Construction **Industry** Improvement **Initiative** - *India*

Regional Roundtable of Building Construction Clients

and LAUNCH of

Ci3 India
Construction Industry Improvement Initiative India

14th October 2015
at IIT Madras

Summary Report

Ci3

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1 Ci3 INDIA BACKGROUND

1.1 Background

The last two decades saw the Indian economy grow significantly. India's GDP crossed 2 trillion USD mark in 2014. Construction industry is the 2nd largest employer and contributor to economic activity in India, after agriculture sector. Construction industry contributes about 10% of India's GDP and accounts for second highest inflow of FDI after the services sector. As per recent estimates, nearly 590 Million people will live in Indian cities by 2030 which demands for huge growth in housing, commercial, industrial and infrastructure sectors (Make in India 2015). However, the construction projects in India face many challenges such as time and cost overruns, low-productivity and quality, lack of skilled labor, health and safety issues and technology adoption.

Experience in India and other countries, shows that significant and sustainable industry improvements, along with the necessary culture change, must be championed by a core group of enlightened large clients with a long-term vision for value-driven project delivery. Supply chains will only respond when their paymasters' selection and performance criteria require them to improve in desired directions. A critical mass of large clients must act together, in order to initiate new norms and standards, so that major supply chains realize they must change their mind-sets and ways of working (to stay in business), while end-users appreciate that they are receiving better value from such progressive suppliers (rather than seeking apparently 'cheaper' products elsewhere). Large clients spearheading such change will reap more and faster benefits; and with a stronger foundation as well. Construction Industry Improvement Initiative India - Ci3 India was conceived to empower this transformation. The ultimate aim of Ci3 India is to drive meaningful and sustainable industry improvements by actively involving all the major stakeholders at appropriate stages of this journey.

1.2 Ci3 India Objectives

The major objectives of Ci3 India is,
(1) To identify current and imminent critical issues in the Construction Industry in India
(2) To compile a Roadmap for industry improvements in strategic high (& wide) impact domains
(3) To launch (a) system improvement initiatives and (b) demonstration projects, in prioritized focus areas within the above strategic domains

2 REGIONAL ROUNDTABLE AIM, STRUCTURE & PARTICIPANTS

2.1 Regional Roundtable Aim and Framework

As a first step towards Ci3 India, the first Regional Roundtable of Building Construction Clients was conducted on 14th of October at IIT Madras, Chennai. The aim of the first Regional Roundtable was to explore the first major objective of Ci3 India – "to identify current and imminent issues in the Construction Industry in India". Participants for the first Regional Roundtable were Large Building Construction Clients invited from Chennai, Bangalore, Pune and Mumbai. The preliminary broad themes/ domains in the first Regional

Roundtable are Project Management, Construction Management and Construction Project Ecosystem.

The Regional Roundtable kicked off with the welcome address by Prof. A. Meher Prasad, Head of the Civil Engineering Department at IIT Madras. The first keynote speaker, Mr. S. Mahalingam, Former CFO & Executive Director, Tata Consultancy Services, then set the stage with in-depth insights into "Construction Clients' Aspirations & Shortfalls - What building clients really need from the industry", also identifying the need for collective efforts

Ci3 India was officially launched to address the above needs by Prof. Bhaskar Ramamurthi, Director, IIT Madras, who provided interesting perspectives on the imperatives and potential for construction industry upliftment.

Next, Prof. K. N. Satyanarayana, Professor of Civil Engineering, IIT Madras spoke on "Developing the Industry to deliver Clients' & Societal needs". Following this, Prof. Mohan Kumaraswamy, T.N. Subba Rao Brigade Group Adjunct Chair Professor, IIT Madras gave an overview of recent "Industry Improvement Initiatives in overseas" also inviting comparisons with the Indian scenario. These talks helped stimulate the group session on "Joint Brainstorming for Collective Breakthroughs through Ci3 INDIA" which was moderated by Dr. Ashwin Mahalingam, Associate Professor, Dept. of Civil Engineering, IIT Madras. The morning session concluded after a briefing by Prof. Mohan Kumaraswamy on expectations from the post-lunch Focus Group brainstorming.

