 365 days of curing before it was prepared for examination.

**Speaker 3: Dr. Jayeshkumar R. Pitroda (Associate Professor, Civil Engineering Department, BVM Anand)**

**Time: 1:00 pm to 3:00 pm**

Dr. J. R. Pitroda has more than 11 years of academic experience & around 10 years of experience in Industrial Projects. He is a lifetime member with Indian Society for Technical Education (ISTE), Institute of Engineers India, Kolkata (IE), and Institute of Valuers (IOV). He has published 127 research papers in International journals, and presented 03 papers in different conferences and workshops at National & International level. He has guided more than 60 students in post-graduation and 5 students are pursuing PhD under his guidance. He also published 5 books. He has also been awarded for Academic Excellence Development work during 2015-16 by BVM. He is presently working as Associate Professor, Associate Dean-Infrastructure & PG Coordinator in Construction Engineering & Management at Birla Vishwakarma Mahavidyalaya, Anand.

Inbox (2) - sumedha.mahajan@gtu... Meet - Two days State level... Day 1 Feedback Form Session... | meet.google.com/mar-aseg-ozj?authuser=0

**REC** Jayesh Pitroda is presenting

Two days State level Webinar ...

People (23) Chat

Add people Host controls

Sumedha Mahajan (You)  
Amit Singh  
DARSHILKUMAR JAIN  
DHAGIA NANDIK  
dixit patel  
Dr.PRADIP DESAI  
Engr. Daha Shehu

Utilization of Industrial Waste in Sustainable Concrete

THINK BIG THINK DIFFERENT

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**REC** Jayesh Pitroda is presenting

Two days State level Webinar ...

People (22) Chat

Jayesh Pitroda (Presentation)  
Jairish Salun  
Jyesh Varia  
Ajil Kapatel  
Karan Parmar  
Krystal Dawn De gazman  
MAHESHWARI MAHUR  
Manisha Parmar  
GUM PURAN

EXPERIMENTAL MATERIALS & SOURCES

- OPC 53 Grade Cement
- Fly Ash Class "F" - Power plant of Muncie Products (A division of Nayel Industrial Ltd) located near Kulkarni in Ahmedabad District in Gujarat State.
- Hypo Sludge - J. K. Paper mill Pvt. Ltd. plant. This plant is located near Sanghvi in Tapi District in Gujarat State.
- Coarse aggregate - Locally available 20mm down size IS-385-1962.
- Fine aggregate - Natural River Sand Locally available Zone II IS-385-1962.
- Glass Fibre - KDM Glass Fibre, Ankleshwar, Bharuch District in Gujarat State.

Comparison of Cost of Concrete in m<sup>3</sup> of Various Mix of Fly Ash + Hypo Sludge + Glass Fibre in M20 Grade Concrete

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Two days State level Webinar ...

People (30) Chat

Add people Host controls

Sumedha Mahajan (You)  
AGAM DOSHI  
Amit Singh  
Cristine Alrie Bartolo  
DHAGIA NANDIK  
dixit patel  
Engr. Daha Shehu

Excel spreadsheet showing material properties and calculations for concrete.

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Utilization of Industrial waste in Sustainable Concrete Presentation

Dr. Jayeshkumar R. Pitroda discussed about the Utilization of Industrial waste in Sustainable Concrete. The transportation infrastructure system is one of the main investments every modern society must make for their economic and social development. To bring Rural Regions of India on the main stream of social and economic activities, and also to increase the livelihood opportunities, there is a great need for developing road infrastructure for growth and improvement of quality of life in rural India. In India, for Rural Road development will require huge quantities of pavement construction materials. It would be economical to use industrial wastes in the construction of low-volume roads in rigid pavement construction. A large quantity of waste material is dumped at land filling site which if investigated properly can be utilized in road construction sector. The utilization of these industrial waste materials can be an economical and eco-friendly alternative in nearby areas. For rural road construction, India is having one of the largest road networks of around 60 Lakh km, consists of National Highways, Expressways, State Highways, Major District Roads, Other District Roads and Village Roads with following length distribution.

