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GICEA NEWS

THE GUJARAT INSTITUTE OF CIVIL ENGINEERS & ARCHITECTS

JANUARY-2012 / www.gicea.org / Vol.80 / Issue 2, 2011-12

NIRMAN 2011

RETROSPECTIVE OF A MEGA SHOW

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GICEA News / Vol. 80 / Issue 02, 2011-2012 / JANUARY 2012 / www.gicea.org

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THE GUJARAT INSTITUTE OF CIVIL ENGINEERS AND ARCHITECTS

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Your comments & suggestions are welcome. For more queries & comments about the articles, please contact GICEA Newsletter Committe

Design & Print : Print Vision Pvt. Ltd.

President's Message

ESTD. : 1947

www.gicea.org

Dear Member,

On the eve of New Year, I extend my best wishes to all our members for your happiness and prosperity. I pray to the Almighty to provide us the wisdom, knowledge & ability to work hard to succeed in our mission.

It is our network of member who make GICEA powerful. As an institute, we have a common cause and shared values. We have collective influence and part of our culture is providing professional development and lifelong learning for our membership.

I belief that during my tenure the relationship between our members - bound by our shared interests and our shared values - will be one of the defining one in the coming year. I also take this opportunity on behalf of the institute to express appreciation to all my colleagues, office bearers and our members for their valuable contribution in the growth of the institute. With your intelligence and effective role; you have driven our institute to new heights and have set a distinguished example. Thank you so much for your efforts.

NIRMAN 2011 organized at state-of-the-art Gujarat University Convention Centre at Ahmedabad from 23rd to 25th September was yet another milestone event. The three day ceremony was inaugurated by chief guest, Smt. Anandiben Patel, Hon'ble Minister for Revenue, Roads & Buildings, Disaster Management, Capital projects, Government of Gujarat and guest of honor, Shri Asit Vora, Hon'ble Mayor of Ahmedabad city. With a consistent track record, NIRMAN has grown significantly over past 26 years, More than 100 exhibitors displaying latest products and technologies, the three day event attracted close to more than 42000 visitors providing a large forum of over 5,00,000 sq.ft. to showcase an extensive range of finest products. The deliberation, under the banner of NIRMAN Symposium has provided 'food for thought' to planners, architects, designers, bureaucrats and engineers by way of presentation and interaction with the expert speakers from the country.

Nirman 2011 also witnessed the release of the coffee table book "Architectural Work of Bunglows"

During last two months, GICEA has organized a series of technical seminars on "Integrated Township", "Vulcan, an anti scaling & de-rusting system", health related program like "Emotional Quotient", public cause program like "Heritage Walk of Ahmedabad city" and entertainment program like "Navratri Ras Garba Mahotsav" & "New Year Get Together." All the programs were successful and we have received tremendous response from the members.

Highest recoard break membership growth of 450 new members and total-4300 members, highest in state level organization in all over India.

17-Technical Seminar,

5- Technical Tour,

8- Institutional Programme.

12- Entertainment Programme.

We have published 4 Books for the Technical knowledge for our members.

Bharat Modi
President - GICEA

CONGRATULATIONS

Our President **Mr. Bharatbhai Modi (FLM 170)** has been elected unanimously to the Board of Directors of Karnavati Club for 3 years & also elected as the president of Dhandhuka Vidhyarthi Kelvani Mandal for 3 years.

Shri P. N. Jain, (FLM 39) Chief Engineer (NH) & Additional Secretary, R & B Department, Government of Gujarat elected as the President of Indian Road Congress (IRC) during 72nd Annual Session of IRC at Lucknow.

ISTE Charutar Vidya Mangal, Vallabh Vidyanagar, Gujarat Award for the best Engineering College Teacher in Gujarat State for the year 2011 awarded to Dr. Rupesh Parmanand Vasani (FLM 725) during the Inaugural Function of the **41st Annual Convention of ISTE on 16th December, 2011 at Baba Banda Singh Bahadur Engineering College, Fatehgarh Sahib, Punjab.**

Director, RESMA (Real Estate management Academy) **Mr. Mitesh Thakkar (FLM 760)** has won a trophy of **'KING OF REVENUE'** at annual training programme of Kotak Group / Kotak Finance at lonawala 2011 training programme on 07/11/2011 at lonawala.

THE GUJARAT INSTITUTE OF CIVIL ENGINEERS & ARCHITECTS™

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GICEA™

NIRMAN 2011

AKAR INFO-MEDIA PRIVATE LIMITED

another landmark event @ ahmedabad

With rapid urbanisation, changing lifestyles and booming economic activity in Gujarat, the housing and commercial construction of the state is witnessing unprecedented growth. Each year, the state gets to push-up more and strive better in the construction industry, fetching a lot more attention from the nearby states. The fact that the state government is very much keen to ensure that construction industry looks-up, has helped the industry rise tremendously. Adding strength and prosperity to this blooming industry, **Nirman** undoubtedly, stands as a very interactive platform every year, that leaves the exhibitors and visitors thirsting for more. With a vintage of 25 successful editions, this year too, **Nirman 2011** exhibition has promised to put-forth the realm of the real estate and infrastructure industry, by offering unparalleled business opportunities for the professionals and others related to the industry.

The 26th edition of this highly successful show - **Nirman 2011** held at Ahmedabad between **September 23-25, 2011** heralded a huge success by creating a very effective and vocal platform for manufacturers of building materials, home décor products and construction equipment. With a vintage of 25 years, Nirman has emerged as the biggest platform in Gujarat to reach-out to builders, architects, interior designers, urban planners, project managers and of course, end-users.

Nirman 2011 was organised at the state-of-the-art Gujarat University Exhibition Centre at Ahmedabad, jointly by the Gujarat Institute of Civil Engineers and Architects **(GICEA)** and Akar InfoMedia Pvt. Ltd. **(AIM)**.

INAUGURAL CEREMONY

The three-day event started with a grand inauguration ceremony, held at the Convention Hall on 23rd September 2011, with Lighting of the Lamp by the Chief Guest - **Smt. Anandiben Patel**, Hon'ble Minister for Revenue, Roads & Buildings, Disaster Management, Capital Projects, Women & Child Welfare - Government of Gujarat in the presence of Guest of Honour - **Shri Asit Vora**, Hon'ble Mayor of Ahmedabad; Mr. Bharat Modi, President - GICEA; Mr. Bakul Desai, Hon. Secretary - GICEA, Mr. Mukesh Majeethia, Vice President - GICEA; Dilip Patel, Vice President - GICEA; Mr. Navneet Thakershy - Proprietor - Abhinav Engineers; Mr. N K Patel, CMD - Sun Builders Pvt. Ltd.; and Mr. Kamal Khokhani, Managing Director, Akar InfoMedia Pvt. Ltd.

Smt. Anandiben Patel, while delivering her inaugural address, briefed the audience about the mega plans of Gujarat Government, under the able leadership and guidance of Gujarat Chief Minister, **Shri Narendra Modi**. She also shared the vision of Hon'ble Chief Minister to bring prosperity with peace and harmony in the State. While addressing the gathering, Shri Asit Vora shared the development plans of Ahmedabad Municipal Corporation to provide a strong infrastructure for ever-growing city of Ahmedabad. He also shared AMC's plans to expand BRTS network, slum rehabilitation, River Front Development Project and so on. He also complemented GICEA and AIM for putting-up such a wonderful show.

The audience was consisting of *who's who* of construction industry, office bearers of GICEA and GIHED, infrastructure developers, leading architects, civil engineers, urban planners and academicians.

Seen in the picture : Mr. P. B. Pathak, Mr. Vikram Shah, Mr. Bakul Desai, Mr.Mukesh Majeethia, Mr. Navneet Thakershy, Mr.. Bharat Modi, Smt. Anandiben Patel, Mr.Ashit Vora, Mr. N. K. Patel, Mr.Nitesh Shah, Mr. Kamal Khokhani, Mr. Dilip Patel, Mr. Prashant Shah, Mr. K. C. Patel

NIRMAN EXHIBITION

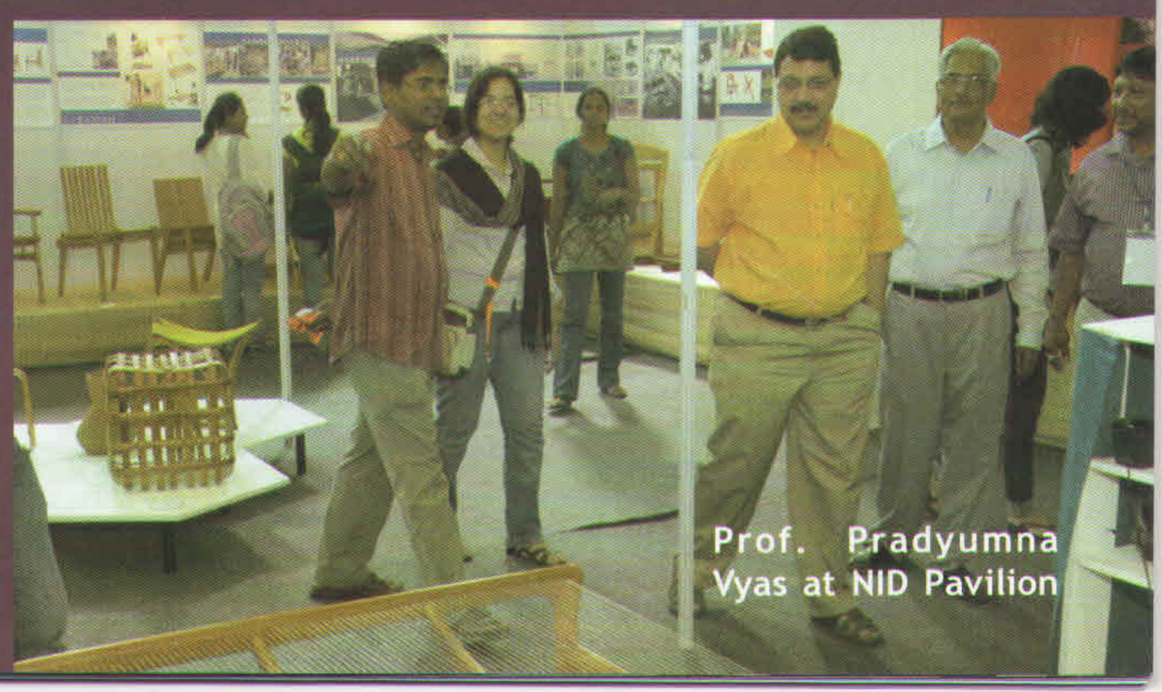
Smt. Anandiben Patel inaugurating the exhibition in presence of Shri Asit Vora. Also seen in the picture (from L to R) are - Shri Kamal Khokhani, Shri Bharat Modi, Shri Sunil Shah and Shri Vatsal Patel

The exhibition witnessed its continued commitment to deliver a quality and top-notch business platform, with more than 100 exhibitors displaying latest products and technologies, for business and networking within the booming construction industry in the state. The exhibition provided a large forum of over 5,00,000 sq. ft. to showcase an extensive range of products in building materials, home décor products, construction equipment, facilities & construction services, ancillaries, etc. The three-day event attracted close to 42,000 visitors. By linking buyers directly with exhibitors, the exhibition became an efficient and effective B2B platform.

Participation by a large number of exhibitors and presence of professionals including engineers, builders, architects, designers, etc. made Nirman 2011 a platform to learn about latest technology and advancements, associated with construction industry.

Amidst all the hustle bustle of the exhibition and the 'food for thought' symposium, Nirman 2011 also saw three eye-catching pavilions over and above a sprawling product exhibition.

NID Pavilion exhibited some of its best furniture designs including a special section on bamboo furniture, designed by its students and design masters, associated with the Institute, over the years. NID Pavilion also had a special display of furniture designed by Nakashima. Spread



Prof. Pradyumna Vyas at NID Pavilion

in an area of 2000 sq. ft. this Pavilion was a unique place to see traditional and contemporary designs, side-by-side.

