VIIT's

PARTICIPATION IN

CONSTRO-2018 INTERNATIONAL FAIR

18TH – 21ST JAN., 2018 | PUNE, (MH.) INDIA

P.C.E.R.F
DEPARTMENT OF CIVIL ENGG., (VIIT)
DEPARTMENT of E&TC, (VIIT)
DEPARTMENT of MECHANICAL ENGG., (VIIT)
DEPARTMENT of E&TC (CoE-BVU)

Report compiled by:
Hemant B. Dhonde, Ph.D.,
Associate Professor, Dept. of Civil Engg., VIIT
10th March, 2018

EXECUTIVE SUMMARY — VIIT @ CONSTRO-2018

Preface →

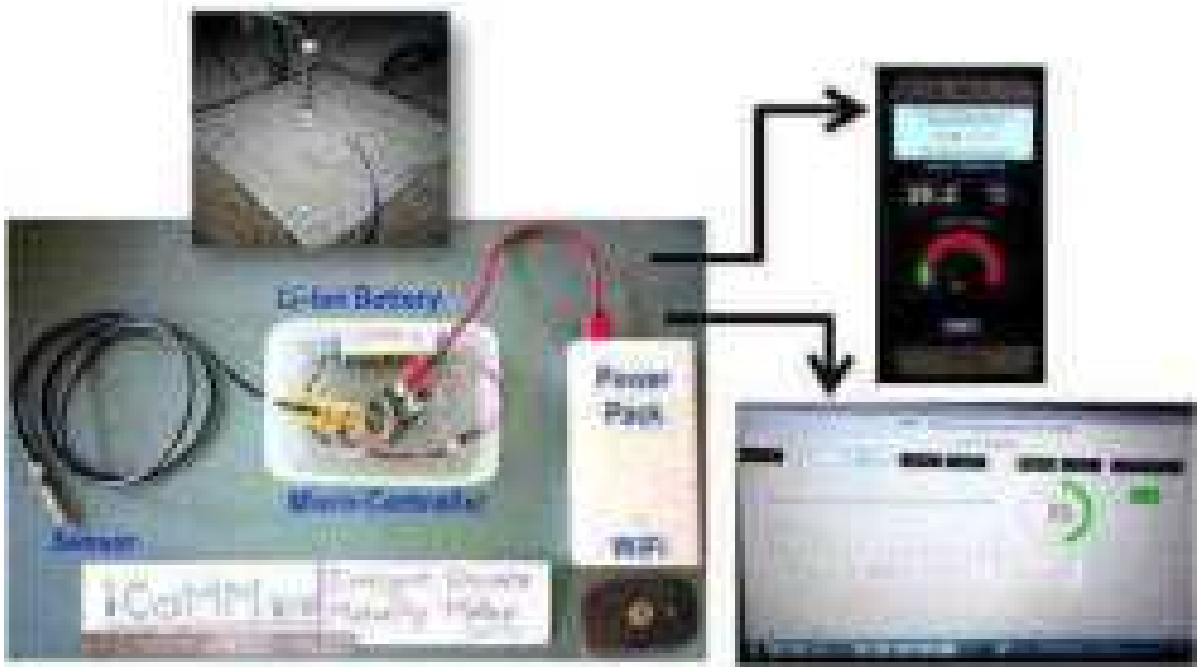
Two highly motivated R&D teams of the Department of Civil Engineering, VIIT, Pune recently participated in a 4-day [15th edition | 18th to 21st Jan., 2018] ***CONSTRO-2018*** International Fair approved by ITPO, at Pune. *CONSTRO-2018* which had a footfall of +2 lakhs, is termed as one of the biggest show of building materials, methods and machinery under one roof, in India.

View of the CONSTRO-2018 Fair

VIIT's inter-disciplinary R&D teams [Civil | E&TC | Mechanical Engineering] consisted of 28-UG students and 7-faculty advisors, representing two applied research projects funded by the Pune Construction Engineering Research Foundation (PCERF). The research projects are based on application of smart and mechanized technology in construction work. Two new marketable products - (a) Intelligent Concrete Maturity Meter (*iCoMM*), and (b) Plastering Machine with Standardization of Plaster Mortar (*Pati-Test*), were displayed. These novel products developed by VIIT are unique to the Indian market and have potential to resolve issues related to safety, quality, economy, and labour in the construction industry.

VIIT's Inter-Disciplinary R&D Teams [Civil | E&TC | Mechanical Engineering]

Intelligent Concrete Maturity Meter | Plastering Machine | Standardization of Plaster Mortar



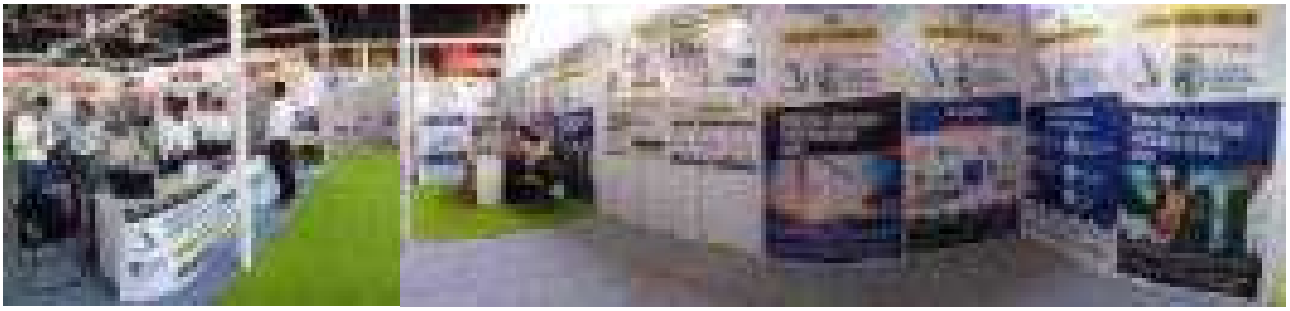
Novel - Intelligent Concrete Maturity Meter

Plastering Machine

A Novel Site-friendly - *Pati Test* for Standardization of Plaster Mortar developed at VIIT

PCERF-VIIT Booth Details →

VIIT displayed their R&D projects in 6 booths admeasuring about 600 sq.ft. footprint area fully sponsored by PCERF at an estimated rental charge of approximately Rs. 5 lakhs.

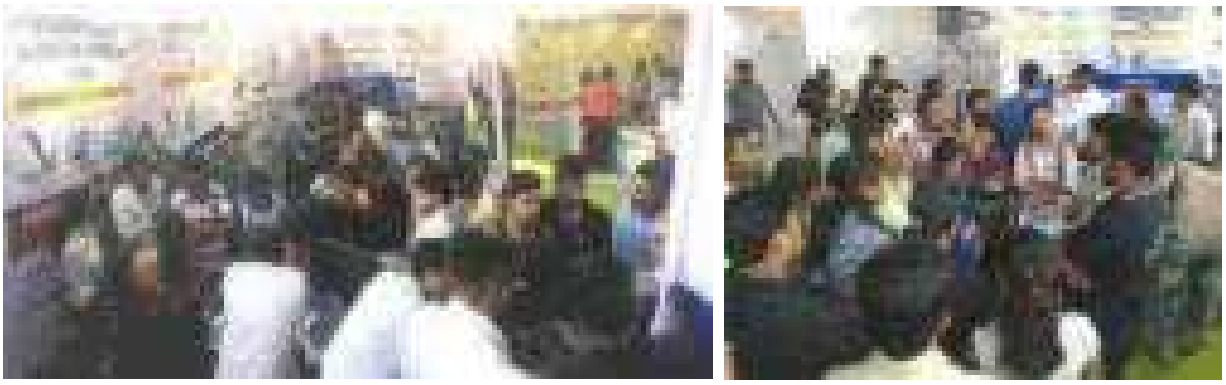


PCERF-VIIT Research Activity Booths at CONSTRO-2018

Co-Sponsors

Visitors →

The PCERF-VIIT booths were visited by more than 3000 individuals, representing numerous companies, professional and educational institutes, and consultants. More than 400 individuals provided feedback, appreciating the R&D work. Several company representatives expressed their interest in establishing research tie-up and training workshops with VIIT team. About 400 UG and PG students from Civil Engineering Dept., VIIT also visited the Expo. The visitors made a number of inquiries regarding the purchase and availability of the R&D products. Moreover, the visitors took great interest in the R&D activities of VIIT and asked several questions. The VIIT students were very motivated and passionately provided information to the visitors.



