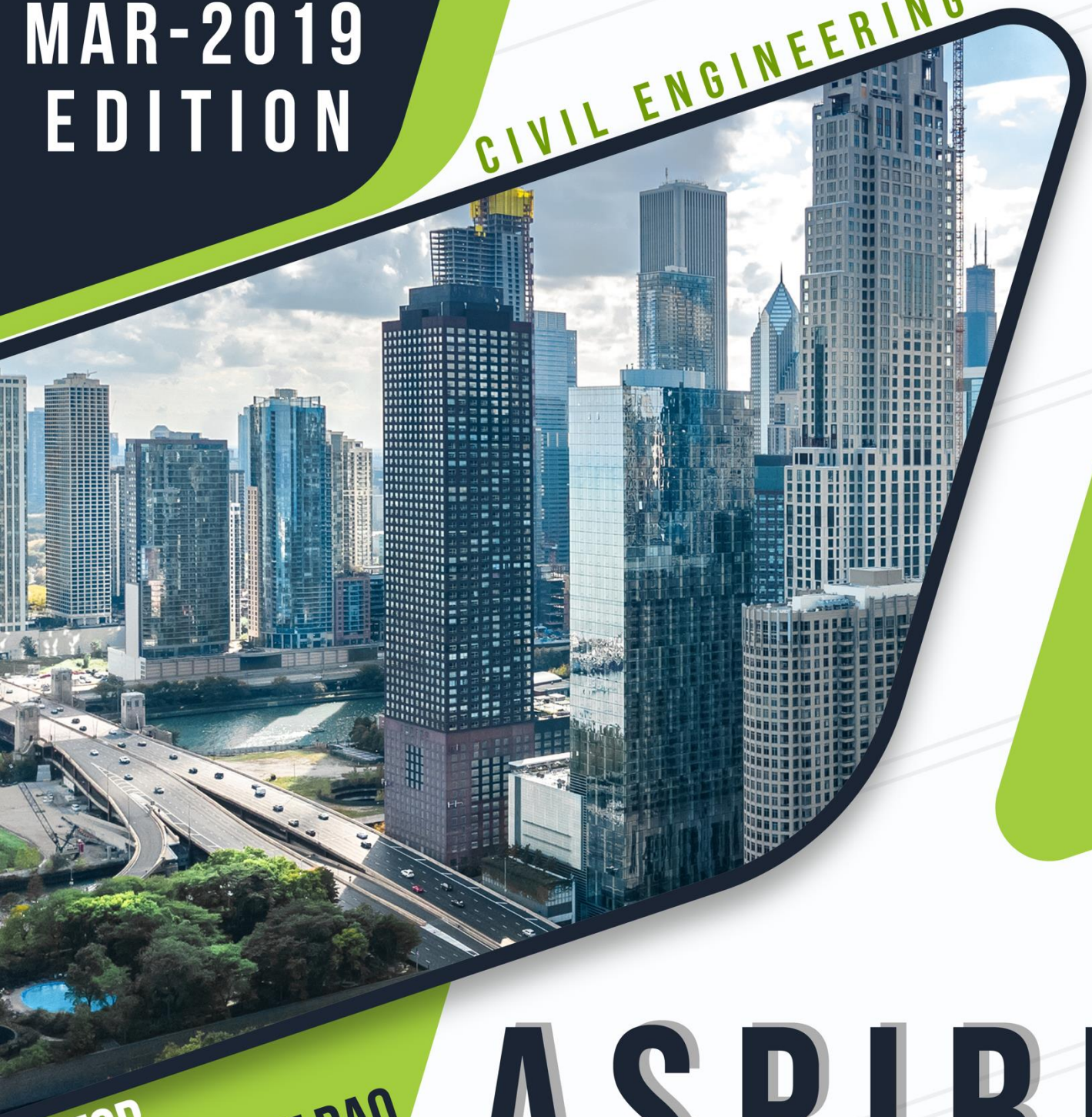
MAR-2019
EDITION

CIVIL ENGINEERING



ASPIRE

INSPIRING ENGINEERS...

EDITOR
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S.R.K.R. ENGINEERING COLLEGE

· VISION ·

Sagi Rama Krishnam Raju Engineering College will be offering Engineering and Technology Programs of choice, where parents want to send their children, where students want to learn, where employers seek Quality Engineers and Technologis-..ts, where Industry and Government find Technological Innovations

· MISSION ·

Eminence in Technical Education through the quality of programs, teaching and research with social relevance

DEPARTMENT OF CIVIL ENGINEERING

· VISION ·

To Lead Acadamics and Research in Civil Engineering Globally

· MISSION ·

To provide high-quality education and make the students ethical, world class professionals

To improve the skills of both staff and students with oppurtunities to innovate and explore knowledge through research projects and consultancy

To inculcate the feeling of present needs in students and evoke in them a respo nsibility to serve the society better

MESSAGE.....