After lunch, the three Focus Group brainstormed in parallel on three different themes. The aim was to develop consensus on current and imminent critical issues identified under each of the three identified themes and suggested sub-themes of Focus Group discussion (as expanded in Section 6). Focus Group presentations of 10 minutes each by representatives from each groups, were followed by a consolidation session moderated by Prof. Koshy Varghese, Professor of Civil Engineering IIT Madras. Focusing on first order prioritization of the emerging issues, this session yielded an Action Plan with a Way Forward. This Roundtable was concluded with a Vote of Thanks by Prof. Koshy Varghese.

The Programme is in **Appendix I**

2.2 Participants Profile

Initially, large building construction clients in the Chennai and Bengaluru regions were approached and expressed interest in this initiative. There being no restriction, the message spread to a couple of organizations in Pune and Mumbai, which extended our initial reach. 24 industry participants from 17 different organizations participated in the Roundtable. The 17 organizations include 3 software and IT/ ITES organizations, 4 manufacturing companies, 5 developers, 2 hospital clients, 2 consultants and 1 Govt. organization. The participants were CEO's, Construction and Infrastructure Heads, Business Heads, Sr. Vice Presidents, Vice Presidents and General Managers of the organization invited. 14 academic participants from IIT Madras and NIT Karnataka were also participated in the Roundtable. Hence a total of 38 participants were participated in the Roundtable.

3 Ci3 INDIA LAUNCH

Prof. Bhaskar Ramamurthi, Director, IIT Madras addressed the Roundtable by sharing inspiring experiences from other fields, while making apt connections with construction industry needs and possibilities. He then officially launched Ci3 India – Construction Industry Improvement Initiative India.

4 KEYNOTE PRESENTATIONS

The four keynote talks are summarized below,

The slides of the three speakers who used PPTs used this medium are available in a Google drive at https://drive.google.com/folderview?id=0B9VIrd3X2-ScejJKUnlSbkFCYnc&usp=sharing

4.1 Construction Clients' Aspirations and Shortfalls - What building clients really need from the industry

Mr. S. Mahalingam, Former CFO & Executive Director, Tata Consultancy Services set the stage for the Ci3 launch with this analysis. He swiftly homed in on some critical areas in the construction industry, capturing and shedding light on reasons for the prevailing uncertainty, amidst the management expectations of a large building construction client.

- Some of the critical areas put identified included uncertainty in project schedules and cost estimates, designing for sustainability, regulatory approvals, assembling components, project planning, monitoring and control, acceptance protocols, fund management and building maintenance.

- He highlighted common reasons for uncertainty on some of the above critical areas, including:
    - Tentative and incomplete initial plans lead to unrealistic schedules
    - Lack of productivity benchmarks and inadequate attention to design lead to inappropriate cost estimates, hence cost overruns
    - Lack of clarity on lifetime cost issue and parameters
    - Poor risk management also lead to time and cost overrun and fund management problems
    - Lack of process orientation and appropriate tools usage lead to inadequate project monitoring and control.
    - Need for focus on change management to better adopt new designs, maintain facilities more efficiently and reduce lifetime cost
    - Need for focus on sustainability

- He also emphasized clients' expectations from the industry, where he highlighted the need for reduced lifetime costs of facilities which directly relates to IRR; visualizing and monitoring projects regularly, to maximize efficiencies in terms of time, cost and targeted quality.

Note: More specifics may be captured from the PPT slides of this speaker that can be accessed as above.

4.2 Developing the Industry to deliver Clients' and Societal needs

The first talk after the Ci3 launch was appropriately on the above theme. It was by Prof. K. N. Satyanarayana, Professor of Civil Engineering, IIT Madras.

