ABES ENGINEERING COLLEGE, GHAZIABAD

Estd. 2000

Department of Civil Engineering

E-Magazine

The Colonnade

Edition -5

ABES ENGINEERING COLLEGE, GHAZIABAD

Vision

To take the ABES Engineering College by the year 2020 to such a level that it is an equal partner of the other leading institution of the world to provide leadership to the international education system and is rated as one of the top world institutions which produces world – class competent and dedicates technical and managerial human resource embedded in the tradition Indian Values and positive attitudes.

Mission

To create an ambience for health teaching – learning process

To nurture the students and infuse in them:

- A passion to excel professionally.
- A spirit to be of utmost use of the industry, corporate sector and the society at large.
- An intense desire to take challenging responsibilities and leadership roles.
- A craving to be wholesome good human beings.
- To develop an environment for creating new knowledge through research and by thriving to explore innovative ideas.

A MESSAGE FROM

Dr. Gajendra Singh

Director

“Education is not preparation for life. Education is life itself.”

For both individuals and nation, technical education is vital for technology development, either as a way of developing human capacity that would aid in industrialization and environment protection or personnel empowerment. A common belief is that education’s purpose is to replace an empty mind with an open one. Let’s go a little beyond and find out what exactly education meant in the past and how, over the decades it has fundamentally altered the present education in our country. I wish all faculty members to ponder over their importance in classroom assuming easy accessibility of information in few clicks. Institutes are under pressure to provide good infrastructure, world class facilities and scholar teaching staff, but the foundation lays equally on joy of learning, discovering strength of students and guiding them to explore and experience new ideas.

I am glad that Department of Civil Engineering is taking out E-magazine. I wish all the best to all students, staff and faculty members of the department.

Dr. Gajendra Singh
Director

A MESSAGE FROM

Prof. (Dr.) Devendra Kumar Sharma

Director (Admin), DSW & HOD-CE

“The best road to progress is freedom road, and a true Freedom cannot be instilled without education”.

With the technology expanding every moments, so is the society and is standards of living. But, ethical education defines the standards of society. Only education can enlighten the real meaning. As globalization is playing a key role is connecting the word beyond geographical boundaries the right education is impetus to coherence beyond communities.

As the education system has become more encouraging and fastest attempts are made to be benefit the under privileged as well. The role of educationists who have revolutionized the education standards is valuable. To honor those with cutting edge spirit, who not only determined but strived to change the density of country. The civil Engineering department ABES Engineering College, Ghaziabad takes its faculty & students through the journey of some of north India’s leading educational crusaders through this one - of - a kind coffee table book. I hope this issue of departmental e-magazine will encourage the students, staff & faculty

Prof (Dr.) D. K. Sharma
Director (Admin), DSW & HOD-CE

ABOUT THE MAGAZINE

The E - Magazine “Colonnade” is an imitative of the Civil Engineering Department of ABES Engineering College to enrich the information in the field of Civil Engineering among students so that they would be able to meet their dreams and aspirations in life.

This magazine provides a platform to recognize the unrecognized and the achievements of the students as well as faculty members.

Patron

Prof. (Dr.) D.K. Sharma

Director (Admin), DSW, HOD-Civil

Production Editor

Mr. Uzair Khan

Asst. Professor

Assistant Production Editor

Avnish Jaiswal

Editor

Anuj Kumar

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International Conference

On

Smart Cities with Focus on Environmental Challenges (SCFEC-2018)

(10th-11th April, 2018)

The Department of Civil Engineering organized on an International Conference on "Smart Cities with Focus on Environmental Challenges, SCFEC-18" on 10th & 11th April, 2018 at ABES Engineering College campus.

The conference was supported by Continental Carbon India Limited as Technical Partner, The Institution of Engineers (India) and LIC of India as Institutional Partner(s), CE & CR as Media Partner and Department of Science & Technology as Knowledge Partner.

The following eminent personalities, among others, graced the Inaugural Function

- Chief Guest Mr. Prasanto K Roy, Vice President, NASSCOM
- Guest of Honor Mr. Sanjay Dewan, Chief (Sales & Marketing), Continental Carbon India Limited

Prof (Dr.) D. K. Sharma, Director(Admin) and HOD-CE welcomed the above eminent personalities, guest speakers, dignitaries and the President, Vice – President, Advisor, HODs, Faculty members, students of ABES EC as also the participants and researchers from other institutions.

The department has received 64 Papers related to the topic.

Keynote Speakers

- Prof.(Dr.) K. K. Aggarwal, Chancellor, KR Mangalam University
- Dr. Ayona Datta, King's College, London
- Dr. O. P. Agarwal, CEO, World Resources Institute (India)
- Dr. Ashoke Ghosh, Professor & Head of Department , Aerospace Engineering, Crescent Institute of Science & Technology (Deemed University), Chennai
- Maj. Gen S. Bhattacharya, VSM (Retd), Secretary & Director General, Institution of Engineers India
- Prof.(Dr.) B. Bhattacharya, IIT Delhi
- Dr. Rizwan A Khan, Aligarh Muslim University, Aligarh
- Mr. A.P. Abraham Head - Operations, CCIL Ghaziabad
- Mr. ND Sapolia, Technical Head, Wave One

- Dr. Anuradha Shukla, Chief Scientist, CRRI
- Mr. Anupan Jain, Founder & Principal Consultant, Rational De Design.
- Mr. Satander Kumar, Consultant Scientist, Ex-CRRI, New Delhi.
- Dr. S C Maiti, Member of BIS Technical Committees and Ex-Joint Director, National Council for Cement and Building Materials.
- Ms. Akshima Ghate, Assoc. Director, TERI.

सेमिनार

एबीईएस इंजीनियरिंग कॉलेज में अंतर्राष्ट्रीय सम्मेलन का आयोजन

विकास के साथ प्राकृतिक सम्पदा का संरक्षण जरूरी: प्रशांतो राय

पर्यावरण संबंधित विषयों पर 500 से अधिक विद्वानों ने प्रस्तुत किए विचार

निशांत टाइम्स संवाददाता

गाजियाबाद। एनएच-24 स्थित एबीईएस इंजीनियरिंग कॉलेज के सिविल इंजीनियरिंग विभाग द्वारा अंतर्राष्ट्रीय सम्मेलन का आयोजन किया। सम्मेलन का मुख्य विषय स्मार्ट सिटी के साथ पर्यावरण की चुनौतियों पर केंद्रित करना था। कार्यक्रम में 500 विद्वानों, अभियंताओं ने सहभागिता की। एबीईएस इंजीनियरिंग कॉलेज के प्रेसीडेंट नीरज गोयल, उपाध्यक्ष सचिन गोयल, सलाहकार रघुनंदन कंसल, निदेशक डॉ0 गजेन्द्र सिंह, सिविल विभाग के विभागाध्यक्ष डॉ0 डीके शर्मा ने कार्यक्रम का शुभारंभ किया।

इसी क्रम में पर्यावरण की समस्या के केंद्र बिंदु पर सम्मेलन के अतिथि हेड ऑपरेशन कार्बन कॉन्टिनेंटल ऑफ इंडिया लिमिटेड संजन दीवान ने वर्तमान में औद्योगिकीकरण एवं पर्यावरण संरक्षण पर उद्बोधन किया। मुख्य अतिथि, नैसकॉम के उपाध्यक्ष प्रशांतो राय ने कहा कि सतत विकास के लिए भावी अभियंताओं को प्राकृतिक सम्पदा का संरक्षण का ध्यान रखना होगा और प्राकृतिक सम्पदा को सदुपयोगिता के अर्थ में लाना होगा। के.आर. मंगलम विश्वविद्यालय के कुलाधिपति और मुख्य विचार वक्ता डॉ. के.के अग्रवाल ने पर्यावरण की स्थिति पर प्रकाश डालते हुए कहा कि सिविल अभियंत्रण को भविष्य में होने वाले संसाधनों को ध्यान में रखते हुए आज के अपशिष्ट को हरित संसाधन में परिवर्तन करने आवश्यकता है।

सिविल अभियांत्रिकी पर डाला प्रकाश

अलीगढ़ मुस्लिम विश्वविद्यालय के प्रवक्ता डॉ. रिजवान खान ने सिविल अभियांत्रिकी और स्मार्ट सिटी के विकास में उपयोग होने वाली विषय पर गहराई से विस्तृत वर्णन दिया जिससे धरती और मानव का सह अस्तित्व बना रहे और सतत विकास का क्रम चलता रहे।

स्मार्ट सिटी के विकास के लिए आधारशिला पर पुनः विचार की आवश्यकता

लंदन के किंग्स महाविद्यालय की प्रवक्ता डॉ. अयोना दत्ता ने शहर का भविष्य और प्रकृति के संसाधन का सदुपयोग करने की जीवन्त प्रणाली का उल्लेख किया। क्रिसेट प्रौद्योगिकी संस्थान के अंतरिक्ष विभागाध्यक्ष डॉ0 अशोक घोष ने भविष्य को ध्यान में रखते हुए यह कहा कि स्मार्ट सिटी के विकास के लिए आधारशिला पर पुनः विचार की आवश्यकता है जो कि भविष्य में मानव की आवश्यकता पूर्ण हो सके।

शहरी जलवायु पर रखी विचार

इंस्टीट्यूट ऑफ इंजीनियर संस्थान के सचिव व निदेशक मेजर जनरल भट्टाचार्य जे पर्यावरण स्थिति की अनुभूति और जागरूकता के विषय पर मार्ग का प्रशस्त किया। आईआईटी दिल्ली के डॉ बी भट्टाचार्य ने स्मार्ट सिटी और शहरी जलवायु पर अपनी बात कही।