Education is the ability to meet life situations. With resistance and diligence laced with knowledge and intellect, one can soar to any extent one desires. The thrust of education at Sagi Ramakrishnam Raju Engineering College is not only to produce mere degree holders but the bright young men and women equipped enough to foray into the world with an all round development of personality. Our vision of the institutions is to impart quality education in all core disciplines of knowledge by developing global leaders who are confident, smart, intelligent, gifted and engaged with life from physics to football.

With best infrastructure, techno-savvy ambience, latest gadgets to equip one to stride with competitive fervour, ever increasing new job oriented courses, career-counselling and highly enthused qualified teachers - we earnestly endeavour to help you in realizing your dreams and make you better human beings. We hope that the long list of distinguished alumni who are serving judiciary, administration, education, corporate, politics etc. would galvanize the youth into positive direction for the development of society.

Sri.S.Prasada Raju
President
S.R.K.R ENGINEERING COLLEGE

MESSAGE.....

"Education is not the learning facts, but the training of the mind to think". I feel honored and privileged to be part of Sagi Ramakrishnam Raju Engineering College where every student is a learner and every day is an opportunity to learn and discover. Cradled in the lap of nature and swaying from serious thinking to playful inventiveness, students at SRKR Engineering College are brimming with a zeal for life empowering themselves with skills and creativity. I congratulate the staff and students of various programs who used various mediums of expression to present their ideas. As long as our ideas are expressed and thoughts kindled we can be sure of learning as everything begins with an idea. High standards and expectations for each student in regard to academic performance, co-curricular participation and responsible citizenship are the foundation of our institute.

G.P. Saradhi Varma
Principal
S.R.K.R ENGINEERING COLLEGE

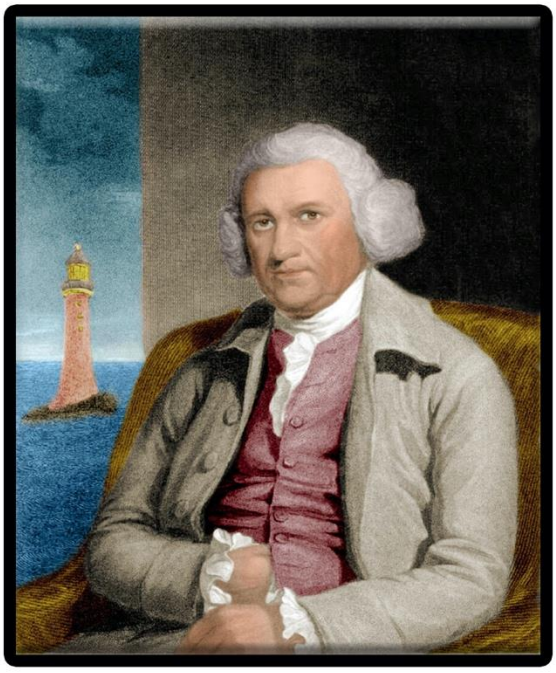
MESSAGE.....

"Excellence is a continuous process and not an accident". Imparting the technological education at different levels like quality of programs through teaching and research with social relevance is a unique ideology of SAGI RAMAKRISHNAM RAJU Engineering College. The objective of department is to prepare students for a successful career in industry, research and academics to meet the needs of growing technology. The department strives to impart knowledge and training of the highest standard. We provide an opportunity for students to work as members of a team on multidisciplinary projects. We promote student awareness for life-long learning and to introduce them to professional ethics and codes. Our efforts are to develop the ability among students to synthesize data and technical concepts for application to product design.

Dr.P.A.R.K Raju
Professor & HOD
DEPARTMENT OF CIVIL ENGINEERING

EMINENT PERSONALITY

JOHN SMEATON



John Smeaton FRS was born on 8th June 1724 in Austhrope, Leeds, England.Smeaton was an English civil engineer responsible for the design of bridges, canals, harbours and lighthouses. He was also being capable for mechanical engineering and an eminent physicist. Smeatonwas the first self-proclaimed "civil engineer", and is often regarded as the "father of civil engineering". He pioneered the use of hydraulic lime in concrete, using pebbles and powdered brick as aggregate. Smeaton was associated with lunar society. He was elected as a fellow of the royal society in 1753, and in 1759 won the Copley medal for his research into the mechanics of water wheels and windmills. His 1759 paper "an experimental enquiry concerning the natural powers of water-amd wind to turn mills and other machines depending on circular motion" He addressed the relationship between pressure and velocity for objects moving in air and his concepts were subsequently developed to devise the 'smeaton coefficient'. Smeaton's water wheel experiments were conducted on a small scale model with which he had been tested various configurations over a period of seven years. The resulting efficiency in water power has contributed to the industrial revolution.