Visitors to PCERF-VIIT Research Activity Booths at CONSTRO-2018

Visitors to PCERF-VIIT Research Activity Booths at CONSTRO-2018

Key Visitors

#	Name of Visitor	Designation	Company
1	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]
13	[illegible]	[illegible]	[illegible]
14	[illegible]	[illegible]	[illegible]
15	[illegible]	[illegible]	[illegible]
16	[illegible]	[illegible]	[illegible]
17	[illegible]	[illegible]	[illegible]
18	[illegible]	[illegible]	[illegible]
19	[illegible]	[illegible]	[illegible]
20	[illegible]	[illegible]	[illegible]
21	[illegible]	[illegible]	[illegible]
22	[illegible]	[illegible]	[illegible]
23	[illegible]	[illegible]	[illegible]
24	[illegible]	[illegible]	[illegible]
25	[illegible]	[illegible]	[illegible]
26	[illegible]	[illegible]	[illegible]
27	[illegible]	[illegible]	[illegible]
28	[illegible]	[illegible]	[illegible]
29	[illegible]	[illegible]	[illegible]
30	[illegible]	[illegible]	[illegible]
31	[illegible]	[illegible]	[illegible]
32	[illegible]	[illegible]	[illegible]
33	[illegible]	[illegible]	[illegible]
34	[illegible]	[illegible]	[illegible]
35	[illegible]	[illegible]	[illegible]
36	[illegible]	[illegible]	[illegible]
37	[illegible]	[illegible]	[illegible]
38	[illegible]	[illegible]	[illegible]
39	[illegible]	[illegible]	[illegible]
40	[illegible]	[illegible]	[illegible]
41	[illegible]	[illegible]	[illegible]
42	[illegible]	[illegible]	[illegible]
43	[illegible]	[illegible]	[illegible]
44	[illegible]	[illegible]	[illegible]
45	[illegible]	[illegible]	[illegible]
46	[illegible]	[illegible]	[illegible]
47	[illegible]	[illegible]	[illegible]
48	[illegible]	[illegible]	[illegible]
49	[illegible]	[illegible]	[illegible]
50	[illegible]	[illegible]	[illegible]
51	[illegible]	[illegible]	[illegible]
52	[illegible]	[illegible]	[illegible]
53	[illegible]	[illegible]	[illegible]
54	[illegible]	[illegible]	[illegible]

Key Visitors to PCERF-VIIT Research Activity Booths at CONSTRO-2018

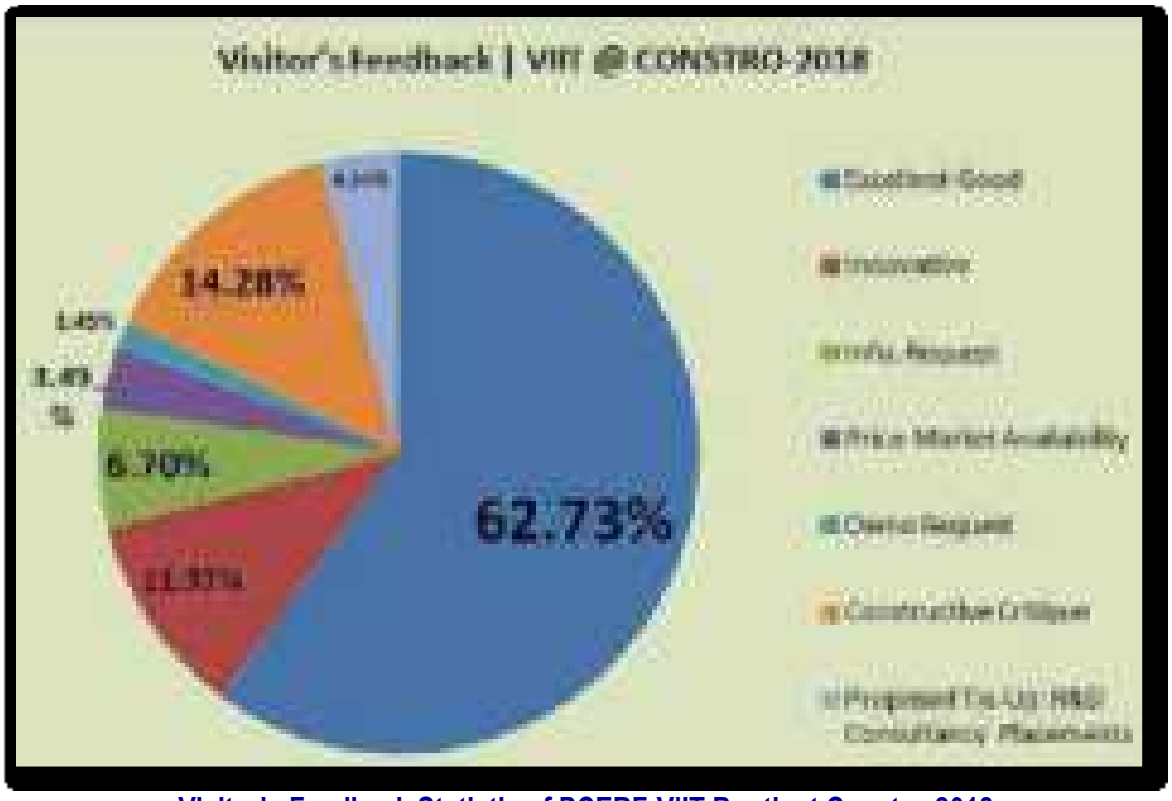
Visitor Feedback →

Valuable feedback and comments were provided by about 400 visitors.

Provided Feedback
> 150 Companies
> 50 Private Consultant
> 200 Academic Personnel

Valuable Feedback from Visitors to PCERF-VIIT Research Activity Booths at CONSTRO-2018

Many of the visitors (about 20% of the visitors) gave their views and suggestion on the projects which were officially recorded. Theses valuable comments will be helpful to improve the product and future research and development work. Most of the suggestions were very positive and encouraging. Many inquired about the cost and availability of both the products. Several requests were placed for providing details and additional information about the new products and technology. Some even extended their request for arranging a demo at their company. Research and Development tie-ups and consultancy offers were also proposed.



Visitor's Feedback Statistic of PCERF-VIIT Booth at Constro-2018

SAMPLE COMMENTS BY VISITORS

Can MM be used - To control water temperature to avoid evaporation due ill-curing for any concrete.
Information about the area capture by one sensor in concrete | Achievement of Cost Effectiveness
Arrangement of Demo on site; Cost and when it will be available?
Excellent effort. I'll get in touch if any help needed.
Nice idea. Interesting work. It will be useful for RCC work.
I love the concept. It has to be implemented.
Great initiative to check quality of concrete at the initial stage.
Great work! Very useful for RCC work to know the strength directly.
Good and economical product. Easy to understand.
Effective system. Excellent innovation will support better quality concrete
Good work to keep a check on the behavior of concrete
Implementation?? Initial cost should be low - What is cost and availability?
New technology. Explained very well.
Good - Need more clarification
Extremely good product. Looking forward for launching in market
Revolutionary concept- gives guidelines of concrete behavior
Demo and Trial run request at our company
Interested in R&D tie-up.
Interested in Consultancy tie-up with VIIT
Interested in Manufacturing Maturity Meter.
Launch and market these relevant products ASAP

Meaningful and practical work
Good - please send ppt. and related information
Very useful project -- very well going
Good work by students, such innovation will reduce expenses for testing
Good. Please send information. Hiring graduates.
Model is not verified so get it certified.
Arrange a mock up demo at our company
Liked the project as its new technology in India
Very essential product – it may give quick and reliable info about concrete in place.
Please make more user friendly
An excellent attempt for instrumentation in NDT.
All the best. Require ppt. information and details to buy
Nice, Visit our lab for R&D Tie-up
Nice Concept. Need for today.
Helps to maintain quality of construction
Good change in industry – mechanization and smart gadgets
Launch project's products in market soon
I like this concept, Please start consultancy related to the R&D work.
Great applied research done. We want to use it at our precast plant in Delhi

Key Outcomes →

- ✓ **Communication of R&D work with public**
- ✓ **Exposure to Industry**
- ✓ **Exchange of valuable thoughts**
- ✓ **Confidence building in students**
- ✓ **Product enhancement, sales & marketing**
- ✓ **Tie-ups with professionals/companies for R&D/Consultation/Recruitment**
- ✓ **Strengthening ties with PCERF**
- ✓ **Awareness of R&D activities at VIIT**
- ✓ **Branding & Marketing of PCERF, VIIT**

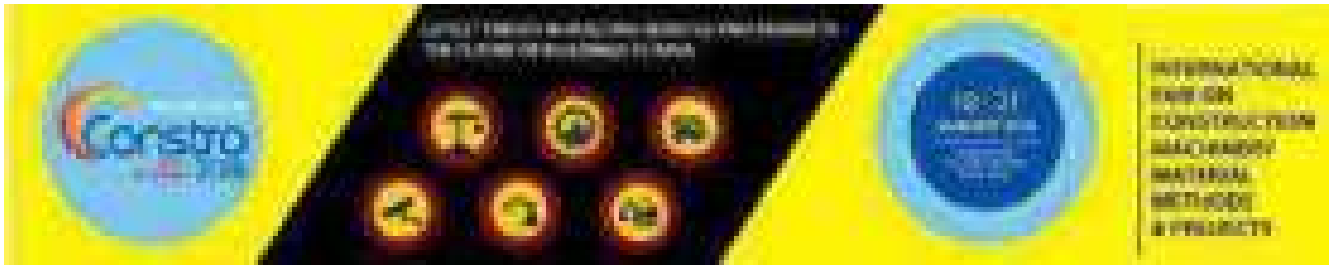
For the first time, PCERF offered complimentary display booths of significant size to VIIT project work. The 4-day event brought out several tie-up opportunities with professionals and companies with VIIT for R&D/Consultation/Recruitment. R&D tie-ups with VIIT were proposed by several renowned companies such as Lunkad Reality, Naiknavare Group, B.G. Shirke Co., Panchshil Group, Nyati Group, Vilas Javadekar Lifestyle Developers, Everest Group, Water Resource Dept., MERI-Govt. of India, Bhate & Raje Co. Ltd., Precast India Pvt. Ltd., Ultratech Cement, etc. Hundreds of inquires related to availability of products, costing and training were received. Requests for product's live demo and training were also placed.