Heritage Pavilion created with an old world charm of pillars, jharokas, chowks and facades was a visual treat and displayed city's numerous heritage conservation projects undertaken by the Heritage Cell of Ahmedabad Municipal Corporation. This Pavilion showed as to how our old heritage is timeless, even after centuries.

ArtQuest Pavilion displayed work of art by city's two prominent galleries - Marvel Art Gallery and Anayas Art Gallery, which showcased a collection of Indian paintings, sculptures and art installations, and also provided unique opportunity to interact with the artists.


Art Pavilion


NID Pavilion


Heritage Pavilion

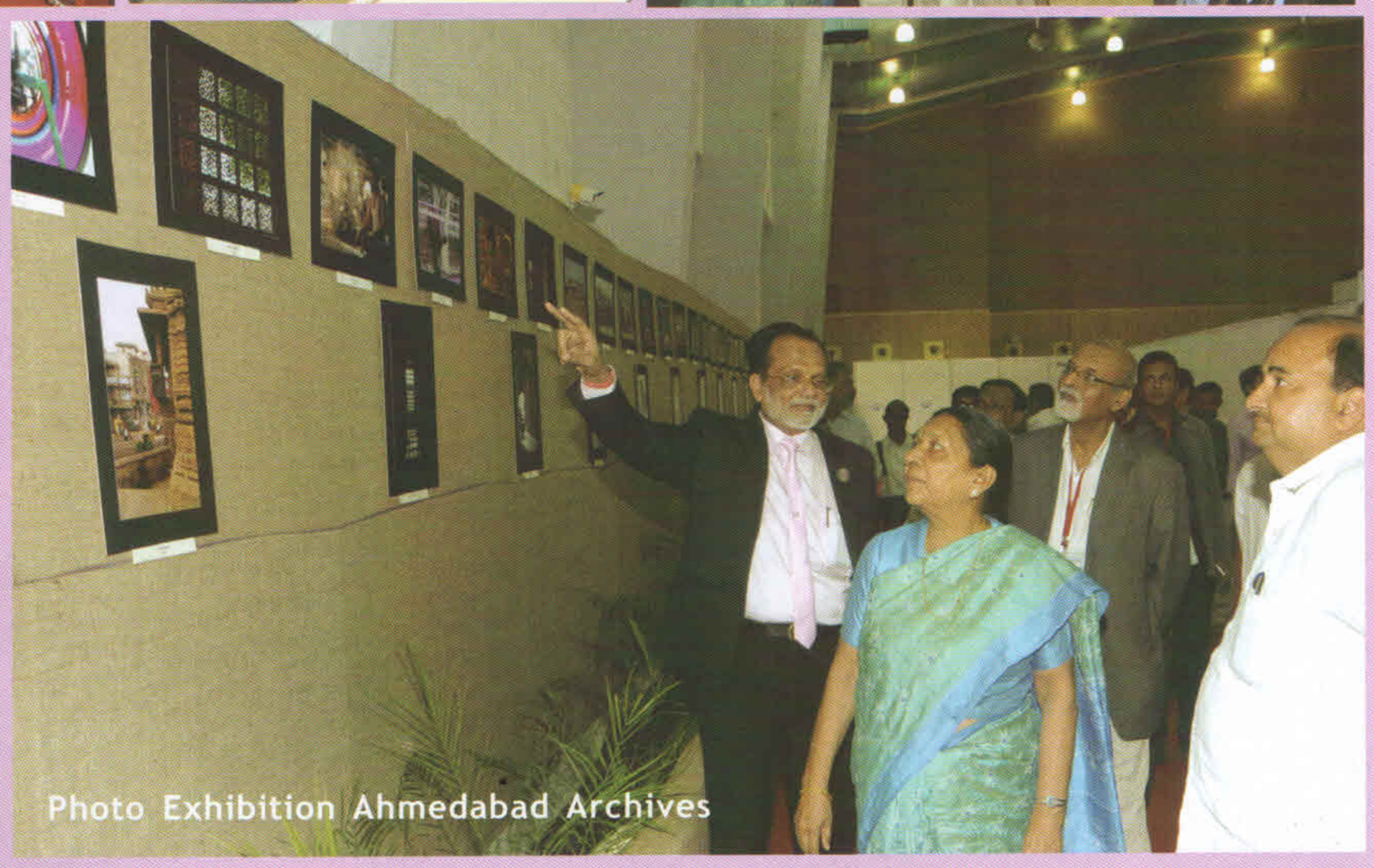
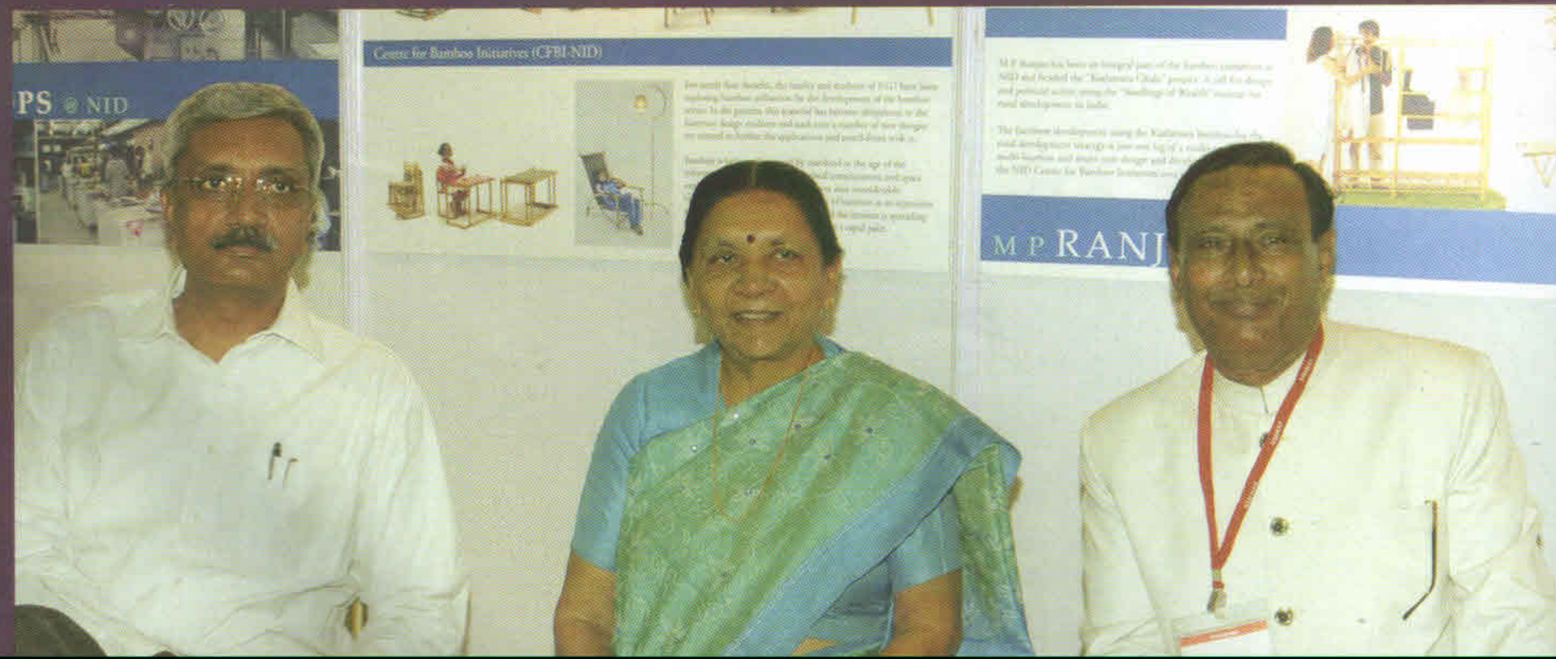


Photo Exhibition Ahmedabad Archives



NIRMAN SYMPOSIUM

The two-day deliberation at **Nirman Symposium** was organized as concurrent events to provide 'food for thought', by eminent speakers, who delivered discreetly on two vital subjects - Sustainable Heritage and Design in Architectural & Interior Projects. These very significant subjects of today's time indulged audience into very interesting and stimulating sessions.

Symposium-I
Sustainable Heritage

On the first day of Nirman Symposium, the theme was 'Sustainable Heritage', wherein eminent architects, designers, activists and professionals came together to throw some insight, based on their work and experiences on the highly sung subject of 'Heritage Conservation'.

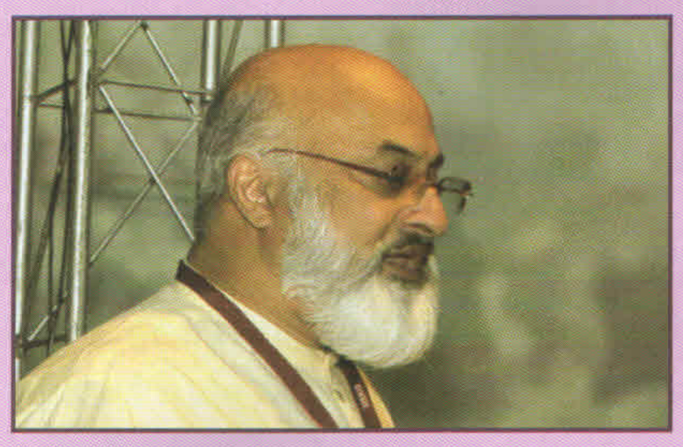
To begin with the forum, **Ar. Karan Grover**, a profound architect, conservationist and Principle Architect of Karan Grover & Associates, Vadodara, introduced the speakers of this symposium. Ar. Grover also gave a presentation on 'Sustainability of Heritage', which started with a walk-through the monuments of ancient world and his understanding on sustainability through their study. He elaborated on the idea of converting intangible heritage into a tangible idea; making sure that the concepts and the values attached with design remain life-long. To support his talk, first some light was thrown on how versatile elements like 'jalli' or lattice in Indian architectural design has got interpreted, reinterpreted and integrated with time. As usual, his presentation, filled with mind-blowing images and messages was simply mesmerizing! His larger than life sized presentation on 40 ft. wide screen took the delegates to a different world!!

Mr. Debashish Nayak, Advisor, Heritage Programme, Ahmedabad Municipal Corporation has more than two decades of experience of working towards urban conservation of historic cities in India and abroad. Mr. Nayak made a very interesting presentation - 'Getting the City Back to the People' specifically showing his work spread across the city of Ahmedabad. He shared his experience and attachment with the city of Ahmedabad and how the Heritage Walk in Ahmedabad has become instrumental in changing the mindset of people about conserving and sustaining their heritage!

After Mr. Nayak's enlightening show on revival of Ahmedabad's Heritage, **Ar. Aftab Jalia**, Project Architect of Aga Khan Trust for Culture, New Delhi discussed the restoration work at Humayun's Tomb in New Delhi. He has been working with the Aga Khan Trust for Culture's Urban Renewal Initiative in Nizamuddin, New Delhi encompassing conservation, socio-economic and environmental development in one of Delhi's oldest and culturally most vital districts. He also discussed the 'if's and buts" faced in this project and also showed a video footage on how the perceptions of people can be changed with an earnest approach.

After Mr. Jalia's dialogues, there was a very occupying presentation by designer **Ar. Ambrish Arora** of Lotus Designs, New Delhi. His presentation focused on understanding the words sustainability and heritage through their range of works, design processes and experimentation works. Some of his projects were like eye-opener for the audience. He showed as to how simple scissors, if used cleverly and innovatively, can create a unique pattern for a boutique of leading fashion designer. At the same time, by showing the hotel project at Jodhpur, he demonstrated as to how a new project can be merged with old and how Mehrangarh Fort could be used as beautiful backdrop and that too, with a very less intervention !