एबीईएस इंजीनियरिंग कॉलेज में अंतर्राष्ट्रीय सम्मेलन का आयोजन

-अथाह संवाददाता-

गाजियाबाद, 11 अप्रैल। एबीईएस इंजीनियरिंग कॉलेज के सिविल इंजीनियरिंग विभाग द्वारा अंतर्राष्ट्रीय सम्मेलन का आयोजन किया। इस सम्मेलन का मुख्य विषय ''स्मार्ट सिटीज के साथ पर्यावरण की चुनौतियों'' पर केंद्रित था। सम्मेलन का मुख्य उद्देश्य पर्यावरण की समस्या और निदान पर विभिन्न विषय विशेषज्ञों से चर्चा थी। इस कार्यक्रम में 500 विद्वानों, अभियंताओं ने सहभागिता की। इस अभिन्न सम्मेलन में एबीईएस इंजीनियरिंग कॉलेज के प्रेसीडेंट नीरज गोयल, उपाध्यक्ष सचिन गोयल, सलाहकार रघुनंदन कंसल, निदेशक डॉ गजेन्द्र सिंह, सिविल विभाग के विभागाध्यक्ष डॉ डी.के. शर्मा आदि ने सहभागिता दिखाते हुए, कार्यक्रम का शुभारंभ करके अवेषित किया।

इसी क्रम में पर्यावरण की समस्या के केंद्र बिंदु पर सम्मेलन के सम्मानीय अतिथि माननीय संजन दीवान, हेड ऑपरेशन, कार्बन कॉन्टिनेंटल ऑफइंडिया लिमिटेड ने वर्तमान में औद्योगिकीकरण एवं पर्यावरण संरक्षण पर उद्बोधन किया।

सम्मानीय अतिथि द्वारा कथित शब्दावली का पुनरावलोकन करते हुए इस सम्मेलन के मुख्य अतिथि, नैसकॉम के उपाध्यक्ष प्रशांतों राय ने विशेषता कहा कि सतत विकास के लिए भावी अभियंताओं को प्राकृतिक सम्पदा का संरक्षण का ध्यान रखना होगा और प्राकृतिक सम्पदा को सदुपयोगिता के अर्थ में लाना होगा। के.आर. मंगलम विश्वविद्यालय के कुलाधिपति डॉ. के.के. अग्रवाल और इस सम्मेलन के मुख्य विचार वक्ता ने पर्यावरण की स्थिति पर प्रकाश डालते हुए कहा कि सिविल अभियंत्रण को भविष्यों में होने वाले संसाधनों को ध्यान में रखते हुए आज के अपशिष्ट को हरित संसाधन में परिवर्तन कर आवश्यकता है।

विश्व संसाधन संस्थान (भारत) के मुख्य निष्पादन अधिकारी डॉ. ओ.पी. जी ने ज्ञान वर्धक लाभदायी विषय ''रीथिंकिंग स्मार्ट मोबिलिटी फॉर स्मार्ट सिटी'' पर विस्तृत विवरण दिया जो कि सिविल अभियंत्रण और पर्यावरण की परम्परता को इंगित करता है।

लंदन के शिर्ष स्थित संस्थानों में से एक किंग्स महाविद्यालिय की प्रवक्ता डॉ. अयोना दत्ता ने शहर का भविष्य और प्रकृति के संसाधन का सदुपयोग करने की जीवन्त प्रणाली का उल्लेख किया।

डॉ अयोना दत्ता का मुख्यतः ध्यान मानव और प्रकृति के सतत विकास की ओर था।

क्रिसेट प्रौद्योगिकी संस्थान के अंतरिक्ष के विभागाध्यक्ष डॉ अशोक घोष ने भविष्य को ध्यान में रहते हुए ये कहा कि स्मार्ट सिटिज के विकास के लिए आधार शिला पर पुनः विचार की आवश्यकता है जो कि भविष्य में मानव की आवश्यकता पूर्ण हो सके। इंस्टिट्यूट ऑफ इंजीनियर संस्थान के सचिव और निदेशक मेजर जनरल श्री भट्टाचार्य जी ने पर्यावरण स्थिति की अनुभूति और जागरूकता के विषय पर मार्ग प्रशस्य किया।

आई.आईटी. दिल्ली के प्रो (डॉ) बी भट्टाचार्य ने स्मार्ट सिटी और शहरी जलवायु पर अपनी बात कही। इसी क्रम में अलीगढ़ मुस्लिम विश्वविद्यालय के प्रवक्ता डॉ. रिजवान खान ने सिविल अभियांत्रिकी और स्मार्ट सिटी के विकास में उपयोग होने वाली विषय पर गहराई से विस्तृत वर्णन दिया जिससे धरती और मानव का सह अस्तित्व बना रहे और सतत विकास का क्रम चलता रहे।

वातावरण को सुरक्षित रखने पर चर्चा हुई

गाजियाबाद। एबीईएस इंजीनियरिंग कॉलेज के सिविल इंजीनियरिंग विभाग की ओर से चल रहे दो दिवसीय अंतरराष्ट्रीय सम्मेलन में बुधवार को विभागाध्यक्ष डॉ. डीके शर्मा ने प्राकृतिक चुनौतियों पर चर्चा की। वहीं कार्बन कॉन्टिनेंटल ऑफ इंडिया लिमिटेड के हेड ऑपरेशन एपी अब्राहम ने चर्चा की।

Faculty Development Program (FDP)

On

Building Materials for Green Construction Including Hazardous Waste Management by Dr. A.P.J. AKTU sponsored under TEQIP – III

1st -5th May, 2018

Objective of FDP

The aim of FDP on "Building Materials for Green Construction Including Hazardous Waste Management" is to develop an inter-disciplinary platform for the dissemination of knowledge and practice on the engineering and technical issues concerning all aspects of building design, technology, energy and environmental performance. The result is an extremely useful publication for researchers, academics, students and industry professionals. The FDP will focus on emerging research in Green Building as well as Hazardous Management. Eminent personalities from industry, R&D organizations & academia have agreed to become part of FDP for keynote address, plenary talks and panel discussions. The FDP organized by Department of Civil Engineering, ABES Engineering College, Ghaziabad under TEQIP program sponsored by AKTU. The FDP aims to create awareness about the recent innovations on Green Buildings and Hazardous Waste Management. The FDP will provide a platform for exchange of ideas between participants from academia, R & D organizations and industry personnel. The researchers can further work on various real time projects for implementation of ideas

S. No.	Speaker Name	Topic
1	Dr. A. K. Ghose	Hazardous Waste Management
2	Dr. B. K. Singh	Innovative Interlocking Flyash Brick/Block Masonry System for Green Construction
3	Dr. Manoj Verman	Environmental Protection through Tunneling: Production & Solution
4	Dr. Shiv Kumar Dubey	Use of Fly Ash for Green Building Materials
5	Mr. Sourabh Manuja	Hazardous Waste Management
6	Dr. A. K. Srivastava	Green Building & Construction
7	Dr. Joy Pal	Concrete Health Monitoring
8	Mr. Harsh Murthi	Spirituality & Management
9	Dr. S. C. Maiti	Use of Material for Green Building
10	Mr. Milon Mukhopadhyay	Repair of Water Retaining Concrete & Masonry Structure: Like Dams, Barrages, and Aqueduct etc.

Participation Details

Faculty Members from institutes affiliated to APJ AKTU, Lucknow, Uttar Pradesh actively participated in the programme.

Total Participants: 32

Guru Talks

A session was organized by Department of Civil Engineering on 15th March 2018 for students of Civil Engineering in which renowned persons from industrial background share their knowledge about industrial aspects. They impart knowledge for the development of industrial as well as business growth for the budding civil engineers.

Speakers

- Dr. Prem C Jain, Chairman, IGBC
- Devendra Mahajan, VP- Green Initiative, Supertech
- Sheetal Rakheja, Co- Chairman, IGBC Delhi Chapter
- Anupam Jain, Founder- Rational Desgin
- Harsh Murti, VP -Projects, Wave Infra
- Kushagra Juneja, Founder – Design 2 Occupancy

Guest Lecture

Department of Civil Engineering, ABES Engineering College has organized a Guest Lecture on "Use of waste materials in concrete as partial replacement of cement" for B. Tech (CE) - 3rd year students on 13th March, 2018.

Speaker – Dr. Rizwan Ahmad Khan, Associate Professor, Aligarh Muslim University, Aligarh.

Dr. Rizwan depicts the output of waste materials (slags, fly ashes, silica fumes, rice husk ash, etc.) suitable as cement replacement. These waste materials can partly be used, or processed, to produce materials suitable as aggregates or fillers in concrete. These can also be used as clinker raw materials, or processed into cementing systems.

SURVEY CAMP

Practical Wisdom is only attained in the school of experience which makes learning more effective. In order to enhance the skills of the under-construction Civil Engineers, Civil Engineering Department of ABES Engineering College, Ghaziabad successfully conducted a Two-Days Survey Camp for the 3rd year students scheduled from 7th - 8th Feb, 2018 (section – A) and 9th -10th Feb, 2018 (section –B) as a compulsory part of the university curriculum according to Dr. APJ Abdul Kalam Technical University for the 6th semester students.

This camp was aimed to groom Civil Engineering students with essential knowledge and exposure to the field work and to encourage leadership and teamwork skills. This survey camp

resulted in encouraging and supporting students emerging as leaders in several areas of academic provision particularly in the field of civil engineering.