Over the period 1759–1782 he performed a series of further experiments and measurements on water wheels that led him to support as much as possible and made him champion the *vis. viva* theory of German Gottfried Leibniz, an early formulation of conservation of energy. This led him into conflict with members of the academic establishment who rejected Leibniz's theory, believing it inconsistent with Sir Isaac Newton's conservation of momentum.

EMINENT PERSONALITY

Smeaton is important in the history for rediscovery of, and development of modern cement, identifying the compositional requirements needed to obtain "hydraulicity" in lime; work which led ultimately to the invention of Portland cement. Portland cement led to the re-emergence of concrete as a modern building material, largely due to Smeaton's influence.

Recommended by the Royal Society, Smeaton designed the third Eddystone Lighthouse (1755–59). He pioneered the use of 'hydraulic lime' (a form of mortar that will set under water) and developed a technique involving dovetailed blocks of granite in the building of the lighthouse. His light house remained in use until 1877 when the rock underlying the structure's foundations had begun to erode; it was dismantled and partially rebuilt at Plymouth Hoe where it is known as Smeaton's Tower.

Smeaton is considered to be the first expert witness to appear in an English court. Because of his expertise in engineering, he was called to testify in court for a case related to the silting-up of the harbour at Wells-next-the-Sea in Norfolk in 1782. He also acted as a consultant on the disastrous 63-year-long New Harbour at Rye, designed to combat the silting of the port of Winchelsea. The project is now known informally as "Smeaton's Harbour", but despite the name his involvement was limited and occurred more than 30 years after work on the harbour commenced. It closed in 1839.

In 2003 Smeaton was named among the top 10 technological innovators in *Human Accomplishment: The Pursuit of Excellence in the Arts and Sciences, 800 B.C. to 1950.*.

The pioneering constant of proportionality describing pressure varying as the square of the velocity when applied to objects moving in air was named *Smeaton's coefficient* in his honor. Based on his concepts and data, it was used by the Wright brothers in their pursuit of the first successful heavier-than-air aircraft.

ROBOTS IN THE CONSTRUCTION INDUSTRY

It is expected that the need for manual labour will be significantly decreased in the near future, as a considerable amount of work will be conducted automatically. Although we aren't building robotic humans now, we are using robotics to help do certain tasks. Robots are becoming relatively popular in the construction industry. Robots can offer great help in tasks that require accuracy and speed. On top of that, they can easily overcome issues on the site that are linked to human strength limitations or physical weariness.

In order for the use of robotics in construction to be successful, there is a strong need for combining the robot and human presence in a way that they supplement each other. A detailed categorization of the different strengths and weaknesses of each side can help a lot in reaching as close as it gets to a harmonic cooperation between humans and robots.

The main idea, in this case, is that construction workers should primarily focus on tasks where their presence is absolutely necessary, while robots can take over in cases where extraordinary strength and speed is essential. Robots can help in many ways in construction site and some of them are:

Brick-Laying

As the robotics industry continually advances, those in the construction industry can take a breather, as robots are beginning to take over time-consuming repetitive tasks such as brick-laying. Of course, the robots would need supervision to make sure nothing goes wrong, but this advancement of technology is a big step forward for the construction industry.

ROBOTS IN THE CONSTRUCTION INDUSTRY

Surveying Land

What is that in the sky? Is it a bird? A plane? Neither! It's a drone! Drones have emerged throughout the past few years as not only a leisure device but also have made their way into

engineering and surveying projects. Drones can be used to survey a construction site, send images of nearly inaccessible points on a structure, and improve overall job-site safety.

Arc Welding

Japan always seems to be in the lead of other countries when it comes to technological advances. A construction company in Japan is making their welding processes much quicker and efficient by using robots for arc welding structural steel. According to Robotics Online, "Steel I-beams are pre-cut by robots and brought to the job site when required with relatively little welding necessary. Most welding is performed by the robot in the factory, lending the building process to lean, Just-in-Time manufacturing.

Advantages of using robots in construction

Starting from the benefits of using robots in construction, it's no exaggeration to say that they can transform the industry to a great extent.