The VIIT-Civil Engineering students were highly motivated and demonstrated great attitude during the rigorous 4-days of interactions with visitors at the booth. All the 28 students were proactively present for almost all the 4-days. VIIT also got an invite to arrange a display booth at Indian Concrete Institute (ICI) organized 2-day Conference & Expo – "*CONCRETE SHOW*" at Mumbai on 24/25-May, 2018. Overall, the PCERF-VIIT (Civil Department) participation at Constro-2018 turned out to be a meaningful endeavor.

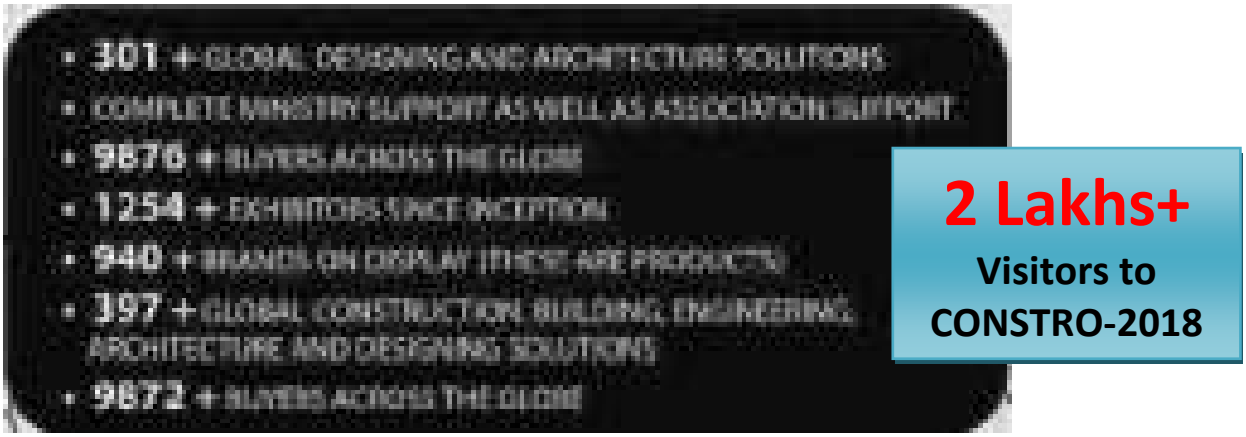
PREFACE VIIT @ CONSTRO-2018

Pune Construction Engineering Research Foundation (**PCERF**) is as an NGO, established in the year 1983 by eminent Civil Engineers, Architects, Consultants and Builders, to serve Construction Industry by solving day to day problems and creating awareness about the latest technological developments in Construction Industry. Members of PCERF, its Executive Committee are eminent businessmen from Construction industry such as Civil Engineering, Building Construction, Interior Designing, Architecture etc.

PCERF has been organizing `Constro' [http://constroindia.org/] exhibition once in every two years since 1985, comprising majorly display of products, services of all related categories of construction industry and including concurrent conferences, seminars etc. With an intention to bring together all aspects of construction under one roof and to create awareness about the latest technological developments, Constro exhibitions were initiated. Constro is an ideal means of reaching out to the people and bringing about an interface between the industry and the public.



"**CONSTRO** is a major interface created between the users and customers on one side and the providers and manufacturers on the other side. After going from success to success with initial fledgling of the 1st series of International Fair Constro in 1985, at present, the 15th edition was schedule on the 18th to 21st Jan., 2018. It's an International Fair approved by ITPO and termed as one of the biggest show of building materials, methods and machinery under one roof, in India."



In continuation with this, Constro'18 International Trade Fair- 15th in series, was organized by PCERF along with ABEC company, during 18th to 21st Jan 2018 at Agriculture college ground, Shivajinagar, Pune and concluded successfully.

Exhibition Theme - Latest Trends in Building Services and Products -The Future of Buildings in India

With the growing demand for housing with modern amenities there is a tremendous growth on the options available for building services. In fact the higher densities of residential areas in urban areas which has been an outcome of the ever increasing demand for housing. High rise buildings and the trends of new building requirements like fire fighting, parking facilities, intelligent lighting, waste management etc. are creating a new dimension to the industry.

In the process of catering to these demands there has been a growth of a gamut of services and service providers as specialized agencies. These services are no longer considered as luxuries but have become mandatory and specific need of any modern building. Considering this very wide range of products and services in the construction industry, PCERF decided to choose this as a theme and give a greater exposure to the range of products and services in this ever increasing demand.

Building services engineering comprises mechanical engineering, electrical engineering and plumbing or public health (MEP) engineering, all of which are further sub-divided into the following:

Communication lines, telephones and IT
Energy supply - gas, electricity & renewable sources
Escalators and lifts
Fire detection and protection
Heating, ventilation and air conditioning (HVAC)
Lightning protection
Low voltage systems, distribution boards/switchgear
Natural/Artificial lighting, and building facades
Security and alarm systems
Ventilation and refrigeration
Water, drainage and plumbing

Building services engineers work closely with other construction professionals such as architects, structural engineers and quantity surveyors. They influence the architecture of a building and play a significant role on the sustainability and energy demand of a building.

Constro-2018 offers a unique platform to meet the Techno-commercial personnel at the seminars and conferences at the fair like;

- ♦ Architects
- ♦ Builders
- ♦ Contractors
- ♦ Civil Engineers – Project Management Consultants
- ♦ Developers
- ♦ Structural Engineers
- ♦ Interior Designers
- ♦ Landscape Architects
- ♦ Electrical Engineers
- ♦ Manufacturers, Suppliers,
- ♦ Dealers of Construction Machinery, Materials
- ♦ Government Authorities

The theme of Constro'18 was *`Latest Trends in Construction Products and Services – Future of Buildings'*. With this theme, PCERF had organized various displays and demonstrations at the `Experience Center', which was created at the Constro'18 ground. This experience center was main attraction for visitors specially to those who wanted to gain insights and knowledge related to the theme. Apart from other displays at the experience center, PCERF had its own pavilion to showcase its activities and services being offered over the years. The key showcased R&D work funded by PCERF and carried out by VIIT-Civil Dept., was the indigenously developed –

1) **Intelligent Concrete Maturity Meter (*iCoMM*)**
2) **Standardization of Mortar used in Plastering Machine**
3) **Plastering Machine**

These projects were displayed in the PCERF sponsored - 6 booths admeasuring about 600 sq.ft. display area. The display consisted of technical information on the projects as well as the various R&D, and Industrial Consultancy work carried out by the Dept. of Civil Engg., at VIIT. PCERF and VIIT is in the process of developing electronic digital *`Intelligent Concrete Maturity Meter (iCoMM)'* conducive to the local material. Various lab tests of this meter have been carried out successfully and currently this product is undergoing field tests and will be launched in the market in coming few months. This meter was demonstrated in PCERF pavilion and drew overwhelming response from visitors during Constro'18, specially from industry experts, professionals, and students.

View of the CONSTRO-2018 FAIR

PCERF-VIIT's Booths Displaying their Research Activities (6 Booths | 600 sq.ft.)