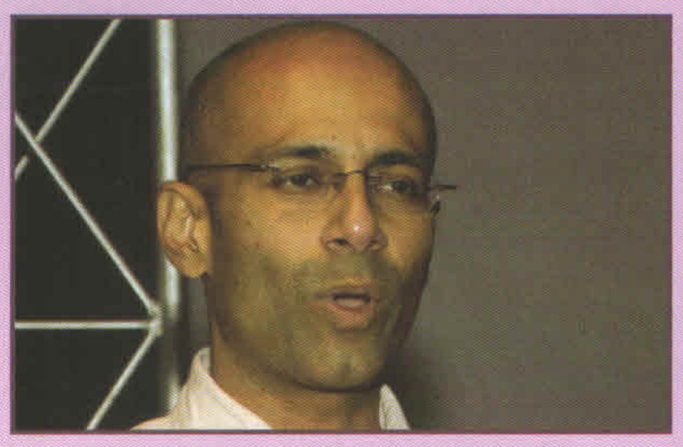
Next speaker was **Prof. Mitchell Abdul Karim Crites**, Director of Saray Limited in New Delhi. Prof. Crites is a respected scholar and author, whose



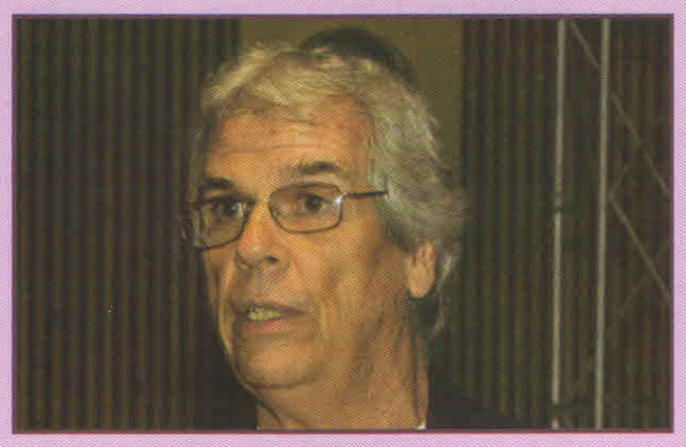
Ar. Karan Grover
Karan Grover Associates
Baroda

Debashish Nayak
Advisor - Heritage Programme
Ahmedabad

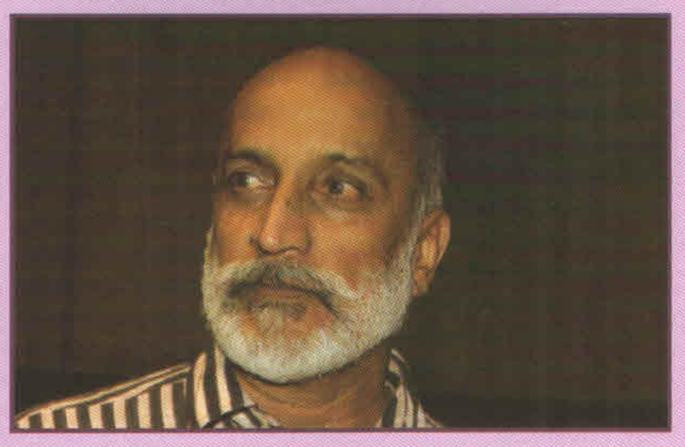
Ar. Aftab Jalia
Project Architect - Sunder Nursery
Aga Khan Trust for Culture
New Delhi



Ar. Ambrish Arora
LOTUS
New Delhi



Prof. Mitchell Abdul Karim Crites
Director - Saray Limited
New Delhi

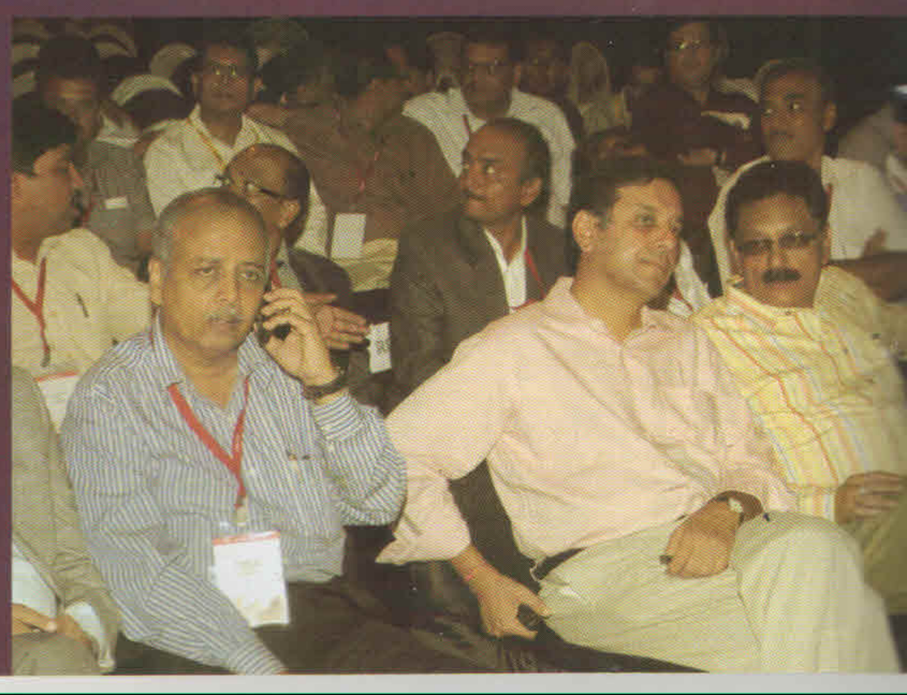


Aman Nath
Co-Chairman - Neemrana Hotels
New Delhi

research and travels throughout India and the Arab world have made him a leading force for the renaissance of traditional Islamic and Indian craftsmanship with unmatchable excellence. His presentation focused on 'Twelve Thoughts on Working with Ustad Masters and Reviving Traditional Arts and Crafts'. These 12 steps largely included developing an eye towards aesthetics, procuring the most regional materials and skills, working hands-on with master craftsperson, researches on indigenous practices of making, fusing history with designs today, assuring quality, allowing space for originality to emerge through the course of time, reinterpretation of tradition, supporting artisans towards development and render meaning or values to the work done. His works including 'Jal Mahal' at Jaipur and 'Sheikh Zayed Mosque' at Abu Dhabi showed as to how the craftsmanship can be revived and made use to enliven the tradition.

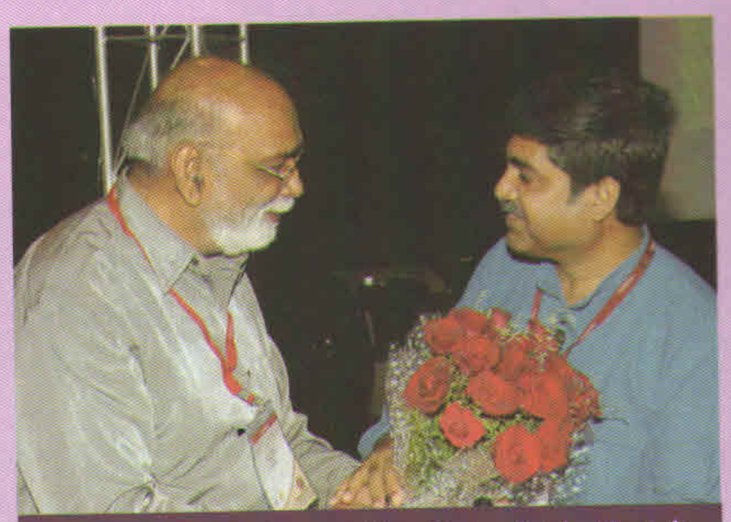
Last speaker of the evening was **Mr. Aman Nath** of Neemrana Hotels, New Delhi. His presentation was titled 'Sustainable Heritage: Sharing Knowledge (modestly) The Neemrana Way!' His working principles are simplicity, authenticity and more correctly, the creation of a heritage environment, keeping as many traces of the past as possible without making visible intrusions. He also believes in combining history and architectural grandeur with honest hospitality. He elucidated the Indian wisdom, juxtaposition persistent in the Indian belief system, values allied with Indian arts and crafts, honouring the heritage built form and finally looking at restoration, reconstruction and revitalisation through Neemrana. He made a brief presentation on various properties they have revived and converted into successful heritage hotels. Starting from Neemrana to Teejara, to Matheran to Kerala to Ahmedabad, it was like a tour to nostalgia for the audience! Very interesting and enticing were the images of various heritage properties - 'before' and 'after'.

While offering his concluding remarks, **Shri N K Patel** expressed the need for creating an awareness about heritage conservation. He confessed that he was really amazed that even though five stalwarts deliberated on the same topic of heritage conservation/sustainability, not a single thought was duplicated ! This, he said, is the beauty of beautiful minds !!



Welcome to Speakers

Mr. Kamlesh Modi to Ar. Karan Grover


Mr. Girish Mistry to Mr. Debashish Nayak


Mr. Ajay Shah to Ar. Aftab Jalia


Mr. K. C. Patel to Ar. Ambrish Arora


Mr. Nigam Shah to Prof. Mitchell Crites


Mr. C. L. Mehta to Mr. Aman Nath

Memento to Speakers


Mr. Bakul Desai to Ar. Karan Grover


Mr. Arun Chaturvedi to Mr. Debashish Nayak


Mr. Prashant Shah to Ar. Aftab Jalia


Mr. Dilip Patel to Ar. Ambrish Arora


Mr. Mukesh Majeethia to Prof. Mitchell Crites


Mr. Chirag Patel to Mr. Aman Nath

Symposium-II
Design in Architectural & Interior Projects

The second symposium focused on the subject of architecture and interior design works. The introductory address for this session was made by **Mr. Sudhir Sharma**, Founder & Creative Director of INDI Design Brand in Pune and Publisher of Pool magazine. He is famous for his pioneering work in design and business transformation consultancy. Having actively participated in the design industry for over 21years now, Mr. Sharma introduced the forthcoming presenters for the session, not only by their work and experience; rather more by their personal virtues and faith in the field of design.

The introductory address by Mr. Sharma was followed by an enticing and thought-provoking talk by creative genius **Mr. Subrata Bhowmick** of Subrata Bhowmick Design at Ahmedabad. He is well-known for his works in product and exhibition design and has won many accolades, nationally and internationally, in varied fields comprising graphics, advertising, interiors, photography and book design. Focusing on responsibilities of designers in the country today, he elaborated on various design aspects like design or redesign, recycle, responsibility, respect, render and repair through a series of interpretative visuals on each of these. Mr. Bhowmick's talk was an eye-opening dialogue on how differently and innovatively the field of design needs to be perceived with the changing times. His statement - "To be an Indian designer, one needs to know India", is like writing on the wall, as far as Indian visual realm is concerned !

The dais was then taken over by **Mr. Sumit Patel**; Founding Director of Leaf Designs, Mumbai. Mr. Patel's presentation mainly emphasized on routing through way finding systems for the larger mass of people, by explaining three simple features of the design - engage, inspire and inform. Mr. Patel supported these understandings through different cases, ranging from Mumbai International Airport under travel, Edelweiss Capital Ltd. under corporate and Tata Star Bazaar under retail.

This was followed by a presentation by **Ms. Nidhi Mehta**, Head of Design at Freedom Tree Design in Mumbai. Her presentation 'Seven Sacred Steps' dwelled on seven aspects of Indian wedding - kala, bhojan, naya daur, sajaavat, shagun, shringaar and pavitra. Each of these had their direct or indirect interpretations with context to the field of design, in order to deduce a palette of colours for further engagement.

Next in the sequence was an incredible presentation by **Mr. Anthony Lopez**, CEO and Principal Designer of Lopez Design, New Delhi. Mr. Lopez talked about branded spaces, as 'creating environments'. According to him, it is essential to consider two most important qualities of design - connecting people and sharing experiences. Through his presentation, various inspiring and helpful tools were shared, like interpretation, character building, defining identity, playfulness, connected thinking, human behaviour and perception, motivational communication and so on; leaving the audience astounded by the nature of involvement of designers today throughout their work span.