- He highlighted that the following areas need greater attention by all stakeholders,
  - Over employment and low productivity
  - Age old construction methods
  - Large time and cost overruns in public projects
  - Scarcity of project managers and construction managers
  - Lack of trained workers
  - Poor safety standards
  - Quality only good 'by exception'
  - Lack of planning and monitoring
  - Conservative standards - resulting in higher consumption of materials
  - Lack of estimating standards
  - Lack of good architectural and design practices
- He also stressed that project schedules are generally unrealistic without considering the ground realities like resources availability, labor availability, holiday seasons and weather conditions, illustrating these with real-life examples.
- He put forth the issues associated with the management of migrant construction workers such as lack of literacy and training, high absenteeism and turnover etc.
- He emphasized the several types of wastes generated on projects and concluded by projecting the potential benefits if large clients step forward to address these issues and re-shape the industry.

Note: More specifics may be captured from the PPT slides of this speaker that can be accessed as above.

4.3 Industry Improvement Initiatives overseas

A quick review of the above, with special insights and relevant examples was provided by Prof. Mohan Kumaraswamy, T.N. Subba Rao Brigade Group Adjunct Chair Professor, IIT Madras.

- He first outlined the overall objectives and strategic thrusts of Ci3 India and explained why it was important to kick off this initiative with a core group of like-minded progressive construction clients.
- He gave an overview of overseas industry reform exercises, principal change agendas and the bodies set up to drive and sustain these initiatives over the last few decades - in countries and jurisdictions such as the USA, Europe, UK, Australia, Hong Kong, South Africa and Sri Lanka etc.
- He also projected and compared the industry development programmes, in some of these overseas initiatives (e.g. comparing the Hong Kong-Singapore-UK programmes) through lens of Institutional Theory). An important lesson learned was that 'regulation' was first needed in some jurisdictions in order to trigger transformation in existing 'norms' or business as usual, before these can eventually translate to the needed culture change in the industry that must accompany across-the-board systemic improvements. Clients can also trigger these changes by incorporating performance oriented criteria in their team section protocols.

- He also gave an overview of KPI's (Key Performance Indicators) used in Hong Kong Construction Industry Performance Reports and UK Construction Industry Performance Reports in different areas (such as productivity, health & safety, environment etc.). He asked what KPIs may be considered appropriate in the Indian context.
- He gave many examples of critical issues in different countries and some emerging issues as well (e.g. the need to linking project management to built asset management) to provoke proposals on what we really need here and now, as well as in medium term and long term.
- Finally, he visualized the possible ways of expanding Ci3 India either 'horizontally' (across the different construction sub-sectors) or vertically (along the supply chain) and thirdly moving it from regional-level to national-level.

Note: More specifics may be captured from the PPT slides of this speaker that can be accessed as above.

4.4 Challenges, Barriers and Potential Solutions

Mr. Hari Hegde, senior Vice President and Global Head – Operations, Wipro Ltd. provide excellent practical examples from his many experiences on this topic.

- He emphasized the need for spending more time to identify the truly critical issues during the pre-construction phase of projects, with striking examples of how he brought on board the best design professionals to work together in these specific client-driven directions.
- He focused attention on revisiting the real roles and responsibilities of clients during the pre-construction phase, to ensure that they analyze and carefully incorporate all of their comprehensive requirements into the design brief and also when selecting the right team and interacting with stakeholders.
- The role of clients in empowering and enabling technology adoption, new management practices and better contractual methods in projects was also elaborated in this talk.
- Emphasis was also placed on adopting new technologies and management practices in projects and showcasing 'model' demonstration projects to the industry, so as to inspire further cycles of continuous improvements.
- He also recommended two strategies for making Ci3 India a success – (1) enlisting Government support and (2) involving a strong and motivated group of large clients and like-minded people and moving this initiative from regional-level to national-level.