## Day - 2 (07/11/2020)

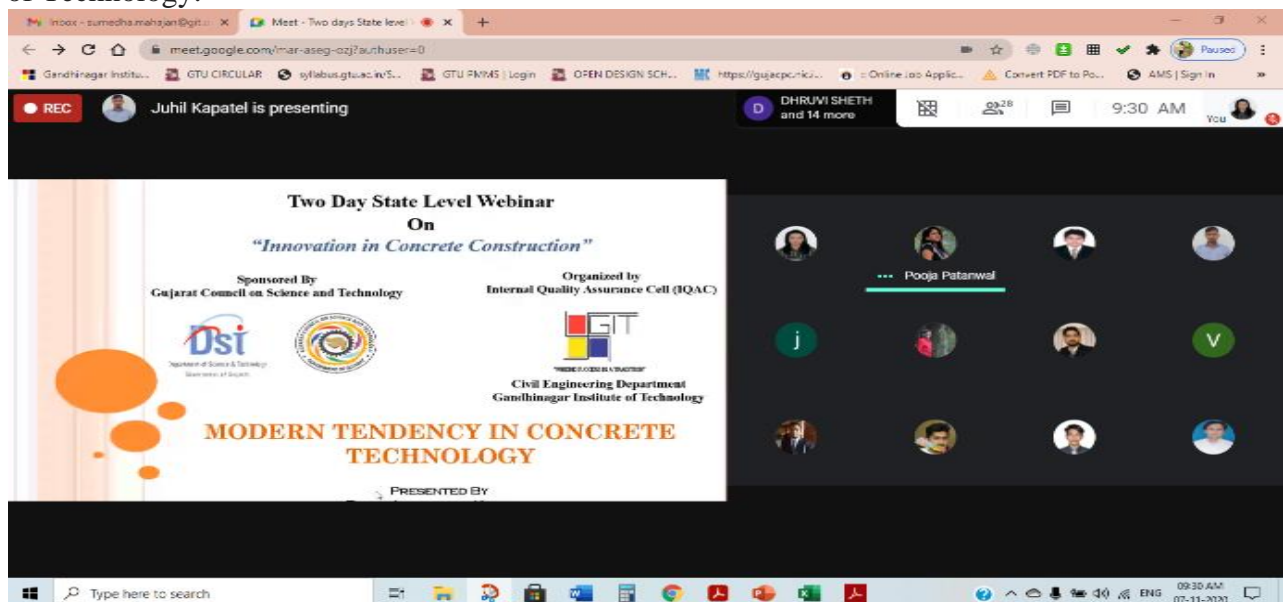
### Time (09:30 am to 3:30 pm)

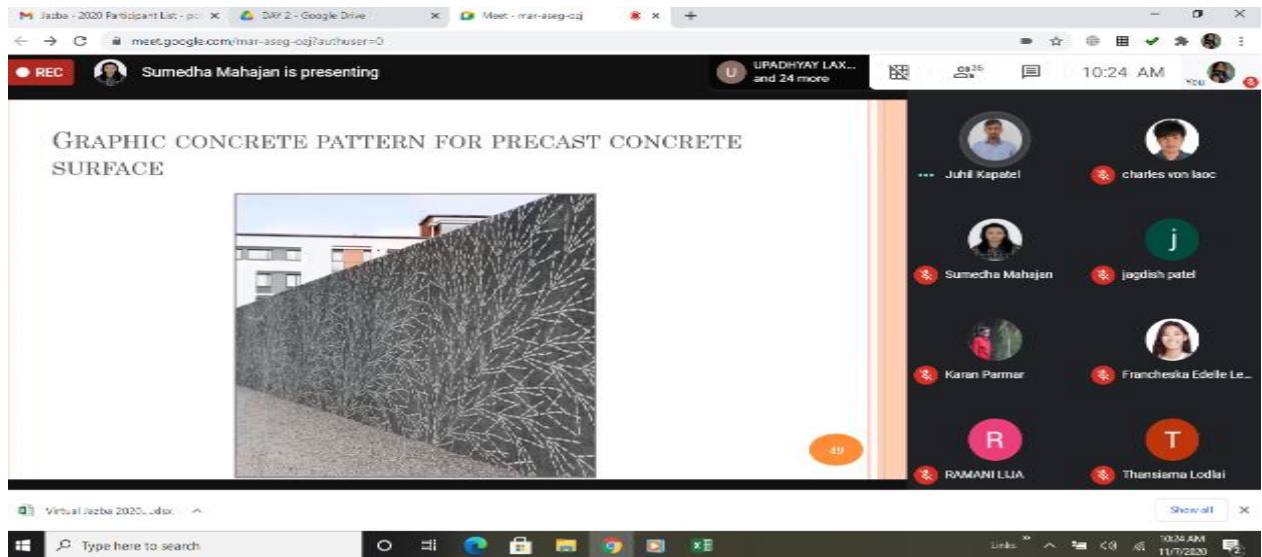
The second day of webinar commenced by introductory speech of Prof. Pooja Patanwal, Assistant Professor, Gandhinagar Institute of Technology. She welcomed all the experts of the day and briefly introduced them. This session covered the latest trends used in the construction industry. Feedbacks and Questionaries sessions were also shared with the participants. At last the webinar was concluded by Prof. Neel K. Shah, HOD CL, giving the vote of thanks to all the experts & participants, Director, sponsors, organizing committee and all staff members who made this event a grand success.