The two day's camp was divided into two phases:

1. Plane Table Surveying
2. Contouring

Students were divided into six groups of 10-12 students monitored by faculty coordinator **Mr. Uzair Khan, Mr. Mohd Aslam & Mr. Nikunj Tomar.**

Building Skill during Interviews

Department of Civil Engineering, ABES Engineering College has organized one day seminar on Building skill during interviews by Knowlens Solution Pvt. Ltd on 30th Jan 2018. Key speaker Mr. Brijesh Agarwal, Founder Knowlens Pvt. Ltd. gives a brief introduction about interviews skill during placement interviews.

He also organized a small session to practice for placement derives.

Student Development Program

On

Universal Human Values and Professional Ethics

Department of Civil Engineering organized three days student Development Program for students of 2nd year, from 18th - 20th Jan 2018. In this workshop 86 students were participated and lecture was delivered by Mr. Sandeep Kumar Tripathi, Assistant Professor. First day of workshop totally devoted towards to understand the role of education in humane domain and students were showed keen interest to understand what to do and how to do. 2nd day of SDP directed towards the harmony in individual and harmony in self in that students were enriched with difference between self and body and how imagination of human being work on the basis of desire thought and expectation. On 3rd day harmony in society, nature and existence was covered in that students were explored the human goal, five dimension of society, and co-existence of pranic order, material order, human order and plant order. In last students given positive feedback in sense of seeing the reality as it is.

Workshop: Career in Gate, PSU

A career guidance program was organized by Department of Civil Engineering on 8th Nov, 2017 at Bhabha Block, ABES-EC for students of third year and final year.

IES Master is to provide quality education to aspiring students with commitment in every possible manner that helps them to achieve their career objective. The unique teaching methodology is designed in such a way that the aspirants are involved in study and practice sessions with an exam-oriented approach rather than just following the curriculum. IES Master ensures that each and every session is conducted with utmost care, and every student who attends the classes learns the complete module with all possible techniques. The sole objective of each session is to extract the best out of students. The students also feel content about what they have learnt to perform better in various competitive examinations.

In addition to the effective problem solving techniques and regular practice sessions, the bunch of question banks and comprehensive workbooks provided to students help them in getting a hands-on experience in solving questions during the real exams. Further, to help the students face the final stage of an exam's selection process i.e. the interview panel, a team of experts is there to guide and improve their overall personality.

Workshop on Mix Design

Department of Civil Engineering, ABES Engineering College has organized a workshop on "Concrete Mix Design" for B. Tech (CE) - 3rd year students on 23th Sept, 2017. The workshop was facilitated by Dr. S C Maiti, Member of BIS Technical Committees and Ex-Joint Director, National Council for Cement and Building Materials. He described the procedure of concrete mix design of different grade of concrete as per IS 10262:2009. Thereafter, third year B. Tech students have designed & tested successfully M-100 Grade concrete mix.

Industrial Visit: Wave One Tower, Sector -18 Noida

An industrial Visit of third year was organized by Department of Civil Engineering on 13th – 14th Sept 2017 at Wave one tower, Sector -18 Noida, for showing the construction process involved in building this iconic tower.

Wave One - a 41-storey iconic structure of more than 2 million sq. ft. of built-up area that is situated in the core of Sector 18, the commercial hub of Noida. Designed by internationally

recognized architect, Brennan Beer Gorman from New York, the tower is set to offer an experience like none other. A fusion of global expertise merged with the philosophy of positive energy flowing through the property, the architecture complies with the principles of Vaastu and Feng Shui, assuring prosperity and success. The tower is set to offer a unique experience and provide a harmonious blend of high street shopping, ultra plush offices, modern entertainment and leisure.

Students learnt about various parts of this building such as layout of building, foundation details, façade details, Reinforcement detailing, Commercial And Industrial Usage of Building, Parking Details, Terrace garden layout, wind Tunnel layout, HVAC etc.

Entrepreneurship Awareness Camp

Department of Civil Engineering has organized 3 days Entrepreneurship Awareness Camp from 13th -15th September 2017. Session was chaired by **Mr. Jaitender Singh,** Director, PHDCCI, New Delhi **& Mr. V K Mishra,** Director- Lakshmi Energy & Food Ltd. Key speakers brief about different policies formed by Government of India. Students also exposed with the concept and process of entrepreneurship development and motivated to become job providers rather job seekers.

SMART CITIES

Department of Civil Engineering has organized 1 day seminar on **"Smart Cities"** for Civil Engineering students on 4th September 2017 by Ms. Anjula Negi, Associate Director School of Infrastructure, RICS SBE, Noida. She gave a glimpse of need of technology in field of Civil Engineering & latest innovations in building infra structure. She also gives a brief intro about recent development by Government of India.

Industrial Visit - SPACE CHEM Enterprises Ghaziabad

Department of Civil Engineering has organized one day industrial visit cum pre placement talk to Space Chem Enterprises, Ghaziabad on 10th August 2017. Visit help to explore practical aspect of Civil Engineering to the faculty and their applications in latest Civil Engineering Structures. Visit is head by Dr. D. K. Sharma, HOD-CE, Mr. Himanshu Gupta, Assistant Professor (T& P Coordinator), and Mr. Nikunj Tomar, Assistant Professor.

The department of Civil Engineering of ABES Engineering College organized an inter-college technical fest ***SETUBANDH'17*** under the aegis of Indian Concrete Institute and Institute of Engineers India. The event was hosted under the shear guidance of **Prof. (Dr.) D.K. Sharma Director** (Admin.), DSW and HOD –CE.

Setubandh, themed bridges, had the aura of bridges in every competition which took place. It is second edition our intercollege departmental fest organized by 4th and 3rd year students **S. Abdul Karim** and **Kuvar Vibhor Singh**, President & General Secretary of "**Setuband'17**", this event witnessed a great deal of participations from our college as well as from all the prestigious engineering institutions in NCR.

This technical event had 9 competitions; **Beat D Euclid, Terramind, Popsio Gang Planck, Edifice, City of Smart Clans**, **Golden Gate, Total Station, Model Exhibition** and **Online quiz** giving the participants a fairly huge platform to showcase their talent.

The fest started with an opening note by Prof. (Dr.) D. K. Sharma Director (Admin.), DSW and HOD Civil, who encouraged the students to participate more and more and how they should emphasis on gaining practical knowledge besides acquiring theoretical knowledge.

This encouragement was followed by the commencement of program with **Edifice,** a technical presentation round where individual teams from different colleges gave presentation on the topic "Recent advancement in Civil Engineering technologies", with the panel of guest as the learned judges. **Edifice** was followed by the qualifying round of **Popsio Gang Plank**, the theme competition of the event, where students build up different bridges by popsicle sticks. These large scale bridges were assessed on various criteria. Team who qualified the first round competed with each other in the final round where a short presentation by the participants was necessary to showcase what makes there bridge better than the rest.

In between **Terramind**, a quiz competition was organized for the students, separately for second year and third and fourth year students. The qualifying round for the Terramind took place on the first day and final round on the second day.

Popsio-Gang-Planck, a bridge model made out of Popsicle sticks was organized for the students. The load bearing capacity of the bridge will be checked till the bridge breaks. This is a team event (comprise of 3 members). The maximum weight of the bridge shouldn't exceed 350 grams. Dimension (l*b*h) of bridge must be: 40cm* 10 cm* 10cm.

Golden Gate, this event will test the technical soundness of the participants. This is a computer based test and the software used in this competition will be "BRIDGE DESIGNER

2016 (second edition)". This is a team event (comprise of only 2 students). Participants shall be given virtual $ 5,00,000 to construct a 16 m long bridge. The merit criteria will be the creativity in the bridge design and judicial use of money.

City of Smart Clans, was a city planning event based on the concept of sustainable development. Participant were given $20000 Virtual money to buy basic facilities in auction and design the city. It was organized on both the days of Fest. It had team size of 3 persons.

Total Station, was a event to bring out the surveyor living within students .The event gave the platform to showcase surveying skills of students . This event ran on the both days of the fest, with team of 2 persons.

Model Exhibition, this event was held on the second day in which the students have to bring the models related to the field of Civil Engineering .The model showed were both working and non working.

Beat D Euclid, was an event to test the soft skills of the participants. The participants had to design the given Drawing on AutoCAD 2D. The team size was of 2 persons and was organized on second day.

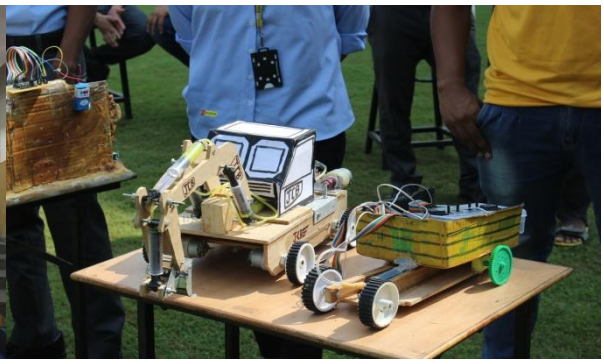
Online Quiz was the pre-event which was run for 10 days before Setubandh'17. In this technical questions related to civil engineering were asked on the Facebook page of Setubandh'17.

The efforts put by the volunteers and the core team alongside the teachers was quite appreciable and helped greatly in the smooth commencement of the technical fest. Going with the vision of the department, the students involved helped in fulfilling the dream of Prof. (Dr.) D.K. Sharma, to lead the department to new heights.