VIIT's Flyer – Distributed in Booths at CONSTRO-2018

VIIT's Flex – Displayed in Booths at CONSTRO-2018

Visitors at PCERF-VIIT Booth | Total Estimated **Visitors > 3000**

VIIT Research Team at Constro-2018

SOON MARKET READY

Development of Concrete Maturity Meter

FACULTY ADVISORS

Dr. H. S. Dhande — Dept. of Civil Engineering, VIIT, Pune
Prof. M. A. Mahajan — Dept. of Civil Engineering, VIIT, Pune
Prof. R. S. Ghongade — Dept. of Electronics & Telecommunications, College of Engg., Bharati Vidyapeeth University, Pune

RESEARCH GUIDE

Er. Mrs. S. L. Gore — Dept. of Civil Engineering, VIIT, Pune

STUDENTS — B.E. - Dept. of Civil Engineering, VIIT, Pune

Shubham S. Siddhe
Avinash J. Chavan
Sachin S. Shinde
Abhijeet C. Konde
Saiprasad S. Gaikwad
Siddarth S. Akhade
Rohit S. Shinde
Akash R. Khandekar
Vishal J. Jagdale
Sushma G. Gaikwad
Rajeshree S. Gavli
Pooja B. Rathod

River Sand Replacement & Mortar Standardization for Plaster

CO-Sponsors

SHIRKE

NYATI

B&R

PRECAST INDIA INFRASTRUCTURES PVT. LTD. (PIIPL)

COSMOS

PCERF-FUNDED VIIT RESEARCH PROJECTS

1) Intelligent Concrete Maturity Meter (*iCoMM*) →

Many lives and resources have been lost due to premature and sudden failures of concrete structures owing to the inaccurate estimates of its in-place compressive strength. At present, it is very difficult to predict the strength and behavior of concrete cast in-place. The standard cube tests, commonly carried out to ascertain the strength of concrete, fail to provide a reliable, accurate and timely estimate of the in-place concrete. To overcome this problem, the *Intelligent Concrete Maturity Meter (iCoMM)* was developed at VIIT through a three year funded research project by P.C.E.R.F.

iCoMM was first developed at VIIT in 2013-14 and has been tested in lab and field. *iCoMM* is based on the well-proven 40-year old rational technology – Maturity Method; already well recognized and practiced in the U.S.A. and Europe. It is based on the concrete's maturity – i.e. its ability to gain strength proportional to the heat of hydration and age of hydrating concrete. Maturity of hydrating concrete is a function of its temperature history as it ages. A maturity meter records the temperature and real-time of fresh and hardening concrete.

Since the strength development of concrete, as soon as it is cast, depend on both time and temperature, it can be said that concrete's strength is a function of summation of product of time and temperature; this summation is called maturity index of concrete.

Concrete's Maturity Index = ∑ (Time x Temperature), *[Deg-C.hrs]*

The compressive strength of hardened concrete is proportional and correlates very well with the maturity index. This concept is useful for estimating the strength of concrete at any other maturity and time as a percentage of strength of concrete of known maturity index.

Generally, the Compressive strength of concrete is determined using destructive test. The Maturity Method is a Non-Destructive Test (NDT) technique to estimate in-place strength of concrete by accounting for the effects of temperature and time on strength development. Maturity meter (*iCoMM*, developed at VIIT) can reliably estimate in-situ, real-time concrete strength, right in the palm of your hand (mobile-based) without the hassle and cost of casting and breaking many cubes/cylinders. *iCoMM* can help make crucial key decisions that affect the safety and success of concreting works; such as – time for deforming, removal of shoring supports, releasing prestress, controlling curing regimes, optimum turn-around times, loading built structures, etc.

The Maturity Method procedure is prescribed in the American Concrete Institute-ACI 228.1R, ASTM STP169D, ASTM C1074 & C918, and various other codes and guidelines. The *iCoMM* developed at VIIT is an intelligent, affordable, rugged and multifunctional smart tool that can reliably and accurately estimate the real time → strength, setting times, and incompatibility problems in fresh and hardening concrete, in-place or in-situ (structure).

Hence, *iCoMM* is an important smart tool to assess the real-time quality and condition of fresh and hardened concrete. The maturity meters have proved to be effective QA/QC tool that potentially can ensure safety and save construction time, resources, and labour.

Applications of Maturity Meter-*iCoMM*:

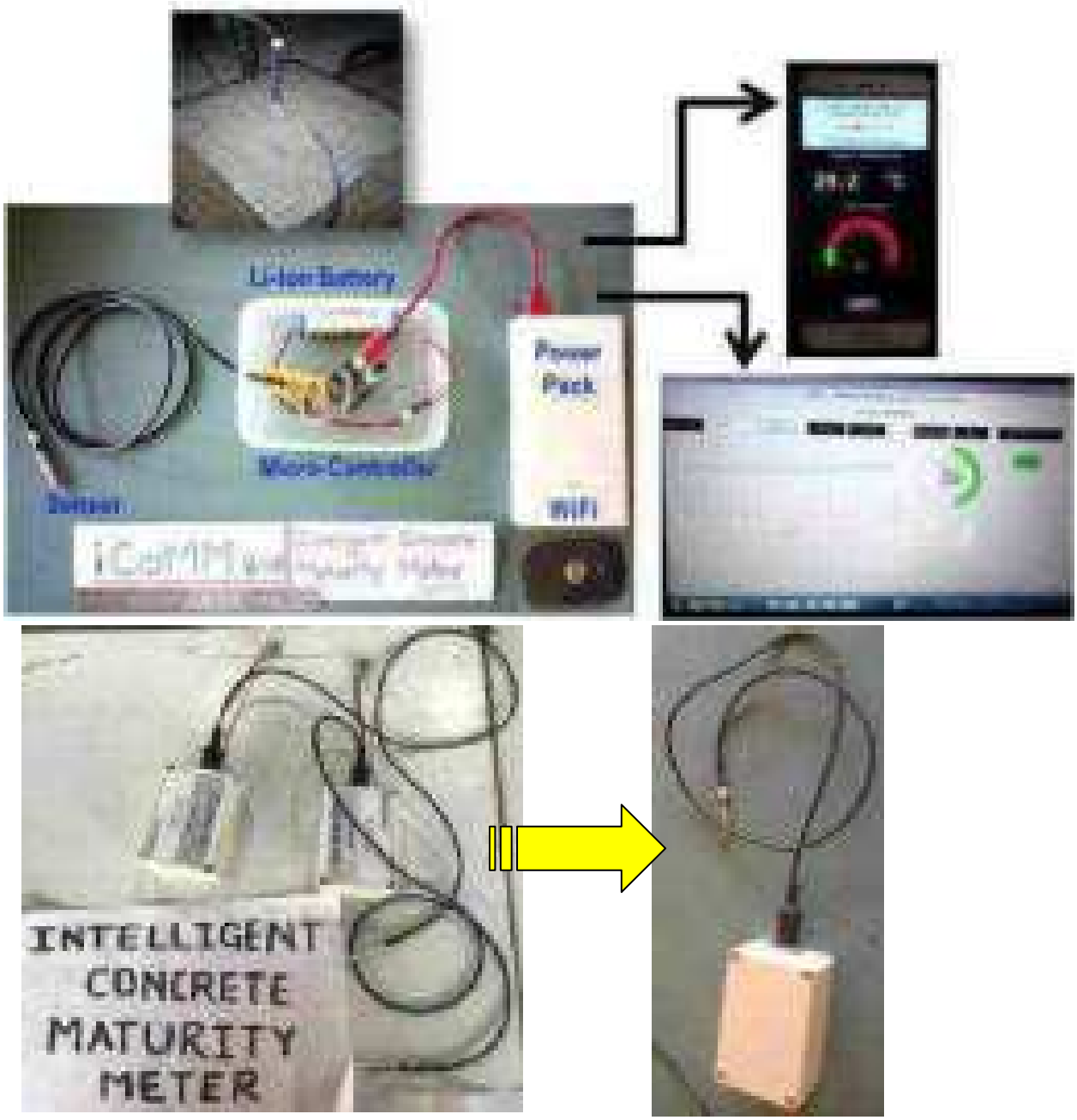
- ✓ Concrete Roads and Bridges: Super & Sub-Structures
- ✓ RCC Pavements
- ✓ Cast-in-place structural concrete
- ✓ Prestressed and precast concrete
- ✓ Post-tensioned and high rise structures
- ✓ Testing labs, R&D, cement plant QC/QA
- ✓ Shotcrete
- ✓ Hot Weather and Cold Weather concreting
- ✓ Massive Concrete placements
- ✓ Any time-sensitive placement where knowing the in-place strength quickly is critical

#	Uses of Thermal Signature of concrete
1	Predict **In-place and Characteristic Compressive Strength** of concrete at **different ages**
2	Predict Setting Time (**IST/FST**)
3	**Optimize concrete Mix** for desired level of performance
4	Estimate suitable **Curing Time** and **Regime**
5	Identify **Incompatibility** problems in concrete
6	Check **Cement Characteristics**
7	**Accept/Reject** Concrete
8	**QA/QC Protocol** for concrete construction
9	Estimate reliable time of de-forming/release prestress, sequential construction, opening traffic flow on road after construction/repair, etc.

Several models of *iCoMM* were developed at VIIT since 2013. Presently, the *iCoMM* Web/Mobile enabled model is in progressive development at VIIT. The endeavor of PCERF-VIIT team is to bring in market an affordable and multifunctional smart *iCoMM* within a few months time.