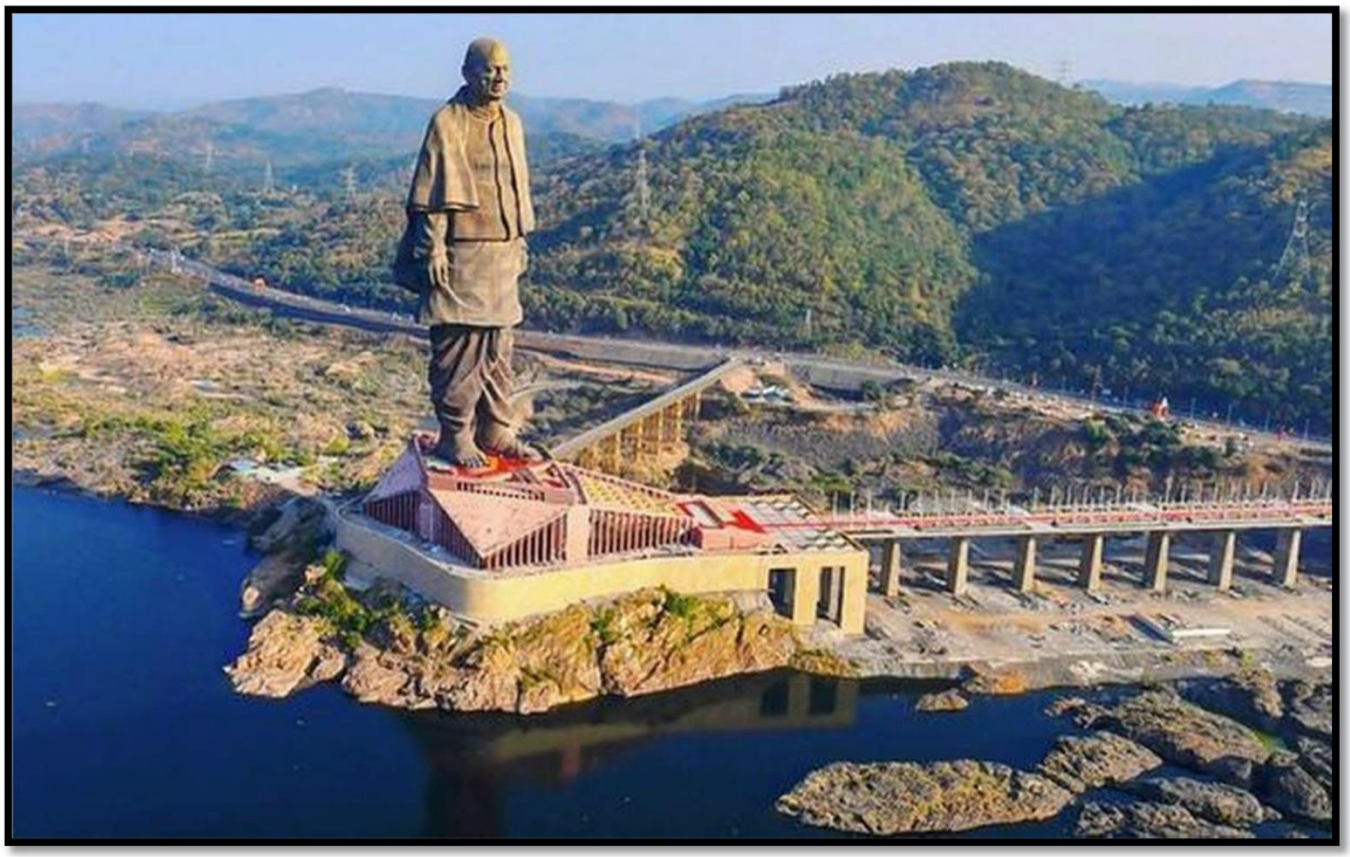
- Fewer mistakes on site
- Lower cost for the construction process
- Protection of the workforce
- Improvement of the industry's profile
- Constructions of better quality
- Meeting deadlines

STATUE OF UNITY

Statue of Unity – the 182-meter magnanimous creation of India stands proudly as the tallest statue in the world. It faces the Sardar Sarovar Dam on the river Narmada in the city of Vadodara, the state of Gujarat, being located on a river island. The statue is in honor of the great Indian revolutionary freedom fighter Sardar Vallabhai Patel.

Making of the statue:

The statue sculpted in the supervision of the Padma Bhushan recipient Ram V. Sutar. It was inaugurated by the honorable Prime Minister of India, Narendra Modi on 31st October, 2018, Patel's 143rd birth anniversary. The company of leading corporate of world top 5 which is Larsen and Toubro pvt ltd has taken responsibility for the construction of the statue. During the announcement of the creation and beginning of the project, the statue was dubbed to be as'Gujarat's tribute to the nation.'



The statue is conceived as a naturalistic depiction of Dr.Sardar vallabhai Patel in characteristic garb in a walking pose. It rises out of a star-shaped, geometric base that covers the entire Sadhu Hill.