GLIMPSES OF FEST





WINNERS LIST

EDIFICE (PAPER PRESENATION):

College Name	Team Member	Rank
KIET	GAURAV KUMAR PATHAK	1st
	AMBIKESH RAI	
	HIMANSHU UPADHYAY	
RKGIT	RATNESH KUSHWAHA	2nd
	PRAKHAR SRIVASTAVA	
	SARTHAK SRIVASTAVA	
JSS	MUDIT CHATURVADI	3rd
	SRISHTI YADUVANSHI	
	DIVYANSHU TRIPATHI	
	BHAVYA SHRIVASTAVA	

GOLDEN GATE:

Rank	College	Participants Name	Prize
I	ABES-EC	Ayush Gaur	Certificate & 1000/- Cash
2	ABES-EC	Himanshu Johri	Certificate & 500/- Cash

BEAT D EUCLID :

College	Participants Name	Rank
ABES EC	Akshay	1st
	Shivam Garg	
ABES EC	Shivam Garg	2nd
KIET	Nirjhar joshi	3rd
	Manish kr verma	

MODEL EXHIBITION:

College Name	Team Member	Rank
KIET	ABHIJEET VERMA	1st
	JYOTI VERMA	
	BOBY SHARMA	
	VAIBHAV GAUR	
JSS	YASHWANT SINGH MAURYA	2nd
	DIVYA YADAV	
	SWAPNIL ANAND	
	PRANSHU SHUBHAM KUMAR	
RDEC	VIVEK CHAUHAN	3rd
	PRAKASH SINGH	
	JYOTI SHARMA	
	NIMA NAZ	

TOTAL STATION:

College Name	Team Member	Rank
JSS	ANURAG KUMAR	1st
	AMAN FAROOQ	
ABES EC	SANA FATIMA	2nd
	SUPRIYA	

CITY OF SMART CLANS:

College Name	Team Member	Rank
JSSATE	DIKSHA BHARTI	1st

College Name	Team Member	Rank
	ANUBHAV SINGH	
ABES EC	ANUJ KUMAR	2nd
	AVINISH JAISWAL	
	SIDDHARTH VERMA	
ITS	FIRDOSH KAUSER	3rd
	ABDUL RAHIM	
	MD. SADIQUE	
ABES EC	TEJAS SHARMA	3rd
	SACHIN PATEL	
	PRKAHAR	

ONLINE QUIZ:

College Name	Name	Rank
BBDIT	DEEPAK MITTAL	1st
BBDIT	VISHAL VERMA	2nd
RDEC	NIMA NAZ VIVEK CHAUHAN	3rd

TERRAMIND:

College Name	Name	Rank
RKGIT	SATYENDRA KUMAR	1st
JSS	KAUSTUBH AGRAWAL	2nd
ABES	NITIN GUPTA	3rd

CAMPUS AMBASSADOR:

College	Campus Ambassador	Rank
JSS	MUDIT CHATURVEDI	1st
RKGIT	UTKARSH BARANWAL	2nd

POPSIO GANG PLANK:

College Name	Team Member	Rank
RKGIT	NAVODAY	1st
	ARIJIT	
	ASHOK	
KIET	JITENDRA	2nd
	JYOTI	
RKGIT	MEGHA CHEEMA	3rd
	NIRJHAR JOSHI	
	MANISH KUMAR VERMA	
RKGIT	RIKESH	4th
	SHUBHAM NARAIN	
	SUJIT MAHTO	
ABES-EC	AKASH BHASKAR	4th
	ANURAG SINGH	
	ANIMESH SINGH	

Civil Engineering Sports Report

The students of the Department of Civil Engineering have shown an active and enthusiastic participation towards the Sports including Cricket, basketball, volleyball, table tennis, football and badminton. Their brilliance and outstanding performances on the ground hasn't only achieved victory for department but displayed their character, dedication and hard work towards the game. The department feels proud to enlighten the achievements in the field of sports during the recent times:

1. CRICKET

Achievements:

- **AKTU Zonal Sports Fest**-Silver Medal **SLS NOIDA 2k18-**Runnerups(3rdposition)
- **UTSAAH 2k18-**Silver medal

Team Players: Final Year: Prashant Singh(C), Shubham Kumar(VC), Rovin Singh, Shashank Srivastava, Abhishek Raj, Prabhash Patel**, 3rd Year:** Shashank Rajput, Nivesh Pal, Ayush Gupta, Ayush Shukla**, 2nd Year:** Utkarsh Singh**, 1st Year:** Vinay Saini

2. BASKETBALL

Achievements:

- **AKTU ZONALS Sport Fest**-Silver Medal
- **UTSAAH2K18**- Gold medal
- **SRM UNIVERSITY**-Gold Medal
- **GLA MATHURA**- Runner up(3rd position)
- **JP NOIDA SECTOR 128**-Runner up(3rd position)

Team players: Final Year: Prabhash Patel(c),Yash Nigam**, 3rd Year:** Prakhar**,** Tejas, Mukund, Sachin, **2nd Year:** Ashutosh, Praveen, Saksham

3. VOLLEYBALL

Achievements:

- **AKTU ZONALS Sport Fest**-Silver Medal
- **UTSAAH2K18**- Gold medal

Team Players: Final year-Rajan Mogha(c)**, 3rd year-** Prakhar**,**Tejas,Umesh,Sunny,Shubham Rai,Swapnil**, 2nd year-** Chitrak, **1st year-** Vishank Rana

4. TABLE TENNIS:

Achievements:

- **UTSAAH2K18:** Gold Medal
- **GLA MATHURA MAITREE18:** Silver Medal

Team Players: Final Year-Rishabh Verma(c)**, 3rd year-** Anmol Singh**, 2nd year-** Dharya Mittal

CONCLUSION: The Department of Civil Engineering is privileged to have such an amazing sportsmen in the college. Sports not only brings physical fitness but also roots self belief and mental fitness in the individual. The department gives best wishes to all sportsmen and anticipates more awards and achievements in future.

- ***REMEMBER SKY IS THE LIMIT***

FACULTY ACHIEVEMENTS

- **Dr. D.K. Sharma** invited as keynote speaker on World Environment Day at Pragati Maidan, New Delhi, 5 June, 2018.
- **Dr. D.K. Sharma** chaired in International Conference at TIT Groups of Institution Bhopal Key note speaker in **International Conference on Recent Trends in Mechanical Engineering at TIT Bhopal, 27th -28th March, 2018.**
- **Mr. Uzair Khan** has presented research paper at **International Conference on Advances in Construction Materials and Structures (ACMS-2018),** 7th -8th March, 2018, **IIT – Roorkee.**
- **Dr. D.K. Sharma** chaired in International Conference on "Smart Cities with Focus on Environmental Challenges- SCFEC-2018"at ABES –EC, 10th – 11th April, 2018**.**
- **Mr. Uzair Khan and Ms. Garima Srivastava** members of **Editorial board** in International Conference **on "Smart Cities with Focus on Environmental Challenges- SCFEC-2018", 10th – 11th April, 2018.**
- **Mr. Uzair Khan** has appreciated for **NSS Club Counselor** on felicitation ceremony of Clubs ABES EC, Ghaziabad, 30th May, 2018.
- 3rd year students in Civil Engineering Department are working on **High Performance Concrete**, and have designed & tested successfully **M-100 Grade concrete mix,** under the guidance of **Prof.(Dr.) D.K. Sharma,** Director (Admin) & HoD-CE & **Mr. Uzair Khan**, Assistant Professor CE.

PUBLICATIONS

- **Uzair Khan**, **D K Sharma** (2018), **A Review - Study of Mechanical Properties of Fibre Reinforced Self Compacting Concrete,** *International Conference Advances in Construction Materials and Structures (ACMS-2018),* Indian Institute of Technology, Roorkee, 7th - 8th March, 2018.
- **D K Sharma**, **Parul Agrawal** (2018), **Neural Network Management – A study on Heat Transfer Coefficient,** *International Conference on "Smart Cities with Focus on Environmental Challenges- SCFEC-2018",* 10th – 11th April, 2018
- **D K Sharma**, **G. A. Rizvi** (2018), **Study on Summer Cooling and Ground Temperature Variation,** *International Conference on "Smart Cities with Focus on Environmental Challenges- SCFEC-2018",* 10th – 11th April, 2018.
- .**D K Sharma** (2018), **A Study -To Provide Proper Structure for the Analysis on the Obstructions to Sustainable Energy Diffusion,** *International Conference on "Smart Cities with Focus on Environmental Challenges- SCFEC-2018",* 10th – 11th April, 2018.
- Kavika Sharma, **D K Sharma** (2018), **Analysis of Mechanical Behavior of Polypropylene and Human Hair Fibers,** *International Conference on "Smart Cities with Focus on Environmental Challenges- SCFEC-2018",* 10th – 11th April, 2018.
- K.K. Dwivedi, **D K Sharma** (2018), **A Study on the Wind Energy: Effect of Global Warming,** *International Conference on "Smart Cities with Focus on Environmental*

Challenges- SCFEC-2018", 10th – 11th April, 2018.