The next speaker - **Ms. Falguni Shah**, a designer at Landor Associates in Mumbai took the audience on a design journey, which began with creating and developing first impressions about India or being Indian, construing those notions in relation to past, present and future and lastly, accomplishing the selected idea of 'expressiveness' through physical manifestations like art installations, graphics, sculptures, murals and such other tools. Her eye for detailing, strong conceptualizing skills as well as her love for typography clearly reflected in her work.

Mr. Chandrashekhar Bheda, Textile Designer at Spider Design in New Delhi, gave a presentation on 'Reinterpretation of Textiles in Contemporary Spaces'. He has to his credit, a case study on 'Knowledge Murals' prepared for Suzlon One Earth Campus in Pune. He projected several successful collaborations of crafts and design through his works, across the country. Some of his great works included artistic textile weaving from Imphal (Manipur), Kullu woolen shawl weaving (Himachal Pradesh), Panja Durry weaving (Uttar Pradesh), Etawah Cotton weaving (Uttar Pradesh), Bhujodi Shawl Weaving (Kutch, Gujarat) and many others. He elaborated on the co-existence of varied aspects in the form of larger than life textile murals pieces to show the affinity of the tradition and modernity.

While concluding the symposium, **Mr. Arun Chaturvedi**, Founder President of CREDAI, Gujarat confessed that some of the presentation might have been like Greek and Latin for lot of delegates, it was simply great that this much-needed awareness about co-relation between design and interior architecture is addressed, at least.

Subrata Bhowmick
Subrata Bhowmick Design
Ahmedabad

Sumit Patel
Director - Leaf Design
Mumbai

Nidhi Mehta
Head of Design, Freedom Tree Design
Mumbai

Anthony Lopez
Lopez Design
New Delhi

Falguni Shah
Designer - Landor Associates
Mumbai

Chandrashekhar Bheda
Textile Designer - Spider Design
New Delhi

Sudhir Sharma
Founder & Creative Director
INDI Design Brand
Pune

Welcome to Speakers

Mr. Bhadresh Shah to
Mr. Sudhir Sharma

Mr. Vikas Shah to
Mr. Subrata Bhowmick

Mr. Saurin Shah to
Mr. Sumit Patel

Mr. Kirti Maniar to
Ms. Nidhi Mehta

Mr. Narendra Patel to
Mr. Anthony Lopez

Mr. Bharat Prajapati to
Ms. Falguni Shah

Mr. Darshan Fadia to
Mr. Chandrashekhar Bheda

Memento to Speakers

Mr. Akshat Khokhani to
Mr. Sudhir Sharma

Mr. B. K. Desai to
Mr. Subrata Bhowmick

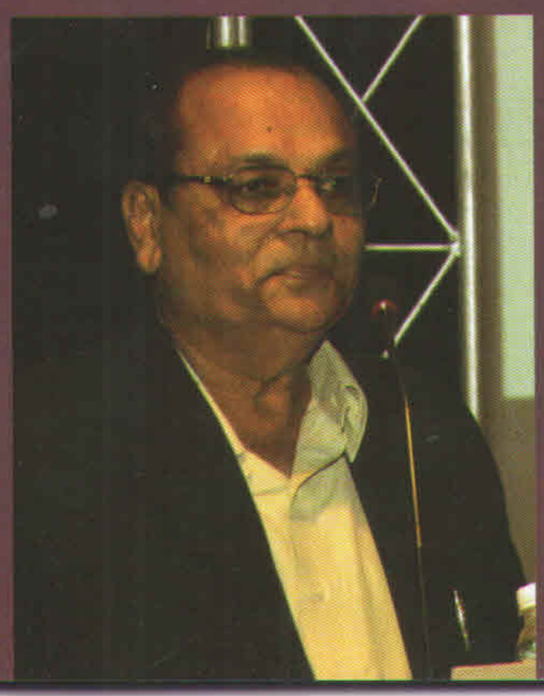
Mr. Priyavardhan Shah to
Mr. Sumit Patel

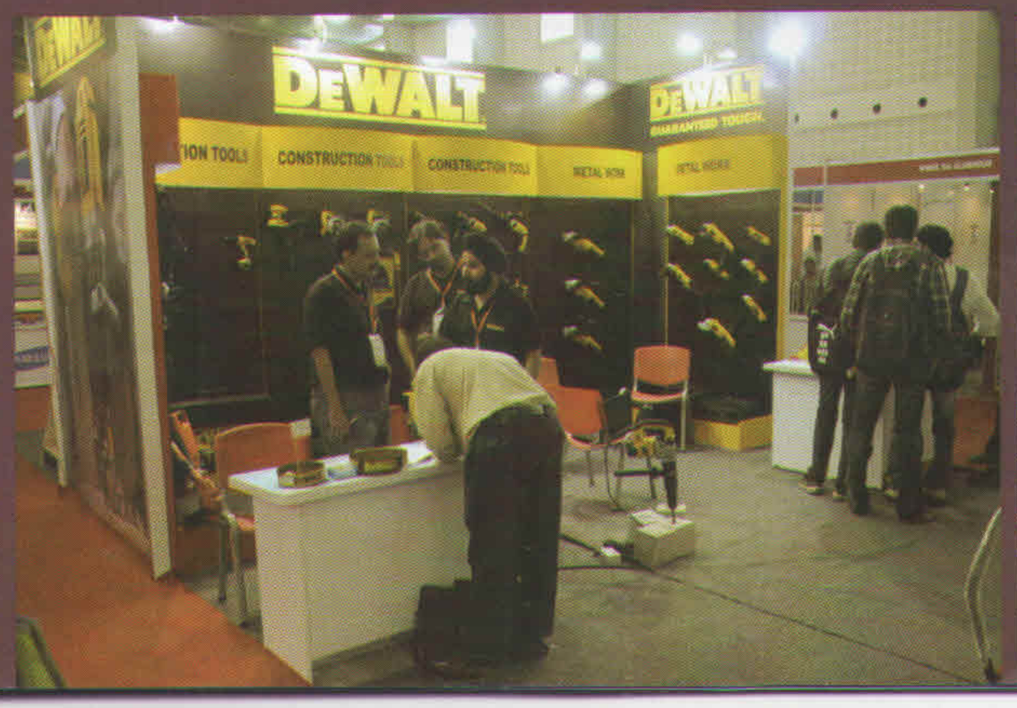
Mr. Navneet Thakershy to
Ms. Nidhi Mehta

Mr. Nainesh Patel to
Mr. Anthony Lopez

Mr. Vikram Shah to
Ms. Falguni Shah

Mr. Bhupendra Mohrawala to
Mr. Chandrashekhar Bheda





Book Release

NIRMAN 2011 also witnessed the release of the book **Architecture of Bungalows** brought out by GICEA. While releasing this book, Smt. Annadiben Patel and Shri Asit Vora congratulated GICEA for documentation of the work of Ahmedabad's architects.

Places (Re-) Discovered, a compilation of Architectural Documentation of Louis I. Kahn Trophy (2007-2009) and a joint initiative of Indian Heritage Cities Network Foundation (IHCN-F), National Association for Students of Architecture (NASA) and Akar Unlimited. This first of its kind monograph was released by Ar. Karan Grover, Advisor - NASA; Ms. Shalini Mahajan, Project Officer - IHCN-F, Mr. Debashish Nayak, Advisor, Heritage Programme - AMC, Ahmedabad; and Mr. Kamal Khokhani, CEO - Akar Unlimited in the presence of GICEA's two past-presidents, Mr. N K Patel and Mr. Prashant Shah.

AHMEDABAD ARCHIVES

Photo Contest on Ahmedabad's Heritage

Early this year, Ahmedabad completed its 600th birthday, and is aspiring to be the first Heritage City of India. With a phenomenal growth, Ahmedabad has maintained a special flavour in terms of its heritage and culture. With this backdrop, Akar Unlimited - group company of Akar InfoMedia Pvt. Ltd. had launched a Photo Competition under the banner of **Ahmedabad Archives**. The theme of this competition was Living Heritage of Ahmedabad, to capture three basic aspects - people, properties and peculiarities.

The noted designer - Subrata Bhowmick Chaired the Jury, and three ace photographers - Mr. Parmanand Dalwadi, Dr. Deepak John Mathew and Mr. Vivek Desai were the members of Jury.

This competition received a fantastic response where 100 photo-enthusiasts submitted about 300 entries, capturing various moods of the city. All 60 shortlisted entries were displayed at Nirman, which were very well appreciated by the public at large.

Mr. Vishak Vardhan
from NID

Mr. Kunal Panchal
from CEPT

Mr. Sohomdeep Sinha Roy
from CEPT

Large Size Stall Category Awards

st Prize : Torfenster Systems India Pvt. Ltd.

IInd Prize : Astral Poly Technik Ltd.

IIIrd Prize : Everest Industries

VALEDICTORY CEREMONY

Valedictory Ceremony of Nirman 2011 was held on September 25, 2011, which was well attended by dignitaries, speakers, industry players, trade visitors, and others. Shri Surendrabhai Patel, former MP (Rajya Sabha) & former Chairman - AUDA addressed the gathering. Shri Surendrabhai, himself an engineer is very closely associated with GICEA. He shared his vision of growing construction and infrastructure industry and co-relation of an event like Nirman as an idea-exchange.

Awards were also distributed for the best stall designs in two different categories. Under small-size stall category, awards were given to **R R Kabel** (First), **Vinayak Electrical Industries** (Second), and **Express Lifts Pvt. Ltd.** (Third), while under large-size stall category, winners were **Torfenster Systems India Pvt. Ltd.** (First), **Astral Poly Technik Ltd.** (Second) and **Everest Industries** (Third). Overall Best Stall Design Award was given to **Simpolo Vitrified Pvt. Ltd.** for its distinctive stall design, size and ambience. **NID Pavilion** and **Anjana Handicrafts** were given Certificate of Recognition.

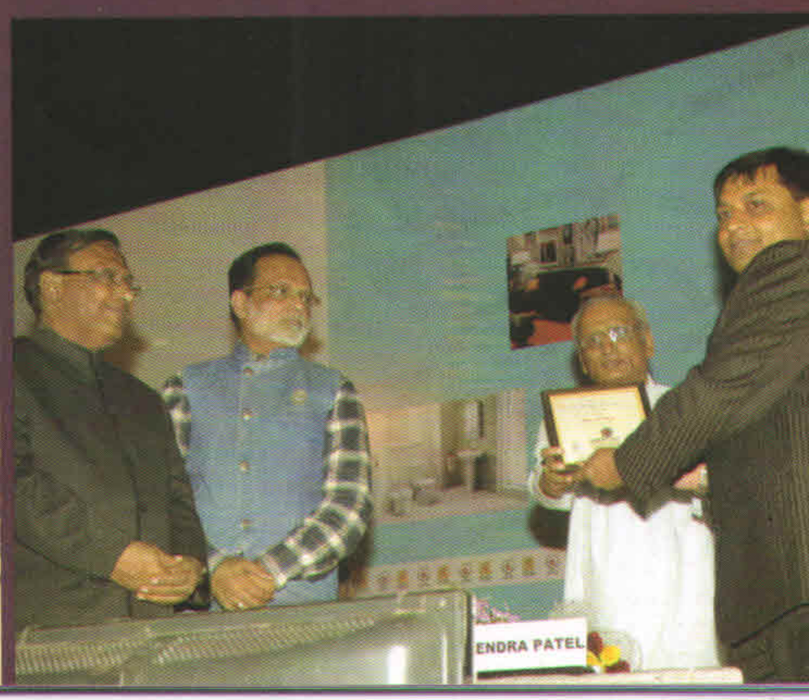
The participation from architects, civil engineers, town planners, valuers, landscape designers, interior designers, real estate developers & promoters, academicians and end-users in the exhibition and symposium facilitated promising contacts with the key industry players in the industry. Undoubtedly, with a range of modern technologies and solutions, and a huge participation from the key industry players, Nirman 2011 was highly propitious in providing a very well-organized platform for 'everybody' who is 'somebody' as far as creation of built environment is concerned.