STATUE OF UNITY

It has a unique, slender width to height ratio.Far more exacting than existing technical norms, that calls for special engineering considerations. The structure has two vertical cores, each housing a high-speed passenger elevators. The vertical cores support the steel frames to which about 6500 bronze panels are being claded. A viewing gallery at the 135 m level, at the chest, can accommodate up to 200 visitors at one go and also affords a breath-taking view of the dam and its environs.

Other than that, we can visit near by places of the statue are listed below.

- An exhibition centre at its base showcasing the life and achievements of Sardar Patel
- A 320 m long designer bridge connecting Sadhu Hill to the mainland
- A memorial and visitors' centre
- 4-lane approach road
- An administrative complex, 3-star hotel and conference centre
- A 40-m suspended fabric roof structure for the visitors' centre

A record amount of construction materials are used in the construction of Statue of Unity

- 210,000 cu.m. of cement concrete poured into the statue
- 18,500 tonnes of reinforced steel
- 6,500 tonnes of structural steel
- 1,700 tonnes of bronze

Evolution of Bronze Cladding

- Selection of right bronze alloy, C90300 used
- Total 540 numbers of macro panels, each of size 5.5mts high x 5.6mts wide
- Each macro panels consists of more than 9 micro panels which are welded together at site
- Micro panels of size 1.83 mts high x 2 mts wide are cast.

CRACK-SOLVE ME

Common Causes of Cracks & Remedial measures in Concrete

THE PRINCIPAL CAUSES OF CRACKS IN A BUILDING ARE AS FOLLOWS:

1. Thermal action
2. Creep
3. Corrosion of reinforcement
4. Moisture content
5. Poor construction practices
6. Improper structural design and specifications

1. Thermal action

Thermal action is one of the most potent causes of cracking in buildings. All materials more or less expand on heating and contract on cooling.

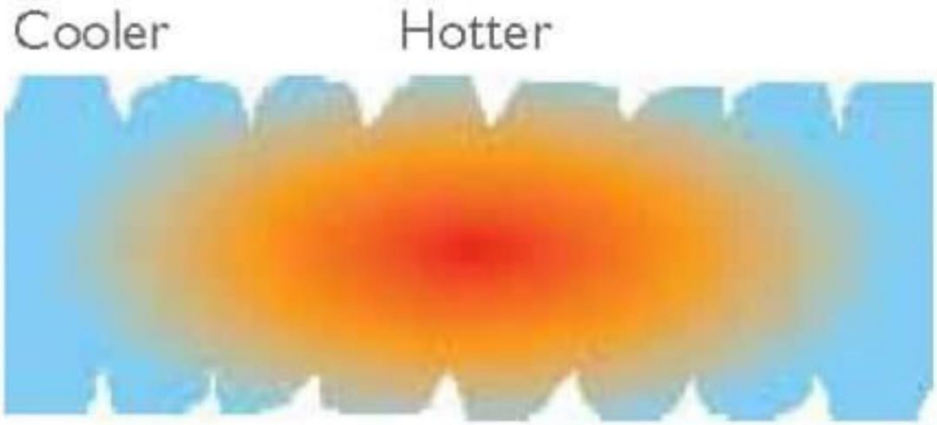
Ambient temperature changes and loss of heat of hydration in portion of structure at different rate lead to temperature variations and subsequent thermal movement.

The thermal action in a component depends on a number of factors such as temperature variations, dimensions, coefficient of thermal expansion and some other physical properties of materials.