2013-14, *iCoMM* Maturity Meter Model Developed at VIIT: Analog Sensor & Mobile Based

2014-16, *iCoMM* Maturity Meter Model Developed at VIIT:
Digital Reusable Sensor, Mobile Based & Multi-Channeled



2016-18, *iCoMM* Maturity Meter Model Developed at VIIT:
Super-Compact, Field Ready, Long-Battery Life, Digital Reusable Sensor,
Mobile/Web Based & Multi-Channeled

Technical Information of Maturity Meter - **iCoMM**

VISITORS AT MATURITY METER - PCERF-VIIT BOOTH

Total Estimated **Visitors > 2500 | 400 Feedbacks Received**

Booth was visited by several professionals, researchers, academicians, and students. They provided valuable suggestions and feedback on the work done by the VIIT researchers. About 400 UG and PG students from Civil Engineering Dept., VIIT also visited the Expo.

Key-Visitor: Er. Col. Adsar, Manager, B. G. Shirke Construction Technology Pvt. Ltd., Pune

Key-Visitor: Er. Manoj D. Deshmukh, Consultant, Pune

Key-Visitor: Er. Rajendra Pawar, Director General, Water Resource Dept., MERI, Nasik

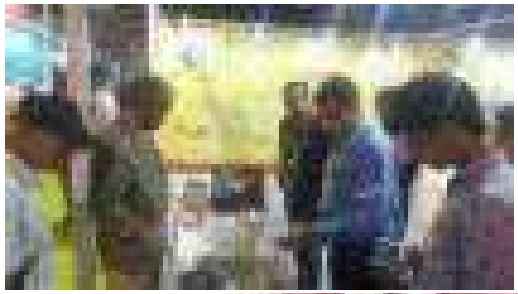
Key-Visitors: Professional Engineers, Manufacturers and Architects

Key-Visitors: Er. P. A. Joshi, Welmade Locking Systems Co. Ltd., Pune

Key-Visitors: Defense Engineers, CME, Pune






Valuable Feedback from Visitors to PCERF-VIIT Research Activity Booths at CONSTRO-2018

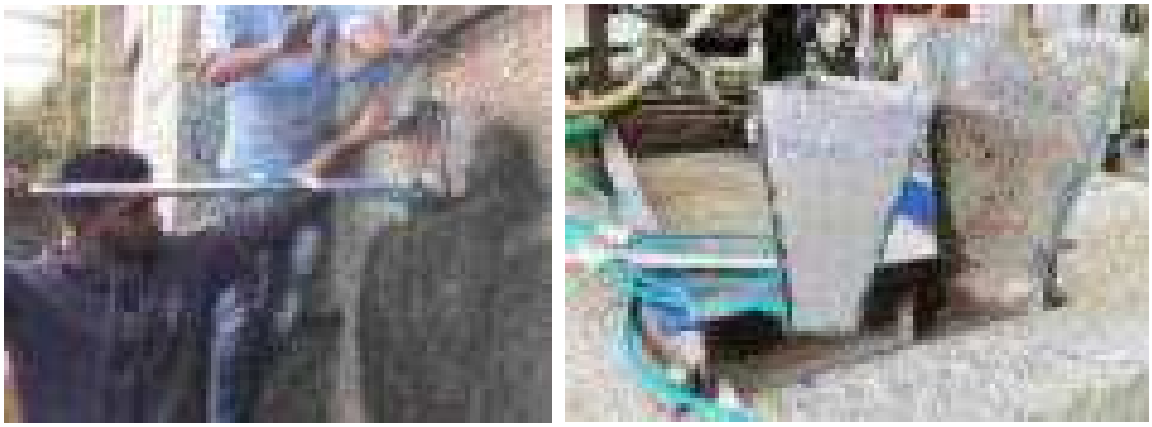
2) Standardization of Mortar for Plastering Machine →

Problem Statement and Applications:

Plastering of interior and exterior wall surfaces is an important construction practice essential for the durability, damp-proofing and aesthetics of a building. However, the manual plastering practice is skilled-labour intensive, time consuming, cost prohibitive and challenging. Moreover, QA/QC protocols for plastered surface are non-specific and non-standard. There are no standard tests to ascertain the quality of plastering work. The problem of effective and quality plastering remains unsolved even with the availability of mechanized plastering machines in current market, due to non-standard mortar preparation and unavailability of graded river sand. In summary, the problems associated with the plastering work are;

- Scarcity of skilled labour
- Lack of QA/QC practice in plastering work
- Unsustainable and eco-damaging usage of river sand for plastering work
- Inept functioning of costly and bulky plastering machine
- Mortar required for plaster machine lacks standard QA/QC norms

To address the above problems, VIITs' interdisciplinary teams from Civil and Mechanical departments together have developed pneumatic hand-held spray type plastering machine.



Plastering Machine developed at VIIT

A Novel Site-friendly - *Pati Test* for Standardization of Plaster Mortar developed at VIIT

For the exhibition we have our different models of machine, gradation sieves especially prepared for gradation of sand, various plaster samples demonstrated on asbestos sheet showing difference between manual and machine plaster. Our special attraction was newly developed *PATI* test used for checking Mortar Quality Index (MQI).

Visitors at Standardization of Mortar for Plastering Machine - PCERF-VIIT Booth

Total Estimated **Visitors > 2500**

Booth was visited by several professionals, researchers, academicians, and students. They provided valuable suggestions and feedback on the work done by the VIIT researchers.

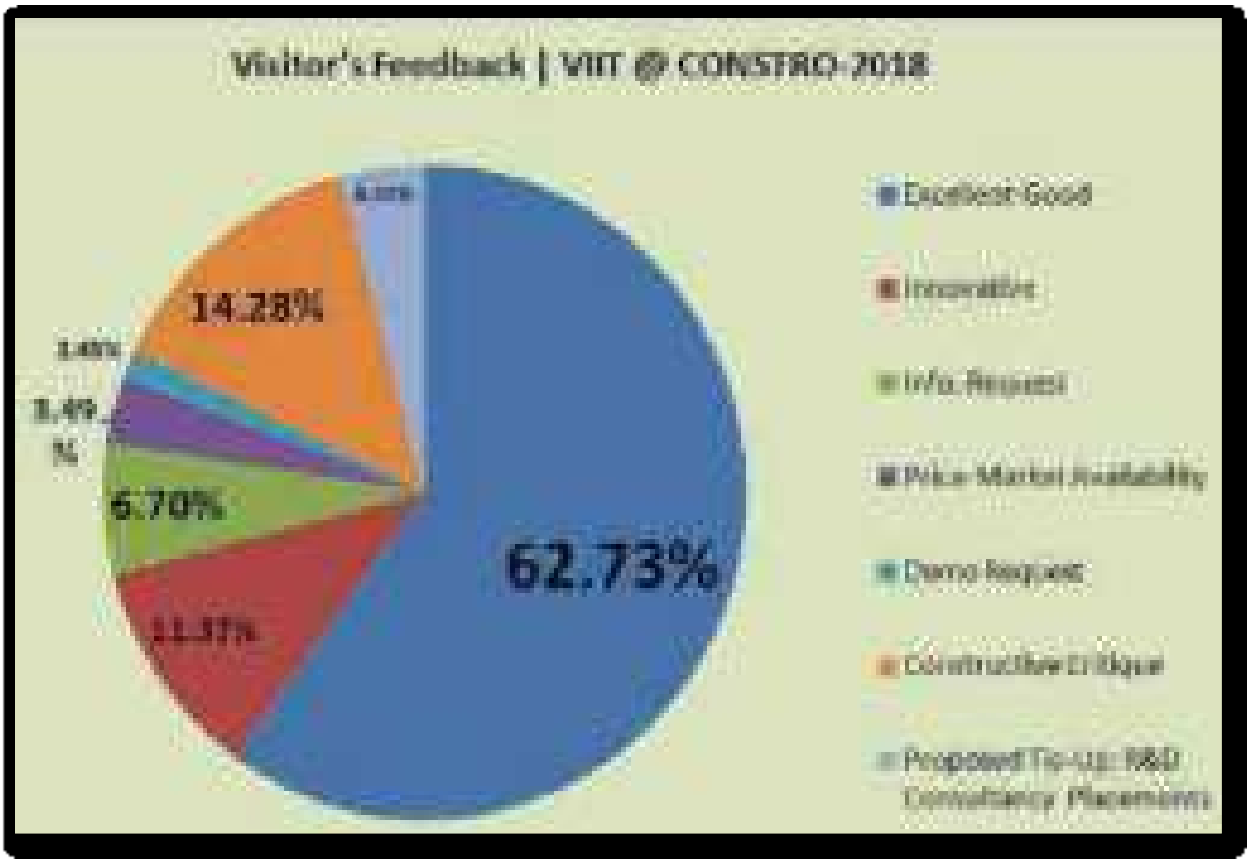





VISITORS AND FEEDBACK ANALYSIS

Many of the visitors (about 20% of the visitors) gave their views and suggestion on the project which was officially recorded. Valuable feedback and comments were provided by about 400 visitors. Theses valuable comments will be helpful to improve the product and future research and development work. Most of the suggestions were very positive and encouraging. Many inquired about the cost and availability of both the products. Several requests were placed for providing details and additional information about the new products and technology. Some even extended their request for arranging a demo at their company. Research and Development tie-ups and consultancy offers were also proposed.