Small Size Stall Category Awards

I[st] Prize : R R Kabel

II[nd] Prize : Vinayak Electrical Industries

III[rd] Prize : Express Lifts Pvt. Ltd.



MONEY

GREEN HOMES CAN LOWER ENERGY CONSUMPTION BY 30 TO 50 PER CENT

Go Green with Pride

Eco-friendly homes may be expensive, but will help you save money in the long run.

By PRITAM P. HANS

While building a bigger home a few years ago, Bangalore-based Srihari Allamsetti aspired for a bungalow which would have all the modern facilities, but at the same time would eschew producing waste or polluting the surroundings. After consulting architects, he successfully built an 'eco-friendly' home, using stabilised mud blocks. It has systems that enable Allamsetti to harvest rainwater for drinking and cooking, and also treat waste water for other daily use. Even the large basement gets plenty of daylight.

"The house cost us around ₹1,350 per sq ft, including construction and fittings. This is the same that we would have spent to build a traditional

house," says the proud owner.

Allamsetti is part of a small, but growing tribe which swears by eco-friendly houses. With an increase in awareness about conserving resources and lowering the carbon footprint – the amount of greenhouse gases an entity emits – green homes are the 'in thing' in the real estate market, both residential and commercial.

So does opting for a green home make sense? It does. "At present, India has 800 million sq ft of green built-up space, of which 40 per cent is residential. We expect it to touch one billion sq ft by 2012. The number will double by 2014," says S. Raghupathy, Executive Director, Confederation of Indian Industry, or CII, and head of the CII-Sohrabji Godrej Green Business Centre. Green homes also offer quality living space. Besides, they help save money. "A green building can lower energy consumption by 30 to 50 per cent and water consumption by 30 to 70 per cent," says Raghupathy. "If you live in a green building, you save on power and air conditioning. For example, a good design can reduce the use of air conditioning. If you consider these factors, green buildings can be much cheaper," says Mili Majumdar, Director, Sustainable Habitat Division, The Energy and Resources Institute, or TERI.

At present, availability of green materials and green consultants is limited. So, the price of an eco-friendly home can be a bit higher, than that of a conventional one. This should not be a worry, say experts. "When we take the full cycle cost of a building, the difference is negligible. The incremental cost of using green technologies such as insulation and hypo-thermal glass is a maximum of five to eight per cent. As savings are also high, you can recover the additional cost in three to five years," says Majumdar.

Eco-friendly homes are not just for people building independent houses. Many builders are now offering "eco-friendly" apartments and villas. "Eco-friendly homes, as a concept and product, are at a nascent stage in India. The awareness level is much higher in the case of commercial projects. But we have started getting enquiries about such residences," says Pirojsha Godrej, Executive Director, Godrej Properties.

Many builders are marketing their properties with the help of green ratings and certificates. However, be warned: all properties being advertised as 'green' or 'eco-friendly' may not be so. Many

THE ECO WAY

INSULATE ROOF AND WALLS
Add thermal mass for insulation to ensure that the roof and walls radiate less heat into the room

USE ALTERNATIVE ENERGY
Invest in solar, bio-thermal and wind energy generating equipment

LOWER HEATING FROM WINDOWS
Reduce the size of window glasses on the east and west or use double-glazed glasses to lower heating

HARVEST RAINWATER
For a family of five, the cost of a 7,000-litre rainwater harvesting system is around ₹50,000

Proper lighting of rooms saves a lot of energy

Good design can reduce the use of air-conditioning

Adequate ventilation is a key feature of green buildings

GREEN CHECKLIST

Buildings are evaluated on several parameters before being given a green rating

- Site planning and eco-friendly building design
- Preservation and protection of top soil and landscape during construction
- Heating, air-conditioning, ventilation, lighting and water heating systems
- Optimisation of building design and structure to reduce demand for conventional energy
- Water and waste management
- Selection of ecologically sustainable materials for construction
- Indoor environmental quality
- Use of renewal energy-based water heating system

small and mid-sized builders call their projects environment friendly just because they have lawns and landscaped gardens, which is nonsense. "If builders say a green lawn is eco-friendly, it is incorrect, because a lawn is not environmentally sustainable. The plants in it consume four times more water than the native species," says TERI's Majumdar.

"In most housing projects, the 'eco-friendly' label is a 'greenwash'. The concept has not caught on in the real estate sector, except for a few developers. These homes tend to be more expensive," says Chitra Vishwanath, an architect who specialises in eco-friendly designs.

At the time of buying a 'green' home, checking certification from a rating agency will help to distinguish between a greenwashed and a genuine eco-friendly project. Institutions such as the Indian Green Building Council, or IGBC, which is part of the CII, and the Association for Development and Researcsh of Sustainable Habitats, or ADaRSH, a joint initiative of TERI and the Ministry of New and Renewable Energy, examine buildings and give them ratings based on parameters such as design, construction materials, energy efficiency, quality of ventilation and lighting, and water and waste management. IGBC offers internationally recognised Leadership in Energy and Environmental Design ratings. A Green Rating for Integrated Environmentally Habitat Assessment, or GRIHA from ADaRSH has been made mandatory for new government buildings, which must score at least three GRIHA stars out of five.

The National Housing Bank, along with Germany-based KfW Bank and ADaRSH, is also running a pilot project giving incentives for energy-efficient homes. "Once the pilot project is successful, the scheme will be available on a larger scale," says TERI's Majumdar. With active support from the government and the private sector, green buildings will soon become the norm. "Corporate houses such as Infosys, Wipro and Tata have a policy to occupy only green buildings," says CII's Raghupathy. "There is tremendous growth in awareness about green buildings. Two years from now, only green buildings will be in demand." ◆

Courtesy: *Money Today*

Self Compacting Concrete : Concrete Solution For Emerging Concrete Application Needs

Umesh Soni, Hitesh Barot, Kartik Mehta - Ambuja Cement Ltd.

Abstract

Concrete is versatile construction material as such the use of concrete for various structures as well as for precast application is increasing day by day. Now we can make Concrete - porous, impermeable, floating (light weight), bendable, with different color and textures, flowing (self compacting) etc. by using appropriate materials and technology based on the application requirements.

Today, the challenge to the construction industry is to construct tall structures with thin sections having reinforcement congestion with good quality concrete finish. This attracts to develop the Self Compacting Concrete with local materials, expertise and available resources.

This paper broadly covers the concept, need and advantages, materials, mix design approach, testing of self compacting concrete based on the learning from Concrete Experts from Holcim Group Support and conducting the trials at Ambuja Concrete Labs and construction sites.

The basic objective is to transfer the technological learning & creating awareness about SCC through seminars / workshops amongst professionals and to encourage the use of SCC for relevant concrete application. This paper also draws a simple approach to design SCC mix with local materials and thus to encourage the use of SCC.

Introduction & Objective

A concrete that is able to flow and fill every part and corner of the formwork, even in the presence of dense reinforcement, purely by means of its own weight and without the need for any vibration or other type of compaction is termed as Self Compacting Concrete.

Today, along with performance requirements of hardened concrete, there is increased demand of performance requirements of fresh concrete amongst constructors. The principal reasons for the same is to achieve the ease of placing in heavily reinforced areas, mitigating the shortage of skilled construction workers, to achieve speed in concrete placement, to place the concrete in complex geometrical shape with dense reinforcement. These performance requirements of fresh concrete can be achieved by using SCC. Traditional concrete may have high workability of concrete at the cost of cohesiveness or better cohesiveness at the cost of workability. SCC addresses both the performance requirement of fresh concrete i.e. workability and cohesiveness.

SCC requires a reliable control of materials characteristics, mixing process and transportation. To obtain SCC mixture, the paste content (including mineral additions and the Superplasticizer dosage) has to be increased and the coarse aggregate content must be reduced. The "excess paste" should be of minimal quantity to create a "lubricating" layer around the aggregate particles and reduce the inter-particle friction necessary to achieve self-compatibility. The Paste in SCC behaves as the vehicle for the transportation of the aggregates. Minimum paste required in case of SCC is of interest for both economical and material performance reasons.

Advantages of SCC application

- Placing the concrete without compaction
- Speed in placing the concrete
- Concrete can be placed even in complex geometric shapes
- Congested Reinforced sections
- Concreting in thin sections
- Reduced the noise level
- Reduced Energy consumption
- Reduced numbers of workers during Concreting
- Safer & healthier working environment is Obtained
- High quality of concrete surface finish
- High strength with better durability

SCC Materials

It is essential to use the advanced concrete materials like chemical and mineral admixtures over and above basic concrete materials like cement, aggregates and water. It is also very essential to choose the right quality concrete materials to meet the performance requirements, which are described below.

Cement : Ordinary Portland Cement / Portland Pozzolana Cement with respect to relevant IS specification.

Coarse Aggregates : Natural/Crushed aggregates with MSA 20 mm, preferably VSI aggregates conforming IS : 383 : 1970

Fine Aggregates : Natural / crushed sand preferably of Zone-II and fineness modulus in the range of 2.6 to 2.8.

Chemical Admixtures : High range water reducers preferably polycarboxylic Ether based.

Mineral Admixtures : Basic mineral admixture fly ash / slag and micro silica, ultrafine slag and metakaolin conforming to relevant IS specification for high strength SCC.

Materials used for Lab. Trials

Material	Characteristics
Cement	OPC conforming IS 12269 : 1987 with specific gravity 3.15 PPC conforming IS 1489 (Part-1) : 1991 with specific gravity 3.0
Coarse Aggregates	VSI aggregates of specific gravity 2.70 to 2.75.
Fine Aggregates	Zone-II sand of specific gravity 2.65 to 2.70
Mineral Admixtures	•Fly Ash conforming IS 3812 (Part-1) : 2003 •Ultrafine Slag (Alccofine 1203)
Chemical Admixtures (IS 9109 : 1999)	•Superplasticizer (PCE based) with specific gravity 1.01 and PH : 8 •Viscosity Modifying Admixture (VMA) with specific gravity 1.1 and PH : 6

Table -1

Physical and Chemical properties of Fly Ash

Properties	Results
Specific Surface (m^2/kg)	320
LOI	0.8
$SiO_2 + Fe_2O_3 + Al_2O_3$	91.24
SiO_2	56.63
MgO	0.61

Table -2

The High Range Water Reducers is being used to compensate the higher water demand because of high amount of fines. Admixtures that modify the cohesion of SCC without significantly changing its fluidity are called as Viscosity Modifying Admixtures. The VMA is being used to increase the resistance against the segregation. VMA makes the SCC more robust and less sensitive to small variations.

The mineral admixtures are used to give particle packing effect and reducing the permeability by secondary hydration. It also helps increased the fluidity and improves rheological properties.

Mix Design Approach

The recent amendment in IS 456 : 2000 (Annexure-J), Aug-2007, gives the guideline about application of SCC and features of fresh SCC. However, reference for the detail guideline & specification is taken from EFNARC 2005, which says that a concrete can be classified as SCC only if it fulfills the three properties of workability

- Filling Ability – Ability of concrete to fill all shapes under its own weight.
- Passing Ability – Ability to flow through tight openings or spaces between steel bars under its own weight.
- Segregation Resistance – The concrete must meet the filling & passing ability requirements with uniform composition throughout the process of transportation & placing.