### Speaker 1: Prof. Juhil D. Kapatel (Assistant Professor, Civil Engineering Department, Gandhinagar Institute of Technology)

#### Time: 9:30 am to 10:30 am

Prof. J. D. Kapatel has more than 5 years of experience in teaching and around 1-year experience in Design of all types Residential, Commercial, Institutional, Industrial and High-rises Buildings. His areas of interest are Concrete Technology, Structure Analysis, Earthquake Resistance Structure, Design of Reinforced Concrete Structures and Steel Structures as well as Static and Dynamic analysis on different types of structures. He has published 1 paper in International Journals. He is a lifetime member with SEFI and NICEE. He has guided more than 20 students in under-graduation. He is presently working as Assistant Professor of Civil Engineering Technology at Gandhinagar Institute of Technology.





### Modern Tendency in Concrete Technology Presentation

Starting with introduction, he briefed about environmental pollution and green house emission due to use of concrete in construction. Then he introduced different types of emerging trends in concrete technology. At last he briefed latest technology used in concrete which reduces the environmental pollution for sustainable development & concluded with how to use latest technology in concrete construction.

### Speaker 2: Dr. Piyushkumar J. Patel (Professor & HOD, Civil Engineering Department, V.S Institute Kadi)

**Time: 10:30 am to 12:30 pm**

Dr. P. J. Patel has more than 18 years of experience in teaching, around 8.6 years of experience in Industrial Projects. He is also associated with Indian Society for Technical Education (ISTE) & Indian Concrete Institute (ICI) group. He has published 24 research papers in national and International journals, and presented 13 papers in different conferences and workshops at National & International level. He also organized more than 17 training programs & conducted expert talks to motivate students & faculty members at national & institute level. He has also guided 6 students for pursuing their Ph.D. He is presently working as Professor, Head of Civil Engineering Technology at Vidush Somany Institute of Technology & Research, Kadi.



Step - 2 : Water – Cement Ratio :  
 (IS 10262 : 2009, Clause 4.1., Page -2)

- Maximum water-cement ratio: 0.45 (Data Given)
- From Table 5 of Is 456 -2000, page – 20 = 0.45

Sr. No	Exposure	Plain Concrete			Reinforcement Concrete		
		Minimum Cement Content kg /m <sup>3</sup>	Maximum Free Water - Cement Ratio	Minimum Grade of Concrete	Minimum Cement Content kg /m <sup>3</sup>	Maximum Free Water - Cement Ratio	Minimum Grade of Concrete
i	Mild	220	0.60	--	300	0.55	M 20
ii	MoVerate	240	0.60	M 15	300	0.50	M 25
iii	Servere	250	0.50	M 20	320	0.45	M 30
iv	Very Servere	260	0.45	M 20	340	0.45	M 35
v	Extreme	280	0.40	M 25	360	0.40	M 40