Provided Feedback
> 150 Companies
> 50 Private Consultant
> 200 Academic Personnel



Visitor's Feedback Statistic of PCERF-VIIT Booth at Constro-2018

Valuable Feedback from Visitors to PCERF-VIIT Research Activity Booths at CONSTRO-2018

More than 50 key prominent professionals (see list below) representing renowned companies visited the VIIT booth. They interacted with the faculty and students with great enthusiasm. List of visitors representing various companies is also presented below. Additionally, a list of typical and relevant comments by the visitors is depicted below.

Key Visitors			
#	Name of Visitor	Designation	Company
1	Er. Rajendra Pawar	Director General	Water Resource Dept., MERI, Govt. of Maha., Nashik
2	Er. Dileep Tawar	Superintending Engineer	Quality Control Circle (WRD), Govt. of Maha., Pune
3	Er. Ranjit Naiknavare	Director	Naiknavare Developers, Pune
4	Er. Col. S. M. Adsar (Retd.)	General Manager (Planning & Design)	B. G. Shirke Group, Pune
5	Er. Raghawendrasing Bais	AVP-Quality	Kolte-Patil Township Ltd. Pune
6	Er. P. S. Ghatpande	V.P. - Engineering	Nyati Group, Pune
7	Er.Tushar Ghate	Dy.General Manager (QA/QC)	Panchshil Group, Pune
8	Er. Prashant Akashe	G.M.	Univastu India Ltd., Pune
9	Er. Vijay Behere	President (Tech.)	Sahyadri Industries Ltd., Pune
10	Er. Akash R. Lunkad	Director	Mother Nature Environment Services LLP, Pune
11	Er. Lunkad	President	Lunkad Reality, Pune
12	Er. Akash Butole	C.E.O.	Nabhraj Construction, Aurangabad

Key Visitors			
#	Name of Visitor	Designation	Company
13	Mr. Vivek Mendonsa	Director	Lawrence & Mayo, Mumbai
14	Er. Vijay Ghugre	Vice President	Panchshil Group, Pune
15	Mr. Abhijeet Sonawane	Chief Executive Engineer (QA/QC)	Vishal Infrastructure, Pune
16	Mr. Ankur Shah	Partner	Bronco Buildsmart LLP., Mumbai
17	Er. Appasaheb Patil	G.M.	Runal Developers, Pune
18	Mr. Sanjay Sharma	Manager (R&D)	Sahyadri Industries Ltd., Pune
19	Er. Nagesh Kole	Dy. General Manager	Bhate & Raje Construction Co., Pune
20	Er. J. V. Inamdar	Founder & Senior Consultant	Strudcom Consultants Pvt. Ltd, Pune
21	Er. Gautam Dahiya	D.G.M. (Survey)	Geo Designs & Research Pvt. Ltd., Gujrat
22	Er.Mangesh Waghmare	Project Manager	Vertiv Energy Pvt. Ltd., Pune,
23	Mr. Balkrishna Kulkarni	Territory Technical Manager	UltraTech Cement, Solapur
24	Er. Milind Kulkarni	Principal Consultant	Milind Kulkarni Consulting Engineers, Mumbai
25	Er. Amitkumar Sinha	Sr. Manager-Projects	Bhate & Raje Construction Company, Pune
26	Dr. Anuradha M. Desai	Director	MarSun Metal Industries Pvt. Ltd., Pune
27	Er. Shailendra Mohite	Project Head	Empire Constructions, Pune
28	Er. Ujwal Morey	Sr. Associate	Archvista Engg. Projects Pvt. Ltd., Pune
29	Er. Rajendra Bharme	Sr. Engineer	Vilas Javdekar Developers, Pune
30	Er. Mohsin Sayyed	Officer-Technical Services	Dalmia Cement, Pune
31	Er. Manoj D. Deshmukh	Founder & Sr. PM Consultant	M.D. Consultants, Pune
32	Er. Mujtaba Lokhandwala	Sr. Consultant (Safety)	Consultant & Office Bearer-PCERF, Pune
33	Er. Mandar Ambekar	Consultant & Charted Er.	Ambekar Consultants, Kolhapur
34	Er. Mangesh Panchpor	Owner - Contractors & Engineers	Padmavati Empire, Pune
35	Er. Abhijit Mahajani	Partner	Synergytech Instruments, Pune
36	Er. Pravin B. Rokade	Deputy Manager-Civil	Serum Institute of India Pvt. Ltd.
37	Ar.Er. Dilip Patil	Architect, Consultant & Charted Er.	Design Forum, Pune
38	Er. Rahul Shitole	Director	Rachana Enterprises, Pune
39	Er.Shreedhar K.Inamdar	Consultant	SI Consultants, Karad
40	Er. Vijay Shitole	Propritor	Shitole Ferrocretes, Pune
41	Er. Priyanka Patra	Asst. Manager-Business Devlp.	BASF India Ltd., Pune
42	Mr. Ankur Mitna	Head- Business Vertical	Innovative Vastunirman Pvt. Ltd., Pune
43	Er. Ms. Swati J. Chirputkar	Quality Manager	CSRL, Structwel Lab, Pune
44	Mr. Avej Shaikh	Head-Quality Control	Flyocrete Green Concrete LLP., Nashik
45	Mr. Abhijeet Patil	Sales Manager	Cosmos Construction Machn. & Equipmts., Pune
46	Er. Gous Mohammad	Managing Partner	Civilco Engineers & Associates, Gao
47	Ms. Sujata Ghugare	Co-ordination Manager	Yashada Reality Group, Pune
48	Er. Pravin Kitekar	Asst. Sales Manager	Sika India Pvt. Ltd., Pune
49	Mr. Amar Patil	Purchase Manager	Silveroak Buildcon Pvt. LLtd., Pune
50	Er. Rupesh Kadlag	Project Engineer-Design	Rdumec, Nashik
51	Representative	Representative	Panacea Civil Ind. Pvt. Ltd., Pune
52	Er. G. R. Awhad	Partners	Awhad Consulting Engineers, Palghar
53	Representative	Representative	Hi-Tech Scaffolding Pvt. Ltd., Pune
54	Er. Ravindra Bansode	Propritor	S. R. Consultant, Aurangabad

VISITORS REPRESENTING VARIOUS COMPANIES

Welmade Locking Systems Co. Ltd.	Everest Ind. Ltd., Nasik
Strudcom Consultants Pvt. Ltd.	GM Arch.
Nyati Group	D.B. Dande & Association
Vilas Javadekar Lifestyle Developers Pvt. Ltd.	N Tech Projects
Proqual Solution (PM), Pune	NCC Ltd. (Pune Metro)
AQT Construction Lab	Skyways Multicon
Technofunds Electronic Solutions	Nyati Group
S.K. Enterprise	PBH
T-Tech LLP.	AFK
Sujit Construction	PK Technical
Active Group	Straid Pvt. Ltd.
Ajay Kadam Associates	Pavetech Industry
Ajay Kadam Associates	CME
Ajay Kadam Associates	Dimension Construction
Honai Construction	Rohan Builders
Bhate & Raje Co. Ltd., Pune	Kandan Spaces
Pooja Group	VERTIV
PWD, Govt. of Maha.	Planedge Consultant
Panchsil	Kicons Ltd.
Innovative Company Pvt. Ltd.	A.M. Jagdale & Asso.
Suzlon Energy Ltd.	B & B
Paranjape Schemes	Sahyadri Properties
NICMAR	WCR
Ashoka Builder, Pune	V Constructions
Bhandari Landmarks	P.S. Constro System
Vilas Javadekar Lifestyle Developers Pvt. Ltd.	TEPL
Sakshi Chemicals	Manpasavd Printers
Thakur Tara Construction	S.T. Build Construction
Vishal Construction	Ultratech Cement
Contractor, Pune	VTP Realty Urban Life, Talegaon
Kumar Properties	Infini Institute
S. R. Consultant	SALT Instra & Design Pvt. Ltd.
Shubham Civil Projects	Om Sai Construction, Karad
Mahasai Corporation	Vital Landmark
2P, Latur	Dhendhe Civil Work
MTRL	Water Resource Dept., MERI, Govt. of Maha.
MERL	Dhokle Construction
NSK	Univastu India
Greystone	CBRE
Ashtech Pvt. Ltd., Pune	Motilal Dhoot Group
B. G. Shirke, Pune	MSEDCL
Suraj Construction	A&T Consultants
Dalmia Cement	Sai Blessigs
Sanskar Consultant	Kashee Engg Pvt. Ltd.
Kalpatani Ltd., Pune	N.P. Jasag & Asso.
Nirman Construction	VTP Reality
Project Manager	Perma Construction
S.J. Contractors, Pune	Rachana Fabrication Co.
Sai Samarth Construction	Vidyut Rachana
Proscn Engineering	Kirloskar Oil Engines, Pune