- **D K Sharma,** Alok Goyal (2018), **Analysis of Mechanical Properties of Bamboo and Jute Composite Fiber,** *International Conference on "Smart Cities with Focus on Environmental Challenges- SCFEC-2018",* 10th – 11th April, 2018.
- Anushita Jain, Ayush Jain, **D K Sharma** (2018), **Managing the Parking Space and Multi Level Car Parking System,** *International Conference on "Smart Cities with Focus on Environmental Challenges- SCFEC-2018",* 10th – 11th April, 2018.
- **Uzair Khan,** S P Singh, **Investigation on the Strength Properties of Hybrid Fibre Reinforced Self Compacting Concrete,** *UKIERI Concrete Congress, Concrete: The Global builder, National Institute of Technology, Jalandhar* (Abstract Accepted).
- S. Abdul Karim, **Uzair Khan** (2018), **To Study the Compressive Strength of Geopolymer Concrete,** *International Conference on "Smart Cities with Focus on Environmental Challenges- SCFEC-2018",* 10th – 11th April, 2018.
- **Uzair Khan,** Vinay Singh, Swapnil Katiyar, Pankaj Yadav (2018), **A Review –Study of Mechanical Properties of Fibre Reinforced Concrete,** *International Conference on "Smart Cities with Focus on Environmental Challenges- SCFEC-2018",* 10th – 11th April, 2018.
- **Rakesh Srivastava, Uzair Khan** (2018), **A Study on Partial Replacement of Sand by Fine Aggregate Obtained From Demolished Concrete Waste,** *International Conference on "Smart Cities with Focus on Environmental Challenges- SCFEC-2018",* 10th – 11th April, 2018**.**
- Kamal Kumar Sharma**,** Himanshu Sharma, **Uzair Khan** (2018), **A Review on Infrastructural Needs of Smart Cities,** *International Conference on "Smart Cities with Focus on Environmental Challenges- SCFEC-2018",* 10th – 11th April, 2018**.**
- Sikandar Shakil, Bergene Bassa Hallala, Tanveer Ahmad, **Uzair Khan** (2017), **Study of Elastic Property of RCC Beam using ANSYS,** *IJSRD - International Journal for Scientific Research & Development*, Vol. 5, Issue 06, 2017, ISSN : 2321-0613. 2094-2098.
-

CONFERENCES/ WORKSHOPS/FDP/ SHORT TERM COURSES ATTENDED

International Conference

- **Dr. D.K. Sharma** has attended International Conference on **Recent Trends in Mechanical Engineering, TIT Bhopal,** 27th -28th March, 2018.
- **Mr. Uzair Khan** has attended International Conference on **Advances in Construction Materials and Structures (ACMS-2018),** IIT – Roorkee, 7th -8th March, 2018.

Short Term Course

- **Mr. Uzair Khan** has attended short term course on **Advances in Concrete Composite** at Dr B R Ambedkar National Institute of Technology, Jalandhar, 22- 26 December 2017.

NPTEL Course

- **Mr. Uzair Khan** has completed 12 Week **NPTEL Online Certification Course** (Funded by Ministry of HRD, Govt of India) **Design of Reinforced Concrete Structures** with **79 % (Elite),** conducted by **IIT – Kharagpur**, July – 0ct 2017.

STUDENTS ACHIEVEMENT

- **Mr. Avnish Jaiswal** (B. Tech-4th Year) and **Mr. Siddhartha Verma** (B. Tech -3rd Year) secured **1st** position at the Inter IGBC Student Chapter Competition 2017: World Green Building Week, Organized by CII- Indian Green Building Council.
- **Mr. Anuj Sahu** (B. Tech -2nd Year) has successful completed 12 Week NPTEL Online Certification Course - **Design of Reinforced Concrete Structures** conducted by **IIT – Kharagpur**, July – 0ct 2017.
- **Mr. Chaitanya Raj** (B. Tech-3rd Year) has successful completed 12 Week NPTEL Online Certification Course- **Soil Mechanics Geotechnical Engineering –I**.
- **Mr. Tarun Mittal** (B. Tech-2nd Year) has successful completed 8 Week NPTEL Online Certification Course - **Earth Sciences for Civil Engineering Part - I & II**
- **Mr. Anuj Sahu** (B. Tech -2nd Year) has successful completed 12 Week NPTEL Online Certification Course - **Soil Mechanics Geotechnical Engineering –I**.
- **Mr. Abhishek Kumar** (B. Tech -2nd Year) secured **10th** position in CIDC competition all over India.
- **Mr. Mohd Faiz** (B. Tech - 4th Year) has appreciated for **President** in **NSS Club** on felicitation ceremony of Clubs ABES EC, Ghaziabad, 30th May, 2018.
- **Mr. Abhishek Singh Raj** (B. Tech - 4th Year) has appreciated for **Advisor** in **NSS Club** on felicitation ceremony of Clubs ABES EC, Ghaziabad, 30th May, 2018.
- **Mr. Kuvar Vibhor Singh** (B. Tech – 3rd Year) has appreciated for **Treasurer** in **NSS Club** on felicitation ceremony of Clubs ABES EC, Ghaziabad, 30th May, 2018.

Research / Review Papers

A REVIEW STUDY OF MECHANICAL PROPERTIES OF FIBRE REINFORCED SELF COMPACTING CONCRETE

Uzair Khan[1], D K Sharma[2]

[1]Assistant Professor, Deptt. of Civil Engg. ABES-EC, Ghaziabad
[2]Professor, Deptt. of Civil Engg., ABES-EC, Ghaziabad

ABSTRACT

Self-compacting concrete (SCC) is a high performance concrete which flows under its own weight through restricted sections without segregation, bleeding and does not require any external vibration for compaction. Fibres are spread uniformly in the mix, which prevents or delays initiation and propagation of mix cracking. This supplement changes large single cracks into a system of multiple smaller cracks, which is desired from safety and durability point of view. This paper put forward the properties of different fibres, used for structural applications accompanying the concise overview of related to the effects of different types of fibres on the mechanical properties of SCC. The merging of different fibres in the mix has been found to strengthen the hardened properties of SCC in terms of its compressive strength, tensile strength and flexural strength. The fresh properties of fibre reinforced self-compacting concrete (slump flow, V- funnel, L-box, T50 cm flow) decreases with an increase of amount of fibres content. Steel fibres improve split tensile strength and flexural strength and polypropylene fibres acts as crack arrester and improves the bond with cement matrix.

Key Words: *Steel fibres, Polypropylene fibres, Glass fibres, Basalt fibres, Mechanical properties of fibre reinforced self-compacting concrete*

INTRODUCTION

Concrete, of which behavior depends upon its constituent phases such as cement mortar, aggregates and aggregate–paste interface, is most widely used construction material in all over the world. As a result of progressive development in the field of technology, sustainable construction has become an indispensable part of the civilization. Therefore, soaring demand for more durable, stronger, and long lasting structures makes the development of concrete necessary. Self-compacting concrete, which was developed at the end of the eighties to enhance the durability of concrete structures by Japan, is a developed type of traditional concrete *(Okamura and Ouchi 2003)*. Self-compacting concrete is highly flow able and coherent which provides spreading and compacting under its own weight without any vibration. Self-compacting concrete can easily fill small interstices of formwork and complex shapes in structural members and it can also be pumped through long distances. Limiting the maximum size of coarse aggregates and content, using chemical admixtures such as viscosity modifying admixtures and new generation high range water reducers, incorporating mineral admixtures, and using low water-to-binder ratios are the common practice to achieve self- compatibility in the SCC *(Okamura and Ozawa 1995)*. Self-compacting concrete is produced by using high cement content. For this reason, some problems such as high hydration heat, high autogenously shrinkage and high cost can be introduced. In addition, serious environmental impacts can be occurred due to the natural resources consumption and carbon dioxide emissions associated with cement production.

Utilization of mineral admixtures such as fly ash (FA) and silica fume (SF) can be a remedy to reduce the cost of the SCC production and environmental impacts due to high cement content utilization.

Self-compacting concrete is defined as that concrete which flows under its own weight through restricted sections without any segregation and bleeding and doesn't require any external vibration for compaction *(Murthy et al. 2012).* It is a concrete mixture, which is suitable for placing in difficult conditions and also in congested reinforcement, without vibration. In principle, a self – compacting must:

i. Have a fluidity that allows the self – compaction without external energy
ii. Remain homogeneous in a form during and after placing process
iii. Flow easily through reinforcement

Self-compacting concrete has been recently used in various structural applications, however the relatively higher cementations material cost still hampers its widespread use. As compared to normal conventional concrete SCC is more costly because of relatively high demand of cementations materials, chemical admixtures -high range water reducing admixtures (HRWR), viscosity modifying agents (VMA). The process of selecting suitable ingredients for concrete and determining their relative proportions so as to obtain concrete of desired strength, durability and workability as economically as possible is termed as mix design of concrete.

Self-Compacting Concrete

Self-compacting concrete is a high performance concrete which flows under its own weight through restricted sections without bleeding and segregation *(Aggarwal et al. 2008).* Self-compacting concrete does not require any external vibration for consolidation *(Murthy et al. 2012).* Self-compacting concrete completely fills the formwork and achieves full compaction even in the presence of heavily congested reinforcement mesh. The production process of SCC is same as that of normal conventional concrete, but its production requires suitable selection of aggregates and finely ground cementitious materials along with proper water powder (w/p) ratio to maintain its workability without bleeding and segregation. Proper selection of finely ground aggregates increases the packing density of solid particles and enables the reduction of water content. For producing SCC incorporation of highly finely ground powder (FA and SF) is necessary to enhance the slump value and cohesiveness. Further water reducing admixtures or super plasticizer (SP) and VMA are also used in producing SCC.