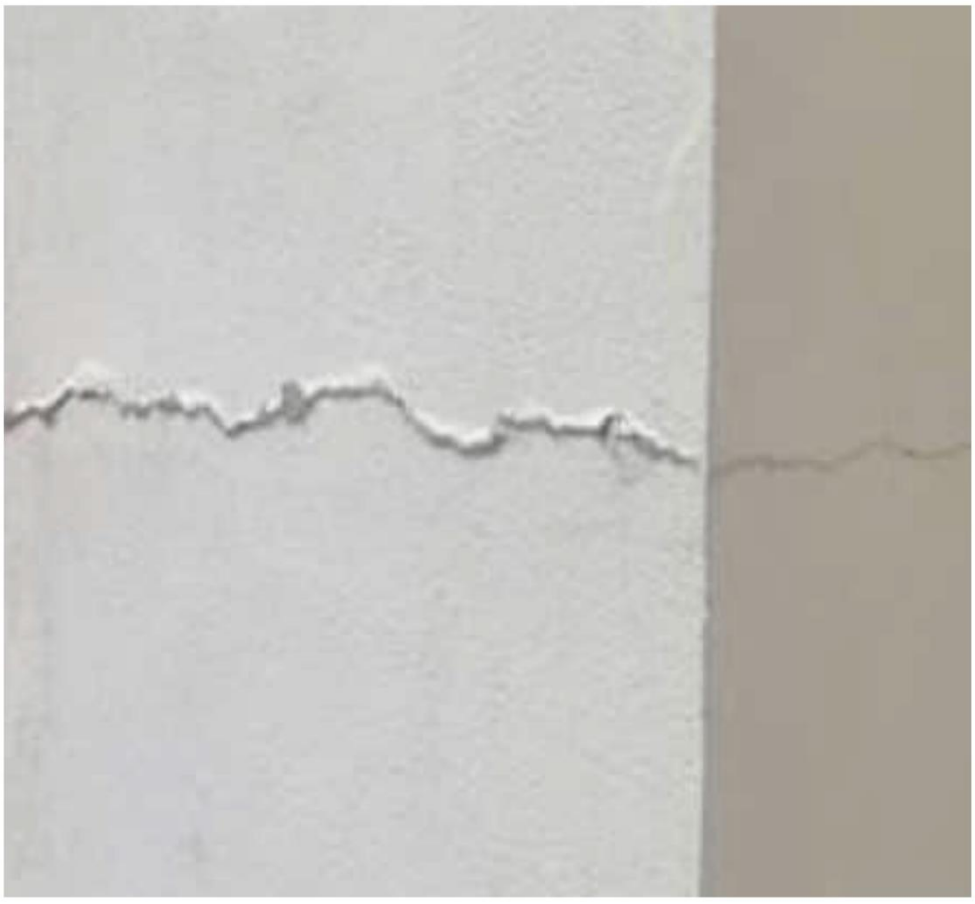
Thermal variations in the internal walls and intermediate floors are not much and thus do not cause cracking.

It is mainly the external walls especially thin walls exposed to direct solar radiation and the roof which are subject to substantial thermal variation that are liable to cracking.

CRACK-SOLVE ME



Concrete cracking due to temperature variations

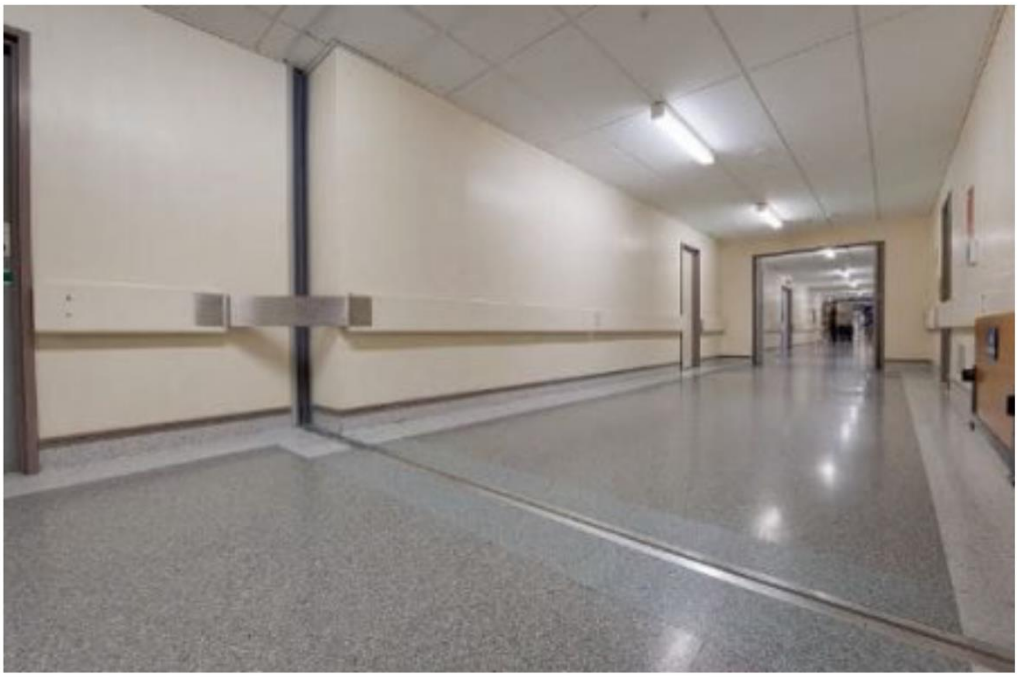


Cracking due to thermal movement

Remedial Measures

Joints shall be considered during the design and constructed properly. For example, expansion joints, construction joints, control joints, and slip joints.

CRACK-SOLVE ME



Joints to prevent cracking due to thermal movement

2. Creep

Gradual and slow time dependent deformation of concrete structure under sustained loads is known as creep. It may generate excessive stress and lead to the crack development.