Based on experience adopt water cement ratio as : NIL

### Concrete Mix Design Presentation

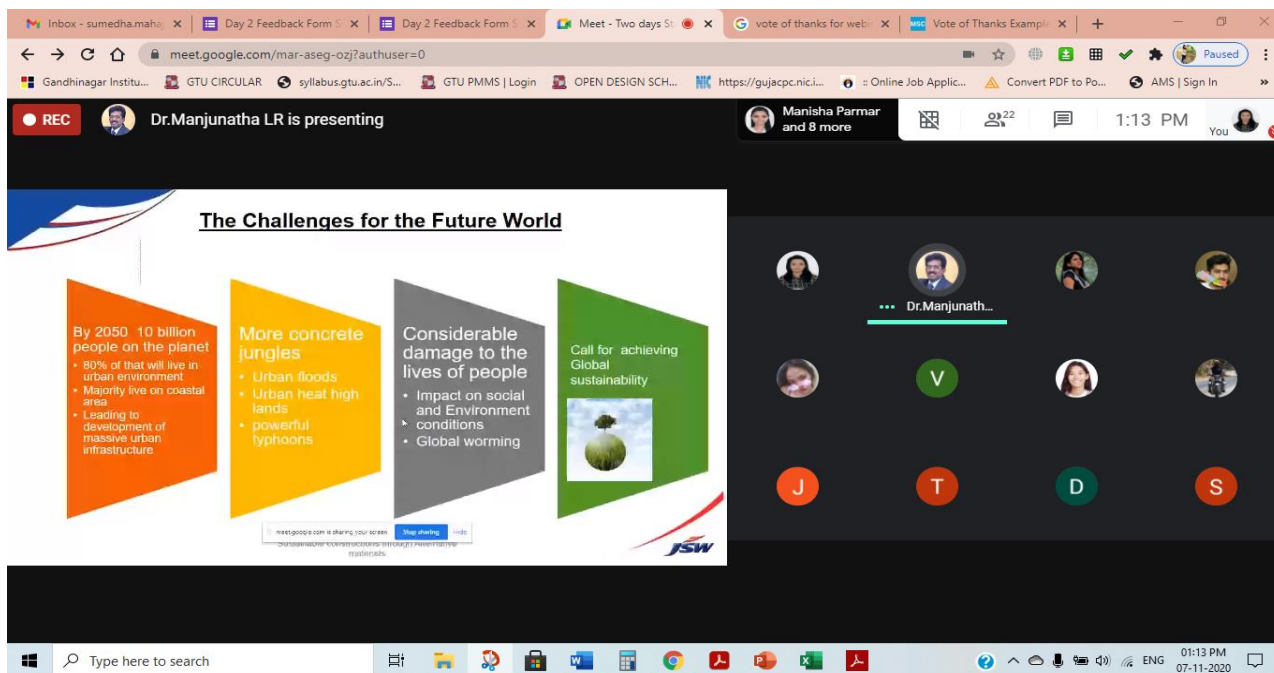
Dr. P. J. Patel discussed in detail about the concrete mix design as per IS 10262:2009. He briefed about the grade of concrete, design mix, aim of concrete mix design. He discussed different mix design method and give detail example of the Indian mix design method.

### Speaker 3: Dr. L. R. Manjunatha (Associate Vice President, JSW Cement Limited)

Time: 1:00 pm to 3:00 pm

Dr. Manjunatha L R has a total experience of 27 years in construction, building materials, techno marketing, applications development, new products development, branding, sales and product training, mentoring and advising in the construction industry, corporate and industries service sectors and startups. He is constantly pursuing his research interest in green building materials, concrete admixtures, special concretes, construction technologies 7 new product development. He is presently working with as Associate Vice president – Marketing at JSW Cement limited and advises on project research works in Civil Engineering and Management for research scholars from reputed institutions. He has research experience of 12 years & has published over 28 research papers in national and international journals and in 40 conferences in his research field & delivered more than 300 guest and expert lectures across the country.





### Latest trends in Construction Presentation

He had started the session with the current situation in construction and shortage of raw materials. Due to increased demand in housing and Infra sectors we need to preserve the environment by avoiding the consumption of traditional method of constructions. The sustainable cycle of concrete was discussed in detail like Steel industrials by products for sustainable constructions Slag-Granulated blast furnace slag (GBS), GGBS, Slag cement (PSC), Slag Fine Aggregates, and Steel Slag Aggregates. At last he concludes with the innovative green concrete products.



Civil Engineering Department Team

**Feedback Analysis:**

In two day of this webinar 55 participants were given participation certificates (e-certificates). As per participant’s feedback, it was a very unique and informative webinar that has happened during this pandemic situation. Participants attended the webinar with maximum attendance on both days.