Basic Consideration

- Designing the mix with absolute volume consideration
- Paste – Vehicle for the Transport of the Aggregate
- Volume of the paste > Volume of Aggregate
- CA to FA Ratio – Reduced for Lubrication for fully coating the CA
- Compatibility of Chemical / Mineral Admixtures with cement is key

Mix Design Rules

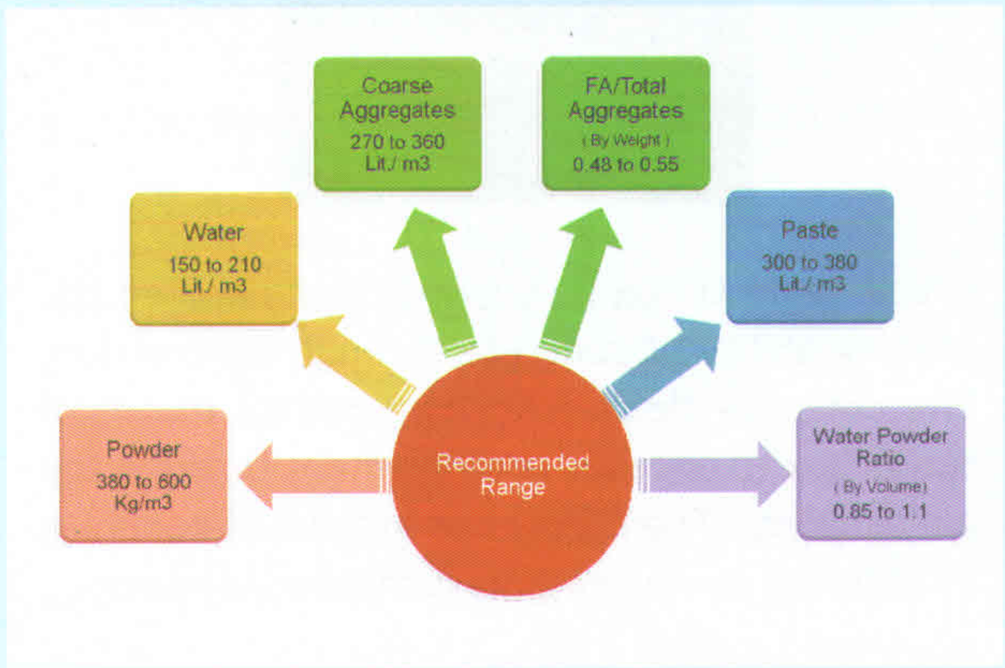


Fig.-1

Powder includes the cement and all mineral admixtures used and paste includes powder, water and chemical admixtures.

Mix Design Steps

- Determine the CA Volume by Optimizing Dry Loose Bulk Density (DLBD) (in case of use of two size aggregates). Take the half weight of DLBD and convert it into volume by using SG.
- Select powder content as per the strength requirements within the guided range in table no. 3

Strength Class (28days Strength in MPa)	Powder Content (Kg/Cum)
25 to 40 MPa	380 to 460
40 to 60 MPa	460 to 550
60 to 80 MPa	550 to 600

Table 3

- Select water content as per the flow requirement within the guided range in table no.4

Strength Class (28days Strength in MPa)	Water Content (Lit./Cum)
25 to 40 MPa	195 to 210
40 to 60 MPa	175 to 195
60 to 80 MPa	150 to 175

Table 4

- Find out the volume of fine aggregates, since all other ingredients are known.
- Use Chemical Admixtures as per recommended dosage & flow requirement and take the trial.

Mix proportion obtained with above procedure.

Material	Specific gravity	Batch Weight (kg/ m3)	Volume liter
Cement	2.78	450	198
Fly Ash		100	
Sand < 4.75 mm	2.68	887	331
C.A. < 10mm	2.7	200	296
20mm < C.A. >10		800	
Water	1	175	175
Total	-	2412	1000
Super Plasticizer	-	5.5	5
VMA	-	0.825	0.825

Table 5

Comparison of mix proportion between SCC and Conventional Concrete

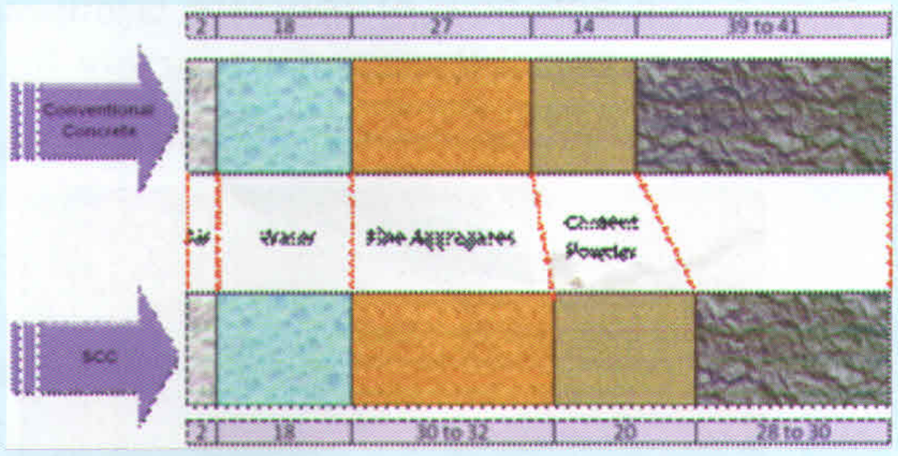


Fig.-2

SCC Mix – Check for Mix design Rules

Powder (kg/m^3)	380 to 600	550
Water (Lit. / m^3)	150 to 210	175
Coarse Aggregates (Lit. / m3)	270 to 360	296
FA / Total Aggregates (by weight)	0.48 to 0.55	0.52
Paste (Lit. / m^3)	300 to 380	378
Water Powder Ratio (by volume)	0.85 to 1.1	0.88

Table-6

Test on SCC

The performance of SCC in fresh state is very critical. It is very essential to test the concrete for classifying its performance as self compacting concrete for checking their filling ability, passing ability and segregation resistance.

Slump-flow, V-funnel, U Box, L Box and J ring test is used to check the performance of SCC in fresh state. The typical recommended range to classify concrete as SCC is given in the table below.

S.NO	METHOD	PROPERTY	UNIT	TYPICAL RANGE OF VALUES	
				MINIMUM	MAXIMUM
1	SLUMP FLOW	FILLING ABILITY	mm	650	800
2	V-FUNNEL	FILLING ABILITY	sec	6	12
3	L-BOX	PASSING ABILITY	mm	0.8	1
4	U-BOX	PASSING ABILITY	%	0	30
5	FILL-BOX	PASSING ABILITY	%	90	100
6	V-FUNNEL AT T5 sec	SEGREGATION RESISTANCE	sec	0	+3

Table-7

Slump Flow Test : This is the test for measuring the filling ability of SCC. The concrete is filled in the traditional slump cone without any compaction and flow of concrete is measured as the diameter of the circular concrete flow in mm as shown in figure given below.

Fig. 3

The time required to achieve 500 mm flow should be < 5 seconds.

V Funnel Test :

The V-funnel test is used to assess viscosity and filling ability of SCC and this test enabled recording flow time (V Funnel). The funnel is filled with 12 Litre of concrete and the time required to empty the V Funnel is measured in second.

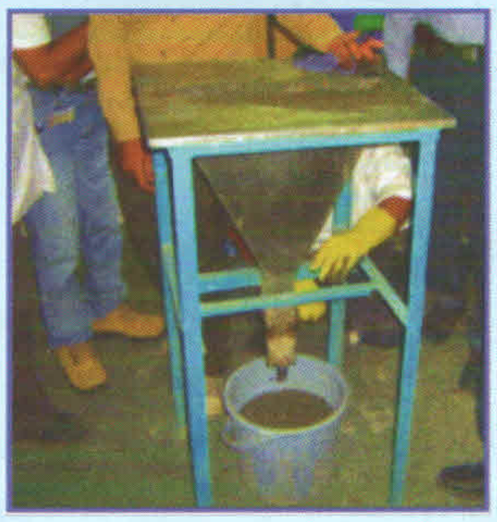


Fig.-4

U Box Test : U Box test is used to measured the passing ability of concrete through obstruction. The concrete flows from one compartment of the U Box to another compartment through the obstruction. The difference in level of concrete in both the compartments is measured in mm.

Fig.5

Typical acceptance criteria for SCC are slump flow from 600 to 750 mm, V funnel time from 6 to 12 sec. and U Box height difference (H) not higher than 30 mm.

SCC Trials in Laboratory

The SCC Trials were conducted in the laboratory for concrete grade M55 and concrete grade M70 separately. The mix for both the grade of concrete is as given below.

Material	Quantity (M55 Grade)	Quantity (M65 Grade)
PPC (with 20% fly ash) kg.	450	450
Fly Ash (kg)	100	75
Ultrafine Slag (Alccofine 1203) (kg)	-	40
Coarse Aggregates (kg)	825	825
Fine Aggregates (kg)	860	850
Water (Lit.)	180	175
Super plasticizer (kg)	5.25	5. 5
VMA	0.90	0.90

Table-8

Concrete mix was prepared in the laboratory in 50 litres batch and mixed in an open twin shaft mixer. The mixing sequence followed is as given below.

- Fine and course aggregates
- Add about 50% of water
- Add powder (cement + mineral admixtures)
- Add balance water with chemical admixtures
- Ensuring the proper mixing.

Slump-flow, V-funnel and U Box tests were carried out to measure the performance of fresh concrete for filling ability, passing ability and segregation resistance. This mixture exhibited good deformability, without blocking, and enough viscosity in terms of resistance to segregation. The cubes were cast to measure the performance of hardened concrete in terms of compressive strength at 1, 3, 7 & 28 days.

Test on Fresh Concrete		
Slump Flow (mm)	650 to 720	
V Funnel Time (Sec.)	8 to 12 Sec.	
U Box (mm)	10 to 25 mm	
Compressive Strength (MPa)		
Age of Concrete	M55	M65
1 Day	18	27
3 Days	36	42
7 Days	48	57
28 Days	65	76
56 Days	76	84

Table-9

Troubleshooting

After successful laboratory & field trials, the SCC may be used for actual field application. It is observed that, while using the SCC in field, one may face issues during application due to various reasons. The table given below suggests the modification of the mix for troubleshooting.

Sr.No	Test	Possible Cause	Effect	Remedy
1	Slump Flow Results on lower side than specified range	Viscosity too high	Blockage	↑ Water content ↑ SP ↓ VMA
2	V Funnel Results on lower side than Specified range	Viscosity too Low	Segregation	↓ Water content ↓ SP ↑ VMA ↑ Fines

Table-10

Challenges for SCC Application

SCC is balanced product in terms of workability and cohesiveness and also having added advantages of improved durability and good quality finish. However, the challenges in SCC application are as give below.

- Sensitive Product
- Admixture Compatibility (use of one or more chemical / mineral admixtures)
- Stringent Quality Control
- Controlling Shrinkage
- Increased Formwork Cost due to Possibly High Formwork Pressure
- Effect on Hardened Properties – Modulus of Elasticity
- Increased Material Cost (Chemical / Mineral Admixtures)
- Efficient Curing

Conclusion

In conclusion, self-consolidating concrete is an exciting technology that has found many successful applications. The new generation of polycarboxylate-based superplasticizers has taken SCC a giant step forward.

As stated earlier, SCC is a sensitive product and it is very essential that enough nos. of laboratory trials have to be taken. It is suggested to take field trials.

Overall cost of SCC may be slightly higher compared to same grade of conventional concrete mainly due to cost of chemical admixtures. However, party the additional cost

is compensated by reducing the cost of compaction and achieving speed during construction.