Creep increases with increase in water and cement content, water cement ratio and temperature.

Added to that, admixtures and pozzolans will increase creep. The increase of temperature in steel bars will increase creep as well.

However, it decreases with increase in humidity of surrounding atmosphere and age of material at the time of loading.

CRACK-SOLVE ME

concrete building cracks due to creep movement

Remedial measure

- Use minimum possible quantity of water.
- Employ large coarse aggregate.
- Provide compression reinforcement if possible
- Avoid formwork removal at early ages.
- Cure concrete properly.
- assign proper cross section for the concrete element.

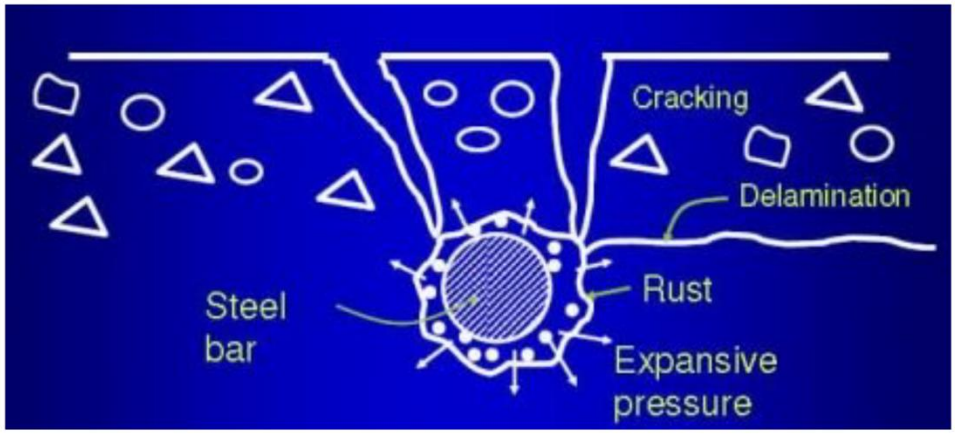
3. Corrosion of Reinforcement

Reinforcement corrosion will produce iron oxide and hydroxide on steel bar surface, consequently its volume increases. This increase in volume causes high radial bursting stresses around reinforcing bars and result in local radial cracks. These splitting cracks results in the formation of longitudinal cracks parallel to the bar.

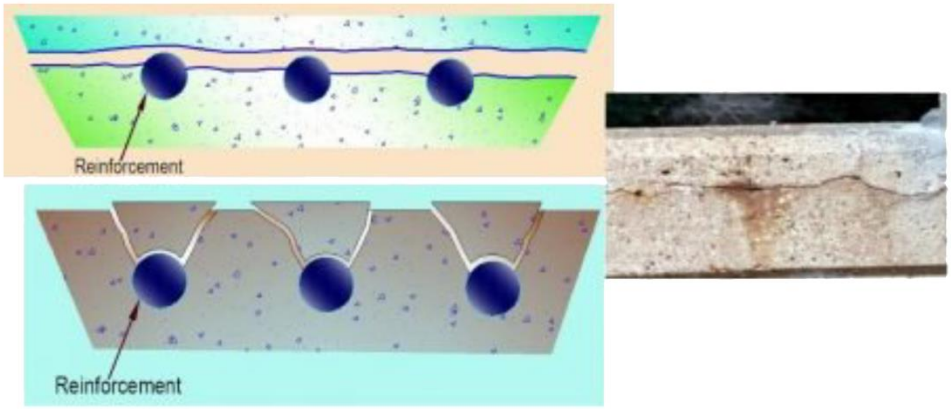
CRACK-SOLVE ME

Reinforcement corrosion will occur unless it is protected properly. Steel reinforcement can be protected by providing adequate impervious concrete cover. This will prevent the ingression of moisture and other aggressive elements.

Steel corrosion will also not occur as long as concrete surrounding it is alkaline in nature having a high pH value.



Cracking due to corrosion of reinforcement



Concrete cracking due corrosion of reinforcement

Remedial Measures

- Use low permeable concrete
- Provide adequate cover thickness
- Make sure concrete-steel bond is as good as possible. This is because concrete alone is not capable of resisting tensile forces to which it is often subjected. Otherwise, concrete may crack and allow harmful substance materials to attack steel bars.

CRACK-SOLVE ME

4. Moisture Movement

Most of the building materials with pores in their structure in the form of inter-molecular space expand on absorbing moisture and shrink on drying.

These movements are cyclic in nature and are caused by increase or decrease in inter pore pressure with moisture changes.

Shrinkage can be of plastic or dry. Factors that cause cement or mortar to experience shrinkage include excessive water, and cement quantity; rich cement mixtures suffer greater shrinkage.