Fibre Reinforced Self Compacting Concrete

Fibre reinforced self-compacting concrete (FRSCC) is produced from cement, various size of aggregates which incorporate with fibres. It can be defined as concrete containing dispersed randomly oriented fibres *(Sahmaran et al. 2005).* According to the material and geometrical parameters like: diameter, length, aspect ratio, longitudinal profile and cross-sectional shape, the fibres enhances the mechanical parameters of the mix under tension and flexure. Among the fibres available in the market the best performance can be observed for steel fibres *(Naaman 2003); (Pajak and Ponikiewski 2013).*

Hybrid Fibre Reinforced Self Compacting Concrete

Hybrid fibre reinforced self-compacting concrete (HFR-SCC), it is a new kind of composite material produced adding different type, shape and dimensions of fibres in a SCC *(Kumar 2017).*

Adding two or more fibres to the concrete mix enhances the strength of the concrete and it is known as HFR-SCC. The fracture properties of concrete gets increased upon the addition of fibres. Addition of steel fibres improves the flexural strength as well as the deflection capacity. The formation of micro cracks can be reduced when fibres are used. Inclusion of hybrid fibres reduces the generation of first crack and increases the failure load *(Nandhini and Manju 2017).*

TYPES OF FIBRES

Steel Fibres

Steel fibres are the most worldwide used fibres in the building industry. There are various types of steel fibres such as wave cut, end large steel fibres, deformed sheet and moreover hooked end steel fibres. Steel fibres acts as a bridge tortured their cracks propagation, modernize several characteristics and properties of the concrete. The addition of steel fibres does not change the compressive strength and modulus of elasticity of the concrete. Steel fibres play the most important role in enhancement of the flexural parameters of HFR-SCC *(Pajak 2016).*

Fig -1 Steel fibres

Advantages

i. Crack Control
ii. Fatigue & impact resistance
iii. Steel fibres result in more homogenous mix in concrete
iv. Flexural strain capacity is enhanced.
v. Reduces material consumption & saves cost
vi. Reduces construction time

Polypropylene Fibres

Polypropylene fibers are new generation chemical fibres. They are manufactured in large scale and have fourth largest volume in production after polyesters, polyamides and acrylics. About 4 million tonnes of polypropylene fibres are produced in the world in a year *(Madhavi et.al 2014).* Polypropylene fibres are one of the cheapest & abundantly available polymers. Polypropylene fibres are resistant to most chemical & it would be cementitious matrix, which would deteriorate first under aggressive chemical attack. Its melting point is upper (about 165 degrees centigrade).

Advantages

i. Impact resistance of concrete.
ii. Fire resistance of concrete.
iii. Reduce small plastic shrinkage and cracking throughout the hardening of concrete.

Fig -2 Polypropylene fibres *(Madhavi et al. 2014)*

Basalt Fibres

It is a type of igneous rock formed by the rapid cooling of lava at the surface of the planet. It is the common rock in the Earth's crust. Characteristic of basalt rock vary from the source of lava, rate of cooling and historical exposure to the elements. Good quality fibres are made from basalt deposits with uniform chemical makeup. Basalt fibres are made by melting the quarried basalt rock at about temperature 1400^0C and extrude through small nozzles to create continuous filaments of basalt fibres. Basalt fibres have alike chemical composition as glass fibres but have better-quality strength characteristics. Advantages of using rock fibres in concrete are that there will be zero crack in the concrete, satisfactory workability of fresh concrete, dry shrinkage is zero, increase in impact resistance, increased ductility of the concrete due to addition of fibres.

Fig -3 Basalt fibres

Glass Fibres

It is also called fibres glass. It is made from extremely fine fibres of glass. Fibres glass is a lightweight, extremely strong, and robust material. Mechanical properties of glass fibres are lower than carbon fibres and it is less stiff, the material is usually typically far less brittle, and the raw materials are much less expensive. When compared to metals, its bulk strength and weight properties are also very good and it can be easily formed using molding processes. Addition of the glass fibres and polyester fibres improves the compressive strength, tensile strength and flexural strength *(Bharathi 2017).*

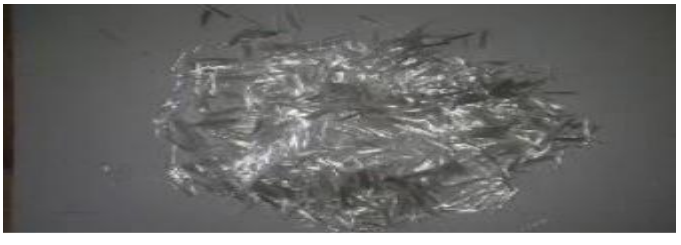


Fig - 4 Glass fibres *(Hemalatha & Rose 2016)*

LITERATURE REVIEW

Effect of Fibres on the Properties of SCC

Sahmaran et al. (2005) studied the comparison of SCC and SCC combined with the FRC (Fibre Reinforced Concrete). Two different types of steel fibres - Dramix ZP 305 (with hooked ends) and OL-6/16 (with straight ends) of sizes 30 mm and 6 mm and aspect ratios 55 and 37.5 were used. Six mixes were prepared, one control and five fibres reinforced with the entire ingredient as constant expect steel fibres. The fibre ratio of ZP 305 to total fibres was taken as 100, 70, 50, 30 and 0 %. Compressive strength and ultra-sonic pulse velocities at 28 and 56 days were determined. Slump flow test, J ring test and V- funnel test were used for testing of workability. As increase of in compressive strength was observed as the OL-6/16 was increased in all the mixes. Compared with mix having only ZP 305, when only OL-6/16 was used both 28 and 56 days strengths increase in order of 20% due to relative smaller dimensions of OL-6/16 fibres which delay and to a certain extend prevent the formation and propagation of micro cracks in the concrete mix. In case of split tensile test, the highest split tensile strength occurred in the mix having equal composition of both the fibres.

Mazaheripour et al. (2011) studied the effect of polypropylene fibres on the properties of fresh and hardened lightweight SCC. Different mix proportions were prepared according to the Nan-su's method with varying values of polypropylene fibres, SP and some other materials. Slump value, V-funnel and U-box tests were performed to access workability and compressive strength, splitting tensile strength, elastic modulus and flexural strength was determined too. It was concluded that with the increase in the percentage of polypropylene fibres, the workability decreases. There was no significant change in the compressive strength and elastic modulus values. Splitting tensile strength and flexural strength values were increased by addition of polypropylene fibres in light weight SCC.

Kamal et al. (2014) studied the mechanical properties of FRSCC mixes. They studied the optimum dosage of both steel and polypropylene fibres content to be used in SCC. The optimum dosage content for polypropylene fibres was 1% by cement weight while, the optimum dosage content for steel fibres was 0.75% by cement weight. It was found that the addition of polypropylene and steel fibres increased the compressive strength by 13% and 37% at 28 days compared to the SCC mix without fibres.

Muthupriya et al. (2014) investigated strength study on FRSCC with FA and ground granulated blast furnace slag (GGBFS). Self- compacting concrete mixes were produced by replacing the cement with 30%, 40% & 50% of GGBFS, FA and with addition of polypropylene synthetic fibres of 0.05% and 0.10% to the SCC concrete. Slump value, V-funnel, L- box, T50 (sec) and U-box tests were performed to access workability and compressive strength, splitting tensile strength and flexural strength was determined too. Mix which has 50% mineral admixtures and 0.05% fibres additive give good workability results but in case of 30% mineral admixtures and 0.1% fibres additive gives less workability results but it gives under permissible limits. The workability of SCC reduces with the presence of polypropylene fibres. The mix which has 50% mineral admixtures and 0.05% fibres additive give less strength results but in case of mix which have 30% mineral admixtures and 0.1% fibres additive gives high strength.

Rohilla, et al. (2016) made a comparative study of mechanical properties of SCC, reinforced with different types of fibres. The fibres used were 12 mm long chopped glass fibres, carbon fibres and basalt fibres. The volume fractions of fibres were taken 0.0%, 0.1%, 0.15%, 0.2%, 0.25%, and 0.3%. They studied the effect of fibres on fresh properties of concrete, compressive strength, splitting tensile strength and flexural strength of SCC specimens.

It was found that that reduction in slump flow was observed maximum with carbon fibres, then basalt and glass fibres respectively. Carbon fibres absorbed more water than others and glass absorbed less. Addition of fibres to SCC improves the hardened properties of the mix. The optimum dosage content for carbon fibres, glass fibres & basalt fibres were 0.15%, 0.2% and 0.25% respectively.

Satheskumar et al. (2017) investigated the structural behavior of SCC with basalt fibres. For the development of SCC, mineral admixtures - SF and basalt fibres were used. Self-compacting concrete properties were studies on the various percentages of SF & basalt fibres. Basalt fibres were added in 0.5%, to 3.5% by weight of fine aggregates and SF was added in 10%, 12.5% and 15% by weight of cement. It was observed that addition of the basalt fibres tested improves the compressive strength, tensile strength, durability load carrying capacity of ordinary reinforced cement concrete in flexure even with small dosage levels of 0.5% and 3.5 %. It was found that the result obtained in 3.5% is more when compared to the results obtained for 0.5%.

Effect of Hybrid Fibres on the Properties of SCC

Pajak (2016) carried out an experimental program to investigate the compressive and flexural properties of HFR-SCC with the combination of steel and polypropylene fibres. Three volume ratios of steel fibres (0.5%, 1.0%, 1.5%) were mixed with two amounts (0.3%, 0.9%) of two types of polypropylene fibres (PP19 and PP38). Fresh properties of concrete deceases with an increase in the amount of fibres. Fibers volume ratio more than 1.4% the mixes did not satisfy the passing ability requirement for the SCC. Steel fibres play the most important role in enhancement of the flexural parameters of HFR-SCC mixes. The addition of polypropylene fibres reduced the flexural tensile strength.

Bharathi (2017) conducted experimental study on HFR-SCC. Hybrid fibre reinforced self-compacting concrete was developed by addition of glass and polyester fibres to SCC. Addition of the glass fibres and polyester fibres improves the compressive strength, tensile strength and flexural strength even with small dosage levels of 0.8%. Compressive strength and split tensile strength of the mix (SCC with 0.6% glass and 0.2% polyester fibres) was found to be 42% and 5.55 % respectively as compared to normal SCC.