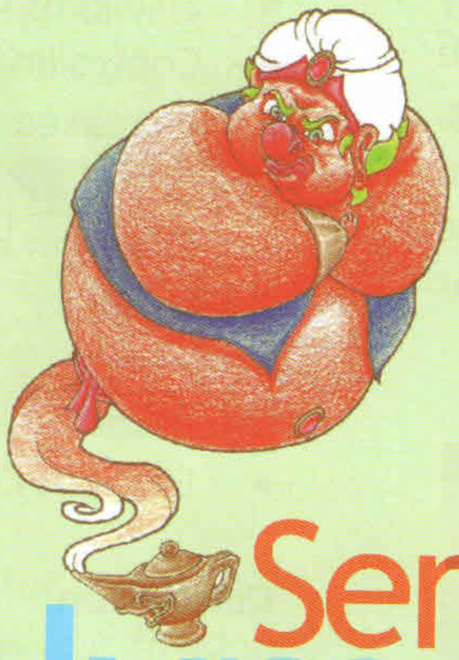
SCC is the product meets the upcoming challenges of handling the concrete in fresh state, specifically for certain application stated earlier. Use of SCC may also be encouraged for exposed concrete structures, where the cost of finishing application can be eliminated. SCC is also very suitable product for precast application to achieve speed & better finish.

SCC meets the four essential specification of concrete i.e. workability, strength, durability and aesthetic appearance.
We strongly believe that educating manufacturers and contractors is the essential step in expanding the reach of extremely promising technology for the future need of the society.

Acknowledgements & References

- The European Guidelines for Self Compacting Concrete (Specification, Production & Use), May-2005.
- Technical Support from Holcim Group Support Experience.
- IS 456 : 2000 Amendment No.03, Aug-2007.
- Relevant IS Specifications for Materials & Testing.

Note : For More Details & for Practical applications you may this e-mail ID : umesh.soni@ambujacement.com



Serious Humour

A sales rep, an administration clerk and the manager are walking to lunch when they find an antique oil lamp. They rub it and a Genie comes out in a puff of smoke. The Genie says, "I usually only grant three wishes, so I'll give each of you just one." "Me first! Me first!" says the admin clerk. "I want to be in the Bahamas, driving a speedboat, without a care in the world." Poof! She's gone. In astonishment "Me next! Me next!" says the sales rep. "I want to be in Hawaii, relaxing on the beach with my personal masseuse, an Endless supply of pina coladas and the love of my life." Pool! He's gone. "OK, you're up," the Genie says to the manager. The manager says, "I want those two back in the office after lunch."

Moral of the story: Always let your boss have the first say.

MICROTECHNOLOGY FOR HIGH PERFORMANCE CONCRETE

*Ajay Pathik, **A. N Vyasa Rao, **Cyrus Dordi ,

Abstract

Concrete has to-day very demanding performance requirements. In fresh concrete, it is essential to have a fairly high degree cohesiveness, pumpability, slump retention and also self-compacting nature. In hardened concrete, properties such as high early strengths and late strengths, high elastic modulus, low creep, dimensional stability, low permeability, sulphate and chloride resistance, chemical resistance, frost resistance and abrasive resistance are required in combinations depending on the type of structure being constructed and its environment.

In view of the above requirements, the material technology in concrete has undergone a tremendous change. One of the important changes is the introduction of microtechnology for high performance with ultra fine and various other micro sized and fine cementitious materials.. It is now possible to achieve excellent particle packing and thereby comply with the demands for performance in concrete both in fresh and in the hardened state. Laboratory as well as field studies have shown that ultra fine slag not only improves the cohesiveness of the concrete mix but also helps in slump retention, workability and flowability of characteristic concrete in the fresh state.

Besides it helps concrete to gain higher strength with lower shrinkage and creep. Ultra fine slag not being a purely silica based material like some ultrafine to a great extent helps in durability by way of improving the alkalinity in concrete.

This paper summarizes the characteristics of a newly developed micro product called ultra fine slag, for its performance in various tests and its successful implementation in some field applications from the feedback received from some consumers.

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** Ambuja Cements Ltd., Mumbai, India

1. INTRODUCTION

The construction practices in India is continuously in pace with the developments and challenges from consumer's special requirements, environmental constraints, sustainability guidelines etc. Most of high rise structures and Ready Mixed Concrete (RMC) producers prefer standard strength concrete with high flowability and segregation resistance and large range of workability retention. Use of 'green materials' such as fly ash, slag, silica fume, artificial sands, recycled materials, smart materials inclusion in concrete etc are gaining momentum in recent past. Structures in aggressive environment demand low permeable and durable concretes. Special concretes like Reactive Powder Concrete, Self Compacting Concrete and cement based grouts etc need to have ultra fine materials for their effective performance. All these leads to exploring and development of new / modified concrete ingredients to satisfy the demands.

Experiences and studies all over the world strongly consider that high durable concrete needs perfect particle packing which is possible with the Portland cement-pozzolanic/ cementitious micro materials composite system rather than the Portland cement system only. (R N Swamy,2007). It is applicable to high performance concretes also, as most of them demand low permeability, high strength etc. A combination of normal fineness, microfine, ultrafine and even nanoscale (if required) materials provide a satisfactory packing effect and thus produce durable concretes irrespective of strengths. Microtechnology plays a pivotal role in this respect.. The term 'micro technology' means that either grinding or the classification of material particles to microniized size. There are several ways to get materials at micro size. The traditional way of doing is by mechanical grinding. The other ways are- collection of fumes/exhaust dusts through high efficient bag filters/ Electro Static Precipitators (ESPs), introducing high efficiency classifiers while grinding etc. Grinding with classifier system is the most efficient system as it helps to control the size of particles and the desired range of particle size can be achieved. Thus significance of implementing microtechnogy in cement / concrete is to make tailor made concrete and enhance durability characteristics and service life .

Ambuja Cements Ltd and Counto Microfine Products Pvt. Ltd jointly have carried out detail investigations to develop new products at micro level.

2. MANUFACTURING TECHNOLOGY

The manufacturing unit is situated in Goa. The plant has the state of the art technology for drying and grinding various materials to micron level. The micro materials developed are grouped as

- Micro products with high Calcium silicate (Product-1)
- Micro products with Low Calcium silicate (Product-2)
- Micro products with Alumino-silicate and
- Micro fine other products (steel protector, water proofing mortar, Floor screed, Repair mortar, Façade coating etc.).

The respective raw material of each product (with value added content) is ground in a mill attached with high efficiency classifier which classifies the material and ensures that only the required micron size particle enters the final product. The entire process is operated by automatic process controller. A full fledged testing laboratory provides all facilities to carry out physical and chemical tests including particle size analysis. A stringent QA scheme ensures consistent quality of product with a limited coefficient variation.

3. PROPERTIES

The physical properties of Product-1 are presented in the table 1.

Table 1 : Physical properties of Product 1

Sr. No	Characteristic	Test results
I	Raw Materials : Cement clinker and additives	
	Physical properties	
	Specific gravity	3.10
	Fineness (Computed blaines value based on PSD)	= 8000 cm2/gm
	Bulk density	700-900 kg/m^3
	Typical particle size distribution	
	d10	1.5 microns
	d50	5 microns
	d90	9 microns
	Setting time at $27^0C \pm 2^0C$	
	Initial	60-120 min
	Final	120-150 min
	Marsh cone flow time (for 700 ml grout)	30-34 Sec

Table 2 compares Product-2 with the standard specifications of IS:12089 (specification of granulated slag for manufacture of Portland slag cement) and ASTM C989-05 (Standard Specification for Ground Granulated Blast-Furnace Slag for use in Concrete and Mortars).

Table 2 : Coparison of Product - 2 with the Standards

Property	Product – 2	IS:12089	ASTM C989-05
Raw Materials : Specially GGBS and additives			
Physical properties			
Specific Gravity	2.94	NA	
Fineness cm2/gm (Computed blaines value based on PSD)	>12000		Wet sieving on No:325 sieve, 20% max Grade 120
Activity Index			
7 days	107		90%
28 days	116.9		110%
Chemical properties (wt%)			
		$\frac{CaO+MgO+Al_2O_3}{SiO_2}$ = _=1.0	
CaO	32-34		
Al_2O_3	18-20	NA	
SiO_2	33-35		
Alkalies as Na_2O	1-2		
MgO	5-10	17% max	
Sulfide sulphur	1.2-1.5	2.0% max	2.5% max
SO_3	Upto 4%	NA	4.0% max.
MnO	0.3-0.6	5.5% max	
IR	2-4	Not more than 5%	
Mineralogical properties			
Glass content	>90%	Not less than 85%	>65%

*** NA – Not Applicable**

4. LABORATORY TESTS AND FIELD TRIALS

The different tests carried out at laboratories are presented in tables 3,4, 5 and 6.

Table 3 : Improvement in workability and strength of concrete (M60 grade) by using Product 2.

Sr No	MATERIAL	UNIT	REFERENCE MIX	Product-2
1	Ordinary Portland cement	kgs	360	360
2	Silica Fumes	kgs	40	0
3	Product 2	kgs	0	40
4	Water Content (W)	kgs	160	160
5	W/Binder Ratio	Ratio	0.4	0.4
	Admixture(Polycarboxylate Ether base)		0.50%	0.50%
	Slump (mm) Initial	mm	90	150
	30 min	mm	NIL	100
	60 min	mm	NIL	NIL
	COMPRESSIVE STRENGTH (MPa)			
	24 Hours (1 day)	MPa	22.7	32.93
	3 Days	MPa	35.65	43.11
	7 Days	MPa	47.3	50.5
	28 Days	MPa	61.05	70.85

Table 4 : Improvement in strength of concrete (M20 grade) by using Product 2

MATERIAL	REFERENCE MIX	Product 2
Ordinary Portland Cement	188	126
GGBS	126	179
PRODUCT 2	0	9
Water Content	160	160
W/ binder Ratio	0.4	0.51
Admixture(SNF base)	1.00%	1.00%
Slump (mm) Initial	130	140
30 min	80	85
60 min	-	-
COMPRESSIVE STRENGTH (MPa)		
24 Hours (1 day)	8.64	8.94
3 Days	16.56	16.49
7 Days	22.02	24.43
28 Days	25.42	29.07

Table 5 : Water permeability test for concretes with OPC, Silica Fume (SF) and Product - 2

Material	Water penetration depth in mm (avg. of 3 readings)	MORT and H limit
OPC	17 mm	25 mm
OPC+10% SF	18 mm	25mm
OPC+10% Product 2	13 mm	25mm

Table 6 : Chloride penetration test (pond test) of OPC concrete and OPC concrete with 10% of Product-2

Depth sample (mm)	Chloride content (% by mass)	
	With Product 2	With OPC Concrete Controlled Material
Top surface	0.3900	0.40
5mm depth	0.0450	0.31
10mm	0.0056	0.29
15mm	0.0051	0.20
20 mm	0.0051	0.18
25 mm	0.0048	0.15
30 mm	0.0048	0.15
35 mm	0.0048	0.11

5. PERFORMANCE EVALUATION

The Table 1 confirms Product-1 is in accordance with the physical characteristics of microfine cements (Stephanie Perret et.al, 2000). From the Table 2, it is evident that Product 2 complies with IS: 12089 and ASTM C989-05. IS 456: 2000 (Indian Standard Plain and Reinforced concrete-Code of Practice) recommends that "ground granulated blast furnace slag obtained by grinding granulated blast furnace slag conforming to IS 12089 may be used as part replacement of ordinary Portland cements provided uniform blending with cement is ensured". Hence there is no ambiguity in using 'Product 2' in concrete cement works.

Table 3 reveals that replacement of cement by 10% Product 2 improves workability, workability retention properties in fresh concrete and strength gain in early and later ages of hardened concrete. Further, its addition distinctly improves workability retention when compared with micorsilica. This confirms Product-2 is a 'preferred material' to use in high strength concrete as a partial replacement of cement.

Laboratory trials (Table 4) also infer that addition of Product 2 in normal concrete improves its performance characteristics both in fresh and hardened states.

The results of water permeability and chloride pond tests (Tables 5 and 6) have clearly shown that water and chloride penetration is considerably low which is prime requirement for durable concrete. The chloride pond test is preferred to RCPT test as the later method ' is not a valid test for evaluation of permeability of concretes made with different materials or different proportions'(Caijun Shi). Several studies reveal that RCPT is not at all related to chloride ion migration and has many limitations and reliable method is Pond test (Willfried Krieg et.al 2007, Stanish KD et.al 1997, Milind Joshi and Siddika Mapari,2010).