Crack above window due shrinkage

concrete cracking due to moisture movement

Remedial measures

- Provide movement joints
- Use minimum possible quantity of water for mixing cement concrete or cement mortar
- Compact concrete properly; vibrated concrete suffers lesser shrinkage compare with manually compacted concrete
- Finally, avoid the use of excessive cement.

CRACK-SOLVE ME

5. Poor Construction practices

There are broad variety of construction practices that lead to concrete cracking. Normally, improper construction practices are due to ignorance, carelessness, greed or negligence.

main causes for poor construction practices:

- Improper selection of materials.
- Selection of poor quality cheap materials.
- Inadequate and improper proportioning of mix constituents of concrete, mortar etc.
- Inadequate control on various steps of concrete production such as batching, mixing, transporting, placing, finishing and curing
- Construction overloads induced during construction can frequently be more serious than those imposed during service.
- Inadequate quality control and supervision causing large voids (honey combs) and cracks resulting in leakages and ultimately causing faster deterioration of concrete.
- Improper construction joints between subsequent concrete pours or between concrete framework and masonry.
- Addition of excess water in concrete and mortar mixes.
- Lastly, poor quality of plumbing and sanitation materials and practices.

Concrete building cracking due to poor construction practice; water added to fresh concrete

Remedial measure

- monitoring construction process properly.
- Utilize good quality materials at the time of construction.

CRACK-SOLVE ME

6. Improper Structural Design and Specifications

Several problems can occur due to incorrect structural design, detailing, and specifications.

Errors that may occur at this stage include inadequate thickness, insufficient reinforcement, incorrect geometry, improper utilization of materials, and incorrect detailing.

Problems encountered due to those errors include cracking due to insufficient reinforcement, excessive differential movement due to improper foundation design, increased concentration of stresses as a result of poorly design re-entrant etc.…

Additionally, it is of crucial that the designer consider the environmental conditions existing around the building site.

Major structural crack in beam due to poor detailing practice

Remedial measures

Architects, Structural Consultants and Specifiers shall consider the following measure to avoid cracking and subsequent deterioration of structures:

- Proper specification for concrete materials and concrete.
- Proper specifications to take care of environmental as well as sub – soil conditions.
- Constructible and adequate structural design.
- Proper quality and thickness of concrete cover around the reinforcement steel.
- Planning proper reinforcement layout and detailing the same in slender structures to facilitate proper placing of concrete without segregation.
- Selection of proper agency to construct their designs.

DEPARTMENTAL ACTIVITIES

INNOVATION IN CONCRETE TECHNOLOGY

Seminar on "Innovations in Concrete Technology" on 6th march 2019

Concrete technology deals with study of properties of concrete and its practical applications. In a building construction, concrete is used for the construction of foundations, columns, beams, slabs and other load bearing elements.

There are different types of binding material is used other than cement such as lime for lime concrete and bitumen for asphalt concrete which is used for road construction.

Various types of cements are used for concrete works which have different properties and applications. Some of the type of cement are Portland Pozzolana Cement (PPC), rapid hardening cement, Sulphate resistant cement etc.

Sri T Saibabu, Sr. Manager, Zuari Cements addressed the gathering. He had shared about Cement Types and its specific usage area. He also demonstrated the manufacturing process of Cement which helps the second year students to know about production procedure, specific applications, properties and limitations of different types of cement

DEPARTMENTAL ACTIVITIES

SUPERNOVA - 2K19

Supernova-2k19 was conducted on jan-7&8 of 2019.supernova is a national level technical symposium conducted by department of civil engineering of our college.

INAUGURATION FUNCTION

Supernova 2k19 was inaugurated chief engineer of polavaram **S. Hari Babu** garu

DEPARTMENTAL ACTIVITIES

Events of supernova 2k19

1. quiz
2. poster presentation
3. bricks wall
4. tall structures
5. quiz
6. town planning
7. ppt's
8. auto cad
9. art gallery

1 Poster presentation

2 Powerpoint Presentation

3 Town planning

4 Art gallery

nearly 300 participants participated in supernova 2k19 from different parts of our state. different students from different colleges participated actively in different events and many of them got merit certificates. after the completetion of events the winners will be awarded in the validetory function by the chief guest.

DEPARTMENTAL ACTIVITIES

SUPERNOVA - 2K19

VALIDECTORY FUNCTION

(K . Vijaya Ratnam , D. E. R&B Depatment AP)

the programme is ended up by the distribution of prizes to the winners of all the events by the chief guest. chief guest of validatory function was k. vijaya ratnam garu. He delivers his speech about his life in the field of civil engineering .later he is felistated by the management.

Estd. 1980

S.R.K.R ENGINEERING COLLEGE

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