VISITORS REPRESENTING COMPANIES

SureFix	PCERF
Pushkaraj Consultancy	Kakade & Associates
Sahyadri Industries Ltd., Pune	Vishal Infrastructure
Maharashtra Water Resource Dept., Govt. of Maha.	DNA Fire Enterprises
Shree Hans Enterprises	Khade & Associate
Ultratech Cement	Cosmo World
Empire Construction	BASF
Galco Group	Serum Institute Of India Pvt. Ltd.
SI Consultants	CSRI Structwel
Atharvas Services	Ranawade Associates -S. R. Group
Crystal Swimming Pools Pvt. Ltd.	Silveroak Buildcon Pvt. Ltd.
ArchVista-AEPPL	FlyoCrete
Vedant Construction	Anant Industries
Aarav Corporation	Milind Kulkarni Consulting Engineers
Axis Consultants	Jijau Developers
Saitech Instruments	RDumec
Opel the Specialifts	Kolte-Patil Township Ltd., Pune
Cosmos	Opel Lifts Pvt. Ltd.
Truepower Earthings pvt.ltd.	Prokem Buildecare Pvt. Ltd.
Nabhraj Construction	Padmavati Empire, Pune
Concrete Consultant Org.	Bronco Buildsmart LLP
Civilco Engineer & Associates	Evergreen Enterprises
Gaurav Enterprises	Innovative Vastunirman Pvt. Ltd.
Summet Fire Engineers Pvt. Ltd.	Shreekrupa Infracon
Ananat Industry	Sandcon
Flyocrete Green Concrete LLP.	Kaleshwari Construction
Hi-tech Scaffolding Pvt. Ltd.	Honai Infrastructure
M/s D. A. Futane - Engineer and Contractor	Falcon Engineers
i-Tech Pvt. Ltd.	COSMOS Equipments
Sumangal Enterprises	Honesty Builders & Developers
Sumangal Traders	Ashok Patil & Associates
Alfaone	Futane and Asso.
Rachana Enterprises	Om Shree Sai Construction
Ecosun Energy Company	Jawale Contractors
Bhaishree Ventures	Shrinidhi Constructions
ProQual Solution	Vijay Constructions
Sunil Enterprises	Abhiyanta Structure Construction Company
Galaxy Consrtuction & Developers	Galaxy Construction
Sika, India	Yash Construction
Runal Developers	Vedant Construction
Nabhraj Construction	Virat Construction & Associates
Nyati Group	Lawrence & Mayo
Jemkon Pvt. Ltd	Patil Consultants
Srujan Construction	Lunkad Reality, Pune
Water Resources Department, MERI	B.G. Shirke, Pune
Bhate & Raje Construction Company	Kakkad Constructions, Pune

SAMPLE COMMENTS BY VISITORS

Can MM be used - To control water temperature to avoid evaporation due ill-curing for any concrete.
Information about the area capture by one sensor in concrete | Achievement of Cost Effectiveness
Arrangement of DEMO on site; Cost and when it will be available?
Excellent effort. I'll get in touch if any help needed.
Nice idea. Interesting work. It will be useful for RCC work.
I love the concept. It has to be implemented.
Great initiative to check quality of concrete at the initial stage.
Great work! Very useful for RCC work to know the strength directly.
Good and economical product. Easy to understand.
Effective system. Excellent innovation will support better quality concrete
Good work to keep a check on the behavior of concrete
Implementation?? Initial cost should be low - What is cost and availability?
New technology. Explained very well.
Good - Need more clarification
Extremely good product. Looking forward for launching in market
Revolutionary concept- gives guidelines of concrete behavior
Demo and Trial run request at our company
Interested in R&D tie-up.
Interested in Consultancy tie-up with VIIT
Interested in Manufacturing Maturity Meter.
Launch and market these relevant products ASAP
Meaningful and practical work
Good - please send ppt. and related information
Very useful project -- very well going
Good work by students, such innovation will reduce expenses for testing
Good. Please send information. Hiring graduates.
Model is not verified so get it certified.
Arrange a mock up demo at our company
Liked the project as its new technology in India
Very essential product – it may give quick and reliable info about concrete in place.
Please make more user friendly
An excellent attempt for instrumentation in NDT.
All the best. Require ppt. information and details to buy
Nice, Visit our lab for R&D Tie-up
Nice Concept. Need for today.
Helps to maintain quality of construction
Good change in industry – mechanization and smart gadgets
Launch project's products in market soon
I like this concept, Please start consultancy related to the R&D work.
Great applied research done. We want to use it at our precast plant in Delhi

KEY OUTCOMES

- ✓ Communication of PCERF-VIIT R&D work with public
- ✓ Exposure to the professionals
- ✓ Exchange of valuable thoughts
- ✓ Confidence building in students
- ✓ Product enhancement ideas and sales & marketing
- ✓ Tie-up proposals with professionals & companies for R&D/Consultation/Recruitment
- ✓ Strengthening ties with PCERF
- ✓ Awareness of R&D activities at VIIT

For the first time, PCERF offered complimentary display booths of significant size to VIIT project work. The 4-day event brought out several tie-up opportunities with professionals and companies with VIIT for R&D/Consultation/Recruitment. R&D tie-ups with VIIT were proposed by several renowned companies such as Lunkad Reality, Naiknavare Group, B.G. Shirke Co., Panchshil Group, Nyati Group, Vilas Javadekar Lifestyle Developers, Everest Group, Water Resource Dept., MERI-Govt. of India, Bhate & Raje Co. Ltd., Precast India Pvt. Ltd., Ultratech Cement, etc. Hundreds of inquires related to availability of products, costing and training were received. Requests for product's live demo and training were also placed.

The VIIT-Civil Engineering students were highly motivated and demonstrated great attitude during the rigorous 4-days of interactions with visitors at the booth. All the 28 students were proactively present for almost all the 4-days. VIIT also got an invite to arrange a display booth at Indian Concrete Institute (ICI) organized 2-day Conference & Expo – "*CONCRETE SHOW*" at Mumbai on 24/25-May, 2018. Overall, the PCERF-VIIT (Civil Department) participation at Constro-2018 turned out to be a meaningful endeavor.

Testimonials and Communication with Visitors

Information related to Concrete Maturity Method and Estimation of Concrete Strength at a given age (ACI/CEB-FIP)

hbdhonde . <hbdhonde@gmail.com> 30 January 2018 at 21:16

To: Col S M Adsar <smadsar@shirke.co.in>, Sanjay Adsar <adsars@gmail.com>

Cc: Milinda Mahajan <milinda.mahajan@viit.ac.in>, hodcivil <hodcivil@viit.ac.in>

Dear Col. Adsar,

Appreciate your interest in Concrete Maturity Meter System. Following-up with our telephonic discussion with Er. Jana sir & yourself of Shirke Group, you had inquired about the codal methods to estimate concrete compressive strength at a given age; for which please see the attached short PPT on ACI/CEB-FIP code methods that are of use. Attached is the related ACI 209; REFER SEC. 2.2.1.

We also discussed and clarified your questions regarding the ***iCoMM*** - Reusable sensors, digital sensors, time for measuring/recording data, functionality and applicability issues, etc. Hope the information is useful to you. Kindly let me know if you need additional information.

Follow the Mediafire web-link below to download information related to Maturity Method.

Best regards,

Hemant

_____

Good afternoon Sir,

Myself Tryambak Jadhav working in Everest industries Ltd. Nasik In R & D Dept. last 5 years. Everest Industries Limited is engaged in manufacturing and trading of building products, such as roofing products, boards and panels, other building products and accessories and manufacturing and erection of pre-engineered steel buildings and related accessories.

The Company's segments include Building products and Steel buildings. The Building products segment includes manufacturing and trading of roofing products, boards, and panels, other building products and accessories.

It also includes Fiber Cement Roofing Sheets, Fiber Cement Boards, and Rapicon Wall panels.

We were meeting in Constro exhibition 2018 Pune. We are developed thermography instrument for testing of cement and cement composite material.

I have interested in concrete maturity meter developed by your team.

Please send calculation data regarding IST, FST and final maturity of concrete.

We invite you to visit in our R & D lab (Nashik) as possible. Hope you are fine.

Thanks & Regards,

Tryambak Jadhav

Mob. 9763007354

Officer R & D Dept.

Everest industries Ltd. Nasik

----

hbdhonde . <hbdhonde@gmail.com> 25 January 2018 at 21:51
To: deepamullya@gmail.com
Cc: Milinda Mahajan <milinda.mahajan@viit.ac.in>, Shruti Gore <shruti.gore@viit.ac.in>, Shardul Joshi <shardul.joshi@viit.ac.in>

Dear Ms. Deepika (Kakkad Constructions, Pune),
Appreciate your interest in Concrete Maturity Meter System.
The product will soon be launched in the market by PCERF-VIIT team, with a brand name of - "**iCoMM**" (Intelligent Concrete Maturity Meter). We, will be glad to provide your team with a demo and presentation on using the iCoMM. Additionally, we will be happy to provide your team the required training and also help setup/implement the system at your projects.
Kindly let me know about your requirements.