Kumar (2017) used hybrid fibres i.e. crimped steel fibres and hooked end steel fibres in different proportions and studied their effect on hardened properties of SCC. The maximum fibre content was 2% by weight of cement. The hardened properties such as compressive strength, split tensile strength and flexural strengths of all FRSCC mixes giving better properties when compared to control mix. The compressive strength of HFR-SCC mixes is decreased compared to single fibre reinforced SCC mixes.

Nandhini et.al (2017) presented the study on HFR-SCC. Hybrid fibres (steel & polypropylene
fibres) were along with the mineral admixtures such as FA, SF, limestone powder (LP) and marble powder (MP). Steel & polypropylene fibres were used in 0.75% and 0.25% respectively. Mechanical properties were determined by compressive strength, split tensile strength and flexural strength. Compressive strength, split tensile strength and flexural strength of the mix 10SFLPMP -HF was found to be 28.37%, 56.61% and 67.59% higher than the control mix. Steel fibres improve split tensile strength and flexural strength. Polypropylene fibres acts as crack arrester and improves the bond with cement matrix.

Table-1: Selected summary of FRSCC & HFR-SCC

Reference	Fibres used	Properties investigated	Major conclusions
Rao and Ravindra (2010)	Steel fibres	Fresh properties, Hardened properties,	Optimum volume fraction and aspect ratio of fibres for good performance regarding strength was found to be 1% and 25 respectively. They also concluded that using high-volumes of FA increases the workability characteristics of SCC mixtures.
Syal et al. (2013)	Hybrid fibres i.e., steel and polypropylene fibres	Workability, Compressive strength	Usage of steel fibres increases the overall strength and the polypropylene fibres, due to its light weight, is helpful in optimizing the self-weight of SCC.
Khaloo et al. (2014)	Steel fibres	Fresh properties, Compressive strength, Splitting tensile strength, Flexural strength	Different steel fibres volume fractions were studied, and reference mixes considered were of strength 40MPa and 60Mpa. Results showed that with addition of 2% steel fibres workability reduces far below the minimum limits specified by European Federation of Specialist Construction Chemicals and Concrete Systems (EFNARC). Splitting tensile strength, flexural strength were increased by the increasing the percentage of fibres; however compressive strength was decreased by increasing the percentage of fibres.

CONCLUSIONS

The following conclusions are drawn based on the literature review.

1. Workability of self-compacting concrete decreases with an increase in the amount of fibres.
2. Addition of fibres to self-compacting concrete enhances the mechanical properties like compressive strength, flexural strength and split tensile strength of the mix.
3. Steel fibres play most important role in enhancement of mechanical properties of self-compacting concrete.
4. Hooked or Crimped steel fibres are more effective than straight steel fibres as better bonding.
5. Polypropylene fibres acts as crack arrester and improves the bond with cement matrix.
6. Glass fibres reduce the possibility of cracks.
7. Carbon fibres absorb more water as compared to glass and basalt fibres.
8. Basalt fibres reinforced with self-compacting concrete exhibited maximum increment than carbon and glass reinforced with self-compacting concrete.

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Review of Effect of Industrial Contaminants on Soil

Abhishek Srivastava

Assistant Professor, ABES Engineering College, Ghaziabad

The rapid growth in population and industrialization cause generation of effluents in large quantities. The effluents generated from industrial activities in bulk are discharged either treated or untreated over the soil leading to changes in soil properties causing improvement or degradation of engineering behavior of soil. Soil contamination or soil pollution is caused by the presence of xenobiotic (human-made) chemicals or other alteration in the natural soil environment. It is basically caused by industrial work, agricultural chemicals, or improper disposal of waste. The most common chemicals involved are pesticides, chromium, lead, and other heavy metals. Contamination is correlated with the extent of industrialization and intensity of chemical usages. If there is an improvement in engineering behavior of soil, there is a value addition to the industrial wastes serving the three benefits of safe disposal of waste, using as a stabilizer and return of income on it. If there is degradation of engineering behavior of soil then solution for decontamination is to be obtained.

Introduction

The Index and Engineering properties of the ground gets modified in the vicinity of the industrial plants mainly as a result of contamination by the industrial effluents disposed off. The major sources of surface and subsurface contaminations are the disposal of industrial wastes and accidental spillage of chemicals during the course of industrial works. The leakage of industrial effluent into subsoil directly affects the use and stability of the supported structure. Results of some studies indicate that the detrimental effect of seepage of acids and bases into sub soil can cause severe foundation failures among various means; disposal through land is simple and is being widely used. All types of pollution have either direct or indirect effects on soil properties. Action of any contaminants in soil depends upon the Physical and Chemical properties of the contaminant as well as its interactivity with that of soil. For the matter of soil contamination in the world, Environmental agencies study like Department
for Environment Food & Rural Affairs (DEFRA) in England, United States Environmental Protection Agency (USEPA) in America, Environmental Protection Administration (China), Ministry of Environment (MOE) in Japan, National Environment System SISNAMA (Brazil) and European Environment Agency (European Union) and also so many non-government authorities about contaminated land and risk assessment for hazardous and non-hazardous material. Different remediation technologies can be used according to country specific conditions. For study purposes, soil contamination can be assessed both from a functional perspective and a structural perspective.

The tannery industries are important industries in the country. Industries consume large amount of water and consequently generate large volume of waste water which contains various organic and inorganic materials as well as toxic trace elements.

A huge amount of effluents generated from tanning industries is being discharged on land or into water courses. Addition of tannery effluents is reported to cause deflocculation of soil particles and increase in the N, P and K levels of soils. The leather processing requires large quantities of chemicals like sodium chloride, chromium sulphate, calcium salts, ammonium

salts, sodium sulphide, acids, alkalies, fat liquor and organic dyes. The tannery effluents are ranked as the highest pollutants among all the industrial wastes.

Review Studies

Belay (2010), the results of this review paper indicated that chromium is highly toxic and carcinogenic to human beings, animals, plants and the general environment (soil and water sediment). It is found out that chrome is the primary threat when ever tanning industry comes in to practice. Though many treatment options were evaluated to prevent its consequence on the environment, neither of them could achieve to treat or recover chrome 100%. Treatment options are either; inefficient, complicated, energy demanding, costly or applicable to a certain parts of the world due to technology or skilled man power demand. Therefore, to tackle this serious challenge stringent environmental regulation with law enforcement has to be exercised to use better treatment system which is widely applicable. Polluters must also know the environmental cost of their industry and treated according to polluter pay or precautionary principles. Moreover, the general public has to be aware of it and all concerned organizations and governments has to work hand in hand to reach zero discharge level or at least to attain the EPA chrome discharge limit.[1]

Chittaranjan M et al (2012), if there is degradation of engineering behavior of soil then solution for decontamination is to be obtained. Hence an attempt is made in this investigation to study the effect of certain Industrial effluents such as Textile effluent, Tannery effluent and Battery effluent on the California Bearing Ratio Value of an expansive soil. [2]

Datta et al (2000), in this paper it is mention that tannery effluents also contain several major primary and secondary plant nutrients (N, P, K, S, Mg, Ca, etc.) as well as micronutrients and heavy metals. Addition of tannery effluents was reported to cause deflocculation of soil particles and increase in the N, P and K levels of soils.[3]

Deka et al, (2012), nineteen different soil samples were collected from different sites for study at East Guwahati industrial zone. The study revealed that the top soils in the area are heavily polluted with heavy metals. Statistical analysis of the data is presented to find out the correlation among measured variables. Resulting coefficient of correlation between heavy metals and other soil properties such as organic matter, pH etc established a nonlinear relationship between the parameters.[4]

Gangwar et al (2010), in this paper an investigation has been made to ascertain the metals concentration in the effluents and associated soil and groundwater samples collected from textile and tannery industries located near Haridwar. The results showed that all metals such as Cr, Fe, Mn, Cu, Pb and Cd exceeded the standard limits in effluents of textile and tannery industries and associated soil samples. [5]

Joshi et al (2000), in this paper it was pointed out that the adverse effects of tannery effluents get progressively reduced with dilution of effluents. But database is not adequate to indicate the effect of long-term use of the effluent on soil health. [6]

Kookana et al (1998), the chemistry of Cr in waste material is complex and is controlled by the redox coupling reactions and pH. This paper provides an overview of Cr chemistry in soils and its implications for the dynamics of Cr at tannery waste-contaminated sites. [7]

Liu S et al (2013), the distribution of hexavalent chromium in the weathering slag was studied, as well as the influenced factors of aqueous agent leaching chromium. Results

showed an optimal leaching condition: the chromium particle size is 100– 200 mesh, the liquid-solid ratio is 20:1, the leaching time is 4h–8 h. Enhanced temperature and reduced pH value are benefit to hexavalent chromium leaching. Considering the equipment corrosion of low pH, the optimal pH value is 3–4. [8]