5 JOINT BRAINSTORMING FOR COLLECTIVE BREAKTHROUGHS – through Ci3 INDIA

This session was moderated by Dr. Ashwin Mahalingam, Associate Professor, IIT Madras. The following summarizes the key points in the discussion,

- Background on performance of projects (as cited by the Session Moderator Dr. Ashwin Mahalingam, from the 2013 PMI-KPMG 'Study on Project Schedule and Cost Over-runs', also circulated to participants) - 70% of Indian projects have time

and cost overruns with magnitudes of 30% to 200% - even 70% of construction projects in the world have this issue, hence a worldwide problem!

- Unrealistic planning, scheduling and cost estimation – technologies are available but why are they not used efficiently? Critical role of clients in changing the industry requirements, then culture (eg. CPM adoption initiated by US Army Corps, by making it mandatory in stages on their projects).
- Productivity issues and regulatory approvals also cause a lot of uncertainty in projects
- Building trust between the stakeholders helps tackle uncertainties and improve performance – role of clients is important, e.g. In engaging and empowering the stakeholders (using Relational and Collaborative approaches).
- Developing and establishing management standards to improve performance – role of clients in mandating standards in projects is also important – adopting consistent industry-wide standards also helps in building trust between clients and stakeholders.
- The sector is evolving rapidly – however less preference, less attraction to Civil Engineering jobs – due to low salary package, long working hours, and poor work environment etc. - again clients should take the lead in changing the culture by targeting and nurturing a better working environment.

6 FOCUS GROUP SESSION - BREAKOUT BRAINSTORMING IN FOCUS GROUPS

Three parallel Focus Group discussions on three different themes were conducted after lunch. Focus Group sessions were intended to facilitate brainstorming towards developing consensus on current and imminent critical issues identified under each of the three identified themes and suggested sub-themes. The three major themes of the Focus Group sessions were (a) Procurement and Delivery, (b) Productivity, Quality and Sustainability and (c) Construction Project Eco System. An approximate rating of the identified issues was invited, in terms of 'level of criticality', say on a scale of 1 to 4, from 1 = important, 2 = very important (serious), 3 = critical, to 4 = extremely critical ('life threatening'!). Also, an initial of causal analysis of the identified issues, was also requested to ascertain the potential 'root causes' of at least the 'critical' and 'extremely critical' issues.

Each Focus Group was facilitated by a Chairman (Moderator) and a designated recorder assisted in noting down the key points discussed and the principal findings emerging from the brainstorming. Either the Chairman or a chosen rapporteur was expected to present a summary of the respective Group outputs in 10 minutes each, followed by 15 minutes of feedback and consolidation. The main discussion points and outputs from each group are summarized below.

6.1 Focus Group 1: Procurement and Delivery – Summary and Principal Findings

Focus Group 1 theme: Procurement & Delivery. This included the following sub-themes: *Programme Packaging, Contract types & formats, Project team Selection, Ethics and Professionalism, Time and Cost Over-runs, Payments, Stakeholder and Relationship Management, Dispute Reduction and Resolution*

The discussion kicked off with identifying the major issues in the pre-construction and construction phases of a project and focused on five sub-themes: Program Packaging,

Stakeholder and Relationship Management, Contract types and formats, Dispute Resolution, Ethics and Professionalism. Key points discussed and outcomes are outlined below,

- *Program Packaging* –Project requirements should be detailed as much as possible during the pre-construction phase. Clients must spend sufficient time to clearly set out the project requirements and specifications in detail, in order to avoid misperceptions during implementation. Root causes for issues in developing good program packaging include insufficient data, inexperienced consultants, power of local authorities and different norms in different states, not spending much time in initial stages, statutory approvals, design management, procurement management, poor selection of contractor, and political motivations from a public sector perspective.