Tushar Ghate <tushar.ghate@panchshil.com> 23 January 2018 at 12:46
To: "hbdhonde@gmail.com" <hbdhonde@gmail.com>
Cc: Santosh Bhegade <santoshb@panchshil.com>, Santosh Kolekar <santoshk@panchshil.com>

Dear Mr. Hemant;
With reference to the tel conversation we had last evening –
Would like to thank you for the information provided so far -
Kindly send us the details of ASTM / ACI Code pertaining to said subject and any other data which will help us
Thanks & Regards,
Tushar Gate
Dy.General Manager
QA/QC

PANCHSHIL REALTY
Site Address: ICC Realty (I) Pvt. Ltd., Survey No. 403-A, ICC Trade Tower, Opp. Cross Word Shop, Senapati Bapat Road, Shivajinagar, Pune - 411 016.
Tel. No. 020 – 25630550; **Corporate Office:** Tech Tech Park One, Tower 'E', 191 Yerwada, Pune - 411 006 **T:** +91 (20) 6647 3200 **F:** +91 (20) 6647 3101
M: +91 9823367847 **E:** tushar.ghate@panchshil.com **www.panchshil.com**

hbdhonde . <hbdhonde@gmail.com> 25 January 2018 at 21:42
To: Tushar Ghate <tushar.ghate@panchshil.com>, Santosh Bhegade <santoshb@panchshil.com>, Santosh Kolekar <santoshk@panchshil.com>, Vijay Ghugre <vghugre@gmail.com>
Cc: Milinda Mahajan <milinda.mahajan@viit.ac.in>, Shruti Gore <shruti.gore@viit.ac.in>

Dear Er. Ghate,
Appreciate your interest in Concrete Maturity Meter System.
The product will soon be launched in the market by PCERF-VIIT team, with a brand name of - "**iCoMM**" (Intelligent Concrete Maturity Meter). We, will be glad to provide your team with a demo and presentation on using the iCoMM. Additionally, we will be happy to provide your team the required training and also help setup/implement the system at your projects.
Kindly let me know about your requirements.

SHUBHA Halemani <shubhahalemani@gmail.com> 22 January 2018 at 11:20

To: hbdhonde@gmail.com

Sir, I Shubha S H had attended "Constro" exhibition held at Pune on 21st January 2018. I am pleased to see the working model of 'Testing of concrete maturity level'. I am eager to get brief details of the following project done by your students under your guidance. So I request you to send me the details of the same project for my reference.
Thanking you
Your's sincerely
Shubha S H
Student, D.Y.Patil, Pune

OTHER ACTIVITIES OF VIIT WITH PCERF

Multi-Disciplinary Education for Allied Building Services of the Future

Prof. Milinda A. Mahajan
Ph.D. (IITM), P.D.F. (Germany), P.E., DAAD Fellow, LMIE & LMICI
Professor
milinda.mahajan@viit.c.in , (+91-8879171789)

Dr. Hemant B. Dhonde
Ph.D. (Univ. of Houston, USA), M.E. (GCOEP-Civil), LMFS & LMICI
Associate Professor
hemant.dhonde@viit.ac.in , (+91-7774058927)

Dept. of Civil Engineering, Vishwakarma Institute of Information Technology, Kondhwa, Pune, (MH)-India

---

Keywords: Competent graduates, allied building services, multi-disciplinary education, hands-on training, future industry demands

Introduction:

The sustained growth of construction industry is influenced by several factors. One of these factors is the availability of competent and job-ready fresh graduates. Fresh graduates are expected to possess satisfactory startup knowledge, skill sets and awareness of general industry practices. The academic programs are responsible to ensure these attributes in the fresh graduates.

Presently, the technical educational institutes are striving hard to cater to this demand, but with marginal success. The core and mainstream knowledge pertaining to the building construction practice is taught at Architectural, Technical and Engineering educational institutes. However, the industry is usually much ahead of academic institutes in terms of adopting and practicing construction technologies. Thus, there exists a large gap between the delivered competency level of graduates and that demanded by the industry. Furthermore, this gap will progressively grow in the future, owing to new multifaceted and inter-disciplinary challenges from the industry.

Allied Building Services:

In addition to imparting the mainstream know-how of the field of study, the academic program should also provide training in the allied building services. Allied supportive services are those that are vital for effective construction and proper functioning of buildings. Typically, these services fall within the multi-disciplinary domain represented by Architectural, Civil, Mechanical, Electrical, Chemical/Materials, Electronics, Information Technology, and Computer professional graduates (Diploma/Degree) and technicians (ITI/Vocational Certificate). Some of the allied supportive building services of the present and future along with their inter-disciplinary association are enlisted in *Table-1* below;

Table-1 List of Allied Supportive Building Services and their Multi-Disciplinary Associations

#	Allied Supportive Building Services	Multi-Disciplinary Association					
		Arch.	Civil Engg.	Mech. Engg.	Elect./Elec. Engg.	Chem./Mat. Engg.	IT-Comp Engg.
1	Building Finishes - Paints, Varnishes, Coatings, Toppings claddings, tiles, etc.	✓	✓	-	-	✓	-
2	Plumbing and Sanitary	✓	✓	✓	-	✓	-
3	Electrical – Power/Genset/Wiring/Switches/Controls	✓	✓	✓	✓	✓	-
4	Mechanical – Machines/Equipments/Piping/Ductwork	✓	✓	✓	✓	✓	-
5	Heating, Ventilation, and Air Conditioning (HAVC)	✓	✓	✓	✓	✓	-
6	Formwork Technology	✓	✓	✓	-	✓	-
7	Safety – Fire/Smoke and Security Systems	✓	✓	✓	✓	✓	✓
8	Façade Technology	✓	✓	✓	-	✓	-
9	Fire Proofing – Doors/Shields/Separators/Sprinklers	✓	✓	✓	✓	✓	-
10	Water Proofing	✓	✓	-	-	✓	-
11	Construction Tools, Machineries and Techniques	✓	✓	✓	✓	✓	-
12	Maintenance and Repairs	-	✓	✓	✓	✓	✓
13	Restoration, Retrofitting and Rehabilitation	✓	✓	✓	✓	✓	-
14	Sustainable Technologies and Practices	✓	✓	✓	✓	✓	✓
15	Elevators, Escalator, Conveyor, & other systems	✓	✓	✓	✓	✓	✓
16	Home Automation	✓	✓	✓	✓	-	✓
17	Smart Technologies in Construction	✓	✓	✓	✓	✓	✓
18	Automation in Construction – Smart machines, Robots, 3D-Printing, Drones, Virtual Reality, etc.	✓	✓	✓	✓	✓	✓
19	Building Information Modeling	✓	✓	✓	✓	-	✓
20	Special Services – Flooring/Roofing/Landscaping/Hygiene/ Housekeeping/ Termite Proofing and Pest Control/ Disability Management, etc.	✓	✓	✓	✓	✓	-

Challenges and Initiatives:

The gamut of allied building services enlisted above; necessarily involve multi-disciplinary approach in its education and training. However, the current education curriculum does not include the above mentioned course work, although highly demanded by the industry. In this respect, educational institutes having academic or full autonomy can proactively include some of the key allied building services in their educational/training programs. Hence, it is important that the educational institutes team-up with experts from the industry via professional organizations, to setup special training initiatives for students and teachers.

Competent teachers and experts from industries need to come together to educate and coach the students. First step will be to get the industry and education institutes to sync and work together towards this goal. Training of faculty by industry experts will be required. The flexibility and freedom offered by academic autonomy will help in setting course work and hands-on training of the allied building services to students and faculty. Classroom and on-site short duration training courses for students and teachers by technical experts related to the allied services can be very effective.

Adopting 'out-of-the-box' and novel pedagogical (training) methods will be desirable. Training should be provided to intermixed professional graduates (Diploma/Degree) and technicians (ITI/Vocational Certificate) belonging to multi-disciplinary field of study (i.e. Architectural, Civil, Mechanical, Electrical, Chemical/Materials, Electronics, Information Technology, and Computer). The multi-disciplinary group of students shall be provided with appropriate training related to the allied building services. Some new methods of training to multi-disciplinary group of students could be – participation in bidding/tendering projects, inter-department/inter-institute projects, mock-ups, hands-on experiments, on-site classroom learning, group-internships, and so forth.

Future demands of construction industry will be of smart, sustainable, and value-based multi-disciplinary engineering solutions. Job-ready competent fresh graduates having multi-disciplinary knowledge and skill sets in allied building services will be vital for the continual development of construction industry, to meet global standards.

PCERF - VIDYARTHI AWARD - 2018

JURY RECOGNITION

:Recipients:

Prof. Hemant B. Dhonde | Prof. Milinda Mahajan | Prof. Shardul Joshi

VIIT