Mahimairajah et al (1998), in this study the extent and severity of contamination of the soils around selected tanneries in the Vellore district was investigated. Samples of tannery effluents and sludge were collected. Surface (0- 15 cm) and subsurface (15-60 cm) soils were sampled around the tanneries and analyzed for total Cr, pH and electrical conductivity (1:5 soil: water), and salt content. The results showed that the effluents varied considerably in pH (6.17- 8.17), EC (10.4-23.0 dS/m), Na (2040- 9000 mg/L) and total Cr (620- 26 200 ~mg/L). The sludge contained higher Cr' (1179- 16158 mg/kg) than the effluent. Variation was also observed between tanneries. Though no definite pattern has been observed in the distribution of Cr at different depths, Cr accumulation ranged from 569- 79865 mg kg-I in surface and subsurface soils and the reasons for subsurface accumulation are not clear. Soils around the closed (old) tanneries were particularly high in Cr relative to the existing tanneries. This may be attributed to the more stringent guidelines recently (last 15 years) imposed by the Tamil Nadu Pollution Control Board. The speciation of Cr, determined by a sequential fractionation procedure, indicated that over 85- 99% of Cr was extractable by HNO3. The Cr extractable by NaOH (organic) and EDTA (remaining organics plus iron oxide) constituted only 0.5- 15%. Though no Cr (soluble) was detected in the water extracts, concentrations ranging from III 5.5 to 128 J.lg kg 1 obtained in KNO3 extract are of concern, because this fraction represents the exchangeable and absorbed Cr. [9]

Maria et al (1999), the objective of the study was to speciate and to evaluate various soils Cr species in relation to soil properties. Adsorption and reduction of added Cr (VI) were characterized in soils with contrasting pH, organic matter contents, and chemical and mineralogical properties. [10]

Montes et al (2007), in this paper Seventeen chemical parameters were monitored at six different depths on soil profile, focusing on metals and nitrate in soil solution. Four Factors accounted for 79.20% of the total variance, of which the most important were: Factor 1 (48.35%) showed significant loadings for Mn^{2+}, Na^{+}, K^{+}, Ca^{2+}, Mg^{2+}, Cl^{-}, Pb^{2+} and electric conductivity, strongly influenced by high load effluent disposal; Factor 2 (12.21%) was related with SO_4^{2+}, Factor 3 (10.16%) associated with Cu^{2+} and Zn^{2+} and Factor 4 (8.49%) associated with nitrogen mineralization dynamics after high disposal.[11]

Naidu et al (1998), Chrome tanning is preferred, but the use of Cr (VI) during processing poses the problem of its release in waste water. This paper presents an overview of the tanning industry in India, and describes the current management and waste treatment strategies and the challenges posed both to the industry and to the public. [12]

Narshima Rao, A.V et al (2012), in this paper the soil used in this investigation was classified as “SC” as per I.S. Classification system. It was highly expansive nature as the Differential Free Swell Index is about 255%.The Proctor’s compaction tests were conducted on the soil treated with Textile, Tannery and Battery effluents at different percentages from 20 to 100% in increment of 20%.In order to compare the results of admixed soil, tests were also conducted on untreated soil. There was a decrease in Optimum Moisture Content values and increase in Maximum Dry Unit Weight of soil was treated with Tannery effluent and whereas increase in Optimum Moisture Content values and decrease in Maximum Dry Unit weight of soil with Textile and Battery effluent.[13]

Pavel et al, (2010), the objective of the study was to speciate and to evaluate various soils Cr species in relation to soil properties. Adsorption and reduction of added Cr (VI) were characterized in soils with contrasting pH, organic matter contents, and chemical and mineralogical properties. Batch experiments are used to determine equilibrium sorption parameters for chromium by soil and to study sorption kinetics that is relevant to soil contamination sites. The distribution of metal contaminant in soils can be strongly localized by transport limitations and redox gradients within soil aggregates. The soils adsorption and reduction capacities were eventually overwhelmed, however, and permitted the passage of Cr (VI) into the underlying ground water. [14]

Rae et al (2000), in this paper the effect of certain industrial effluents on Plasticity and swelling behavior of an Expansive Soil was presented. The soil used in this investigation is classified as "SC" as per I.S. Classification system. It is highly expansive nature as the Differential Free Swell Index is about 255%.In this Investigation tests on Consistency Limits and Swelling Characteristics are conducted on the soil treated with Textile, Tannery and Battery effluents at different percentages from 20 to 100% in increment of 20%.In order to compare the results of admixed soil, tests are also conducted on untreated soil. There is decrease in Plasticity and Swelling characteristics of soil when the soil was treated with Tannery and Textile effluents whereas an increase Plasticity and Swelling characteristics were observed with Battery effluent. [15]

Rao et al (2012), in this paper the effect of certain industrial effluents on Undrained Shear Strength characteristics of an expansive soil was presented. The soil used in this investigation classified as, "SC" as per I.S. Classification system. It was found to be highly expansive in nature as the Differential Free Swell Index is around 255%.The effect of curing on Undrained Shear Strength was studied separately on treated soil. In order compare the results of treated soil, tests were also carried out on untreated soil. [16]

Rao et al (2012), the effect of tannery effluent on compaction, Plasticity, Swelling, Strength Characteristics and California Bearing Values of Black Cotton Soil has been presented in this paper. The soil used in this investigation falls under "SC" group as per I.S. Classification and its Differential Free Swell Index is 80% indicating very high degree of expansiveness. The tannery effluent used in this investigation is a colourless liquid and soluble in water. It has a sour taste and a pungent smell. [17]

Reddy et al (2012), the effect of tannery effluent on compaction, Plasticity, Swelling, Strength Characteristics and California Bearing Values of Black Cotton Soil was presented in this paper. The soil used in this investigation is "SC" group as per I.S. Classification and its Differential Free Swell Index is 80% indicating very high degree of expansiveness. The tannery effluent used in this investigation was a colorless liquid and soluble in water. [18]

Riley et al (1998), Monolithic cores, 300 mm diameter and < 1 m long, from highly contaminated soils at an old tannery waste disposal site, were equipped to study the factors that control chromium (Cr) chemistry and movement in soils. Since Cr can occur as Cr (III) and Cr (VI), mini-electrodes were installed to monitor in situ changes in redox potential. Moisture probes were installed to trace changes in the moisture potential during leaching, and pH was measured as well. At regular intervals, the soil solution was sampled using fiber glass wick samplers installed at several depths in the core. The leachate samples obtained from the wick samplers showed that the pH in the soil monolith decreased from >8 in the surface soils to <4 at depth exceeding 40 cm. A similar trend in soluble Cr was recorded in

the leachate samples, with values exceeding 1 mg/l in the surface 10 cm and <.1mg/l at depths exceeding 40 cm. However, Cr was not detected in the solution leaching out of the 1 m long columns. This indicates that Cr that is mobilized in the surface soil layers is rendered immobile towards the deeper end of the profile. In addition to the changes in pH and Cr, l1uctuations in Eh and soluble salts were observed in this study, indicating marked changes in soil solution chemistry with increasing depth of the soil profile. [19]

Smith et al(1998) , This study investigated the extent of surface and subsurface Cr contamination of soils at an old tannery waste disposal site near Adelaide, and measured the salt and total Cr contents of a range of tannery effluents and sludge. Total Cr in the surface and subsurface soils ranged from < 100 mg/kg to70000 mg/kg. At all sites where Cr exceeded 1000 mg/kg an appreciable concentration of Cr was detected in the surface and subsurface water samples in the lysimeters and piezometers. Speciation of Cr showed there was a large proportion of hexavalent Cr in all samples except those with pH<4 0, in which the bulk of the Cr was in trivalent form. Detailed studies on seasonal variation in solutes at the contaminated sites showed marked increases in the concentrations of Cr and salt in the piezometer water samples and in subsurface and ground water samples during and after the wet winter months, confirming our hypothesis that there is high mobility of Cr and salt in the high pH soils at the contaminated sites. [20]

Thangavel et al(1998), The Cr added to soils with tannery wastes is trivalent, and Cr(VI) is generally rapidly reduced to Cr(III) in the presence of organic matter and Fe, so oxidation of Cr(III) to Cr(VI) is not expected under the conditions that prevail in the soil environment at the contaminated site. Further studies are continuing to investigate the reasons for the presence of Cr (VI) in these soils. [21]

Thomson et al (1997), This study investigated a stabilization and solidification process to minimize the chromium concentration in the Toxicity Characteristic Leaching Procedure(TCLP) extract and to produce a solidified waste form with a compressive strength in the range of 150 to 300 pounds per square inch (psi).[22]

Tripathi et al, (2012), Concentrations of Cr were also significantly correlated with Ni and Pb. The study evidently indicates that the level of heavy metal contamination is higher at dumpsites which may be a cause of concern for their surrounding environment and organisms. This work will prove valuable in providing baseline information for further soil quality monitoring studies in study area. [23]

Wang J et al (2013), the results of that paper indicated that ferrous sulfide and zero-valent iron were not helpful for the stabilization of Cr (VI) when directly used because of their poor solubility and immobility. Ferrous sulfate could effectively and rapidly decrease total leaching Cr and Cr (VI) content. The stabilization effect was further promoted by the generation of iron hydroxides after long-term curing. Sodium dithionite also had positive effect on soil stabilization. Appropriate addition ratio of the two chemicals could help maintain the soil pH in range of 6-8. [24]

Conclusion

The soil is degrading day by day by industries effluents and hence the soil is losing its natural strength. Many case studies have been studied where the structures have been failed and foundation failure have been occurred. Extensive cracking damage occurred to the floors, pavement and foundations of light industrial buildings in a fertilizer plant in Kerala was reported by Sridharan et al (1981). Severe damage occurred to interconnecting pipes of a phosphoric acid storage tank in particular and also to the adjacent buildings due to differential movements between pump and acid tank foundations of fertilizer plant in Calgary, Canada was reported by Joshi (1994). A similar case of accidental spillage of highly concentrated caustic soda solution as a result of spillage from cracked drains in an industrial establishment in Tema, Ghana caused considerable structural damage to a light industrial buildings in the factory, in addition to localized subsidence of the affected area was reported by Kumapley (1985). Therefore, it is a better to start ground monitoring from the beginning of a project instead of waiting for complete failure of the ground to support human activities and then start remedial actions.

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