- *Stakeholder and Relationship Management* –Since the construction industry involves a large number of stakeholders, managing them is quite difficult. Involving all major stakeholders and soliciting their opinions at project meetings can reduce conflicts of interest in the project. Also, acknowledging the achievements of contractors and other stakeholders will also result in better project outcomes. Building trust between the client and contractor will also help in better contractual and stakeholder management. A discussion on contractor rating by the Building & Construction Authority (BCA) of Singapore was carried. It was suggested that India may also benefit from a similar rating system which may help in developing trust between the stakeholders.

- *Contract types and formats* – Most contracts were said to be one-sided. It was discussed that FIDIC type contracts are mostly preferred by contractors. It was also suggested to have an appropriate rating system to be followed during the pre-qualification phase.

- *Dispute Resolution* –A fair and clear contract should be drafted with appropriate dispute resolution clauses to avoid time and resources wasted on disputes and claims.

- *Ethics & Professionalism* –Clients must take special interest on illegal dumping of waste which affects the local environment and also impacts on sustainability. Clients should guard against corruption during bid evaluation on their projects.

During the feedback and consolidation session, three principal findings with ratings (on the 1-4 scale mentioned above) was put forth by Focus Group 1,

- Need for **standards** and **better project preparation** - **4**

- Clients need (to tighten-up) to be little bit more passionate and driven about the construction project (**more client involvement**); Good contractor selection- **4**

- Issues of **lack of trust** possibly because of no entry and exit barrier; Contracts are often one-sided – **2.5**

6.2 Focus Group 2: Productivity, Quality and Sustainability – Summary and Principal Findings

Focus Group 2 theme: Productivity, Quality and Sustainability. This included the following sub-themes: Designing for life-cycle 'value' and for Built Asset Management, Lean

Construction, Green, Off-site, Technology and Materials Innovations, Safety and Health, Environment and Society, and Benchmarking and KPIs.

The following summarizes the discussions and principal findings,

Productivity Benchmarks and Standards: A lack of benchmarks and standards that are available for productivity was first highlighted. What quantum of work should be achieved by a mason, carpenter etc. is not clear. It was felt that workers generally achieve much less daily work output compared with what is normally expected. While the developer pays the labor contractor at his quoted rate which has already been padded up for various inefficiencies, the total cost is ultimately transferred on to the customers. We therefore need established standards in order to reduce inefficiencies in the system. Moreover, establishing industry norms might help reduce wasting time when targets are known. The database of RS Means (in the U.S) used by the industry in the US and Canada was cited, while the Central Public Works Department (CPWD) of India indices and Delhi Analysis of Rates (DAR) were considered in the Indian scenario. While the CPWD methodology is good, it was remarked that the CPWD database is not regularly updated and needs adjustments for different areas.

Therefore an independent agency seemed necessary to develop and update such a database. While IIT Madras can frame /cross check the methodology, a separate agency needs to do this job. Doubts were raised as to the willingness of contractors to share of data since this data is not generally available to clients. While one was suggesting for the Confederation of Real Estate Developers' Associations of India (CREDAI) to be entrusted with creating such a database, a consensus on who should take responsibility was not achieved. Moreover, given the varying level of mechanization in different construction sites, the reliability of the productivity benchmarks was also questioned.

Lack of Skilled Manpower - The lack of skilled manpower had to be addressed with training. Increasing in-house workers and a training wing was one suggestion. It was remarked that the workers' motivation level is generally low as they hardly receive appreciation for the work. So having workers on board increases their commitment to do a good job as they gain pride and motivation with the company tag. While practiced by certain organizations, practicability at the industry level was questioned. The need for certification of workers was agreed. However, industry acceptance would probably need clients to mandate a certain proportion of certified workers, which could be increased in stages. This is also important for the development and welfare of the industry including all stakeholders, in the long run. The Construction Industry Development Council (CIDC) is known to provide some certification courses for workers. The problem of attrition after investing in worker training was also raised as the person might leave the job for a better salary. Therefore, providing a premium for certified workers was suggested, with different premium ratings based on skill levels. The need for governance by owners in this regard was also noted. Also recommendation was made to make worker payments through bank accounts. This would also help assessing attrition rates, since higher attrition rate may correlate with lower quality levels too.