6. DISCUSSION

Improvement in properties of concrete such as strength, permeability and heat of hydration, cohesiveness and workability etc., with partial replacement of cement by GGBS or Portland Slag Cement has been observed by several experts (Malhotra, V M & Mehta,1996, Swamy,1999, Reeves,1986, Rajamane 2003 et.al, ACI manual,1997). Addition of ultrafine cementitious material further enhances the performance of concrete. Product 2, imparts strength on hydration by its both cementitious and pozzolanic reactions. This leads to more quantity of hydrated products and enhance strength and durability of concrete.

Recent studies on granulometry of cement and cementitious materials (Huiwen Wan et.al) indicated that not only fineness but also particle size distribution that influences the strength gain and packing efficiency and hence reduces permeability and increases strength of concrete. Particle range of Product 2 from 5 micron to 0.1 micron helps to fill in the gaps between cement hydrated particles or between cement and other pozzolanic materials silica fume , fly ash if used.This is called 'Filling or Packing Effect' and this mechanism makes the paste more homogeneous and dense and hence better enhanced strength including strengthening of interfacial zone between cement and aggregates . A particle size of about two to three times smaller than the average particle size of Portland cement can be utilized to reduce permeability and get both durability and strength (Swamy,1999).

Experiments show that blast furnace slag has filling and dispersing effect besides imparting strength (Feng et.al,1995). Ultrafineness, surface smoothness of particles and dispersing effect improve rheological properties (workability and cohesiveness) of concrete/ cement mortar. These properties made with Product 2 results in improved workability, slump, slump retention, flowability and segregation resistance of concrete. Khayat et.al studies support the influence of ultrafine powder in improving bleeding and strength of cement paste.

Structure of cement hydrated gel and composition play a pivotal role in influencing mechanical properties of concrete besides with other environmental factors. (Lura etal 2010, Ghods et.al 2009, Han young moon etal2009, Khayat et.al,2001, Ray DM and G M Idron,1982). It is opined that the strength of bond controls the mechanical properties of concrete like-tensile strength, creep, elasticity etc. Bond breakage/ weak bondage leads to low mechanical properties of concrete. Alumina in slag can act both as a chain former or demodifier thus improving the strength. It is also considered that pore volume and diameter and pore liquid composition, pH have influence on properties like permeability, resistance to chemical and aggressive agents ingression such as - corrosion, Alkali Silica Reaction, sulphate attack, carbonation etc.(Lura Lothenbach,P,2010, Ghods .P et.al,2009,Hang Young Noon et.al. 2006).

In Practice, high strength concretes, and many of the so-called high performance concretes, are characterized by high cement factors and very low w/cm ratios. Such concretes generally suffer from two major weaknesses. Experience shows that it is extremely difficult to obtain proper workability with such concrete mixes and indeed, to retain the workability for a sufficiently long period of time. High dosages of high range water reducing agents (HRWR) then become a necessity, and the resulting cohesive and thixotropic, sticky mixes are equally difficult to place and compact fully and efficiently(Swamy,1999). The answer to overcome these difficulties is utilization of ultrafine materials to a certain percentage.

7. EXPECTED BENEFITS TO THE INDUSTRY

Product 1 is specifically useful for the purpose of grouting to fill in micro cracks in concrete or rock or voids in soil. It can be used to fix up anchors in rock and soil. Its permeation characteristics when used with recommended admixtures are comparable to chemical grouts such as silicates and acrylamides, but pose no problems of toxicity to the environment.

Use of Product 2 in concrete / cement mortar has many advantages as mentioned below:

Fresh state –

- Improves workability
- Improves slump and its retention
- Improves pumpability
- Improves cohesiveness
- Reduces segregation
- Lowers heat of hydration

Hardened state –

- Improves durability
- Lowers permeability
- Improves resistance to ASR/ chemical attack/corrosion
- Improves strength
- Improves color etc.

The accrued benefits to the users and ultimately to the industry are many folds in terms of consistent quality, durability, fast construction and saving besides the pride of using green material.

8. FUTURE STUDIES

The present study is confined to a few important tests with Product 2 blended concrete to investigate its effect on performance characteristics of concrete both in fresh and hardened states substantiated with some field trials. More studies on chloride diffusivity, sulphate, alkali silica reaction , abrasive and fire resistance tests etc and performance tests in self compacting concrete, Ultra high strength concrete have to be carried out. A comparative performance module has to be developed with other mineral admixtures to establish Product 2 is 'the preferred performance improver'. Such performance based tests to be carried out for Product 1 also.

9. CONCLUSIONS

The Indian construction industry has a pragmatic approach to use new types of materials for better performance, eco-friendly and cost effectiveness. Ultrafine cementitious product is a proven performance improver that can be used in concrete / cement mortar to have accrued benefits.

10 ACKNOWLEDGEMENTS

The authors are thankful to their respective management M/s Ambuja cements Ltd and Alcon microfines Ltd for permitting to use R&D data and their encouragement

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ACHIEVEMENT

Yogesh Shah, (FLM 440) member of our esteemed organization has brought proud for all of us by winning TRIPLE TITLES of International Tennis Federation's Seniors Tennis Championship's 2011 at SINGAPORE (Single) and KUALA LUMPUR MALAYSIA (Single & Doubles).

Prior to this he has also won ITF SENIOR'S SINGLES TITLES at PAKISTAN, THAILAND and DUBAI.

GLIMPSES OF GICEA EVENTS

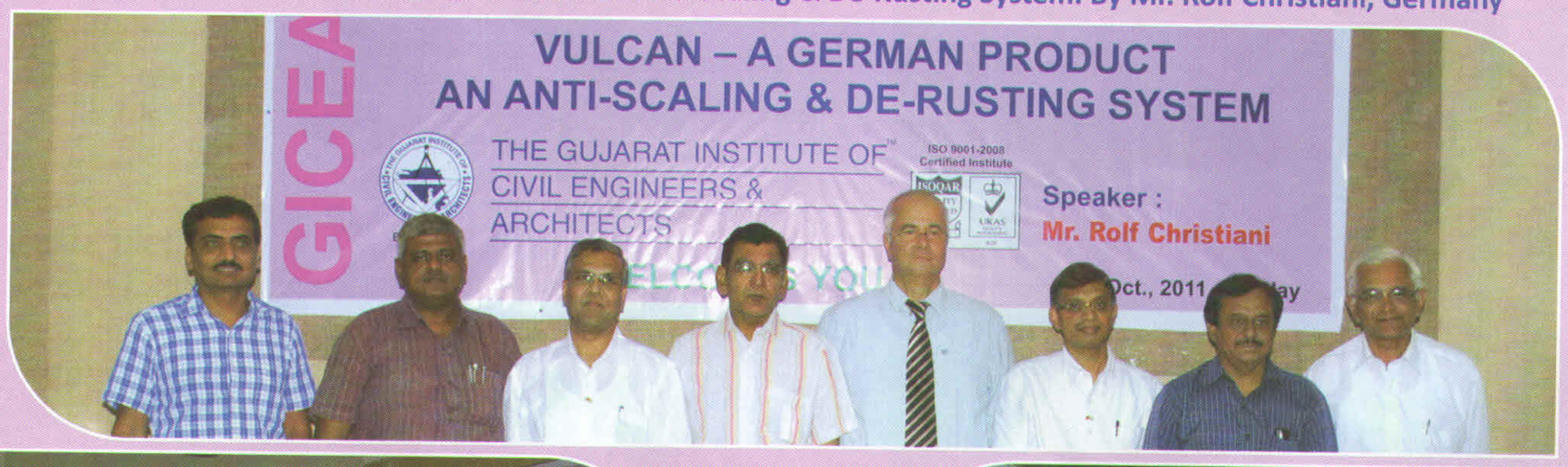
Heritage Walk of Ahmedabad-A City Revisited from Swaminarayan Mandir, Kalupur to Jumma Masjid.

Navratri Ras Garba Mohatsav with Sanjay Oza & Party at Sports Club

GLIMPSES OF GICEA EVENTS

Seminar on Integrated Township By Ar. Ravindra Kadam

Seminar on Vulcan - A German Product an Anti-Scaling & De-Rusting System. By Mr. Rolf Christiani, Germany



GLIMPSES OF GICEA EVENTS

E.Q.: Emotional Quotient. By Dr. Prashant Bhimani

New Year- Get together at Swaminarayan Kutir Event Supported by Shri Umang Thakkar [Dharmdev Infrastructure Pvt. Ltd.] & Dayro by Sairam Dave

GLIMPSES OF GICEA EVENTS

Sports Carnival

Sports Carnival

Workshop on Solar Water Heater Market Development & Use of Renewable Energy Technologies in Urban Cluster.

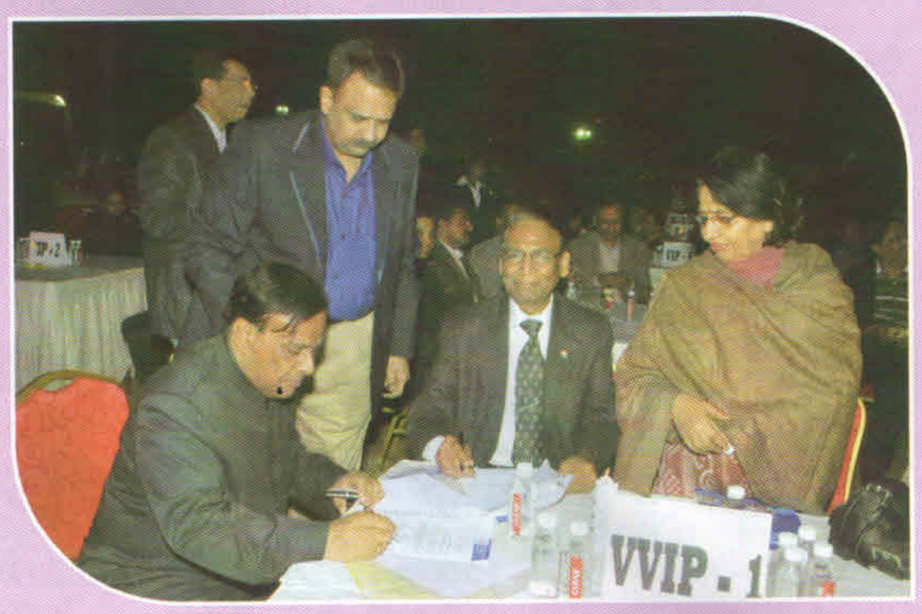
Gujarati Drama " Mrs Ne Mathe Besadi Ne Rakho " at Town Hall, Ellisbridge

GLIMPSES OF GICEA EVENTS

Candle Light Dinner at Amiraj Farm, S. G. Highway Event Supported by Shri Nitin K. Patel [Amiraj Group]

Unveil of New Members' Directory 2012

MOU between GICEA (President Bharat Modi) & Gujarat Technological University (Vice Chancellor Dr. Akshay Agarwal)



GLIMPSES OF GICEA EVENTS

Vyakhyan on Gita Charitra Nirman. By Shri Ramkrishna Goswami

Seminar on Energy Saving & Green Building Technologies Jointly with Sintex Group By Prof. N. K. Bansal, Shri S. B. Dangayach & Shri Sanjib Roy

GLIMPSES OF GICEA EVENTS

Gold Medal Award 2011 Chief Guest Prof. Vasuben Trivedi, Hon'ble Minister of State, Higher & Technical Education, & Dr. Ar. Bimal Patel Guest of Honour

GLIMPSES OF GICEA EVENTS

Lecture on Hriday Rog Vishe Vishesh Jankari. By Dr. Tejas Patel

Lecture on A Future for the Sustainable City. By Prof. Mike Jenks

Dineshchandra R. Agrawal

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