Quality – One of the major concerns on this, is lack of awareness of relevant modern tools and techniques. e.g. in clinging to traditional techniques in areas such as plastering, lifting &

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transporting materials etc. The need for changes in training curricula and for popularizing advanced tools were emphasized.

Designing for life cycle value - The lack of an integrated view in the design process was lamented. The absence of user-centric design was also emphasized. Some issues restraining designing for life cycle value in buildings were lack of competency, lack of awareness, financial implications, and even a feeling of 'not needed' as end-users are not directly connected to the designers or developers. Also, the lack of proper communication of project needs from the leads to defective delivery. Furthermore, contractors may not clearly understand actual and total requirements.

Lean Construction - Issues in adopting lean construction discussed were,

- Limited awareness
- Lack of knowledge on the level of waste prevailing in the industry which can be of the order of 25% to 30%

Such amounts of waste in the system can be translated directly into monetary waste. e.g., wastage in terms of over-engineering, rework etc. Since our system is already flooded with wastage, funding for innovation becomes a serious issue. Lack of innovation is accepted to be one of the serious problems holding back the construction industry. Innovation is needed to enrich user experience and funding issues have also suppressed innovation in this industry.

Off-Site - major issues in adopting precast or off-site construction, as discussed were:

- Need for meticulous planning
- Heavy taxes and excise duty
- Need for various permits for transportation and other traffic regulations
- Storage issues

Health & Safety - major issues on Health & Safety, as discussed were:

Serious attention to health & safety of workers with owners' accountability in taking steps to improve the situation.

- Lack of belief among workers in benefits of compliance with safety rules
- Behavioral problems such as habit of eating paan, consuming alcohol etc.
- Practice of doing overtime as their only means to earn more money

The above issues were rated as follows along the above-mentioned 1-4 scale:

- Lack of skilled manpower – **4**
- Lack of productivity benchmarks, standards / norms - **3**
- Lack of innovation - **3**
- Hindrance to Precast - **3**
- Inadequate Quality - **3**
- Governance by Owners & Transparency to Owners – **3**

6.3 Focus Group 3: Construction Project Eco System – Summary and Principal Findings

Focus Group 3 theme: Construction Project Eco System. This included the following sub-themes: SWOT-type analysis, Up-skilling, Culture-change and optimizing inputs from Tradespersons, Engineers & Managers and Stakeholders & Supply Chains; Computer integrated systems, BIM, ICT tools.

The following summarizes the discussions and principal findings,

Skill Development –Shortfalls in skills, were observed at all levels in construction projects i.e., in Managers, Site Engineers, Supervisors and Workers. Employee attrition is a discouraging factor for organizations to invest in training and skill development. However, in other industries such as IT and Software, the responsibilities of training and skill development is transferred to Universities and Educational institutions. Organizations can also approach the Government for incentives for training construction professionals and workers in the forms of tax benefits etc. High involvement of Government in skill development will greatly help in skilling the industry as only a limited number of suitable training institutes and trainers are available at present.

Focusing on skilling construction professionals, particularly young graduates, there is a wide knowledge gap between academic learning and industrial practice and therefore it takes longer (about three to five years) for a young graduate to become a professional. Need for changes in curriculum was also discussed. A practice based curriculum is needed to cover the different sub-domains in construction. Also, evaluation, certifications, skill mapping, aptitude of graduates need to be addressed before training them. With respect to workers, since a significant proportion of construction workers are internal migrants, a registry to record data about skilled workers by location and measures to retain them by providing the necessary facilities were discussed. Social initiatives such as village adoption as practiced by some players can minimize labor migration and attrition issues and improve long term labor-organization relationship.

Supply Chain Issues – It was pointed out that variations in quality of materials is observed. As the industry is highly fragmented. There is great opportunity to sell rejected materials elsewhere, and the facts of rejection are not made public as in other industries such as the automobile industry. Shortage of materials is also observed due to cartelization of materials. There is a need for standards, testing, certification of materials and vendor development. Innovation in alternate materials with sustainability aspects is seen as the need of the hour as many traditional materials such as sand are becoming scarce.

Technology Adoption –Starting with the cost of buying technology, it was agreed that while a higher initial cost is needed for technology adoption, long term benefits can offset the initial cost. Potential solutions that may be achieved through BIM for example, BIM can help in stakeholder management and reduce time and cost overrun. However, it was debated that clients must first appreciate the benefits of technology adoption. Clients must take definitive steps to adopt technologies in their projects at all levels. Clients must also share the results of their demonstration projects (e.g., with develop case studies) so that they may learn from

each other iteratively, and mutual benefits of technology adoption, best practices and lessons learnt can be exchanged across the whole industry.

7 ACTION PLAN AND WAY FORWARD

Following the Focus Group presentations where all three groups highlighted some of the critical issues in their discussion areas,, collective consensus was reached to initially spotlight 3 specially critical areas that merit urgent attention and which could therefore be addressed in the next stage to demonstrate what can be done through Ci3 India.

1. Skills Development

- About 80% - 85% of construction workers are under skilled. There is huge need to bridge this skills gap.

Action plan

- Start with on-site skilling in project sites – certify workers
- Set targets – say from 2016, 20% of workforce should be certified, 40% in 2017 and so on spontaneously, demand for skill development training institutes increase
- For Engineer and Managers? – Survey existing institutes – eg. PMI, Institution of Engineers, CIDC, Universities
- One option is to set up 'finishing schools' ('top-up') for young graduates with different specializations – Construction Management, Structural, MEP etc.

2. Charters of Standards and Productivity Benchmarks & Norms

Need for productivity standards and benchmarks was addressed throughout the Roundtable from keynote presentations to Focus Group sessions. The only known productivity benchmark in India is the CPWD Delhi Analysis of Rates which is updated once in 7-10 years (with possibly less consideration of methodological and technological changes).

Action plan

- Set up a pilot platform to share productivity data across a 'benchmarking club' of progressive organizations
- Extend to a nationwide common platform to gather and develop productivity benchmarks, also incorporating updated methodological and technological changes
- Develop, validate and propagate standards for safety and quality

3. Innovations and Strategies for Technology adoption in IT and construction technologies

Need for Re-integrating teams with available technologies. Skilling-up professionals with advanced technologies.

Action plan

- Clients create the need for awareness of the use and benefits of technology
- Disseminate the benefits of technology adoption to industry with– demonstration projects, cost-benefit case studies – sharing reports etc.

- Establish standards for precast construction technology
- Spread awareness of new management practices – Lean Construction etc.
- Build in demands for technology adoption in project contracts– to target efficiency and sustainability.

8 ACKNOWLEDGEMENTS

All Roundtable participants are gratefully acknowledged for their valuable contributions. Prof. Bhaskar Ramamurthi, who launched Ci3 India and Prof. Meher Prasad, who gave the welcome address are also thanked for their inspiring words. The incisive industry insights provided by Mr. S. Mahalingam and Mr. Hari Hegde helped to set the scene for the Roundtable deliberations, neatly complementing the two presentations from IIT Madras. The chairs, rapporteurs and recorders of the Joint Brainstorming plenary sessions and the Focus Group discussions did excellent jobs in facilitating and consolidating the valuable outcomes from all present. The Brigade Group and IIT Madras are acknowledged for establishing the T.N. Subba Rao Brigade Group Adjunct Chair Professorship that helped launch and support this initiative. We are also grateful to Mr. S. Mahalingam for his much valued advice, direct inputs and valuable efforts and personal invitations that helped mobilize a balanced cross-section of high caliber participants for this Roundtable.

9 DISCLAIMER

This summary report was prepared from available information from recordings of discussions, presentations and notes of recorders which were compiled to the best of their ability, given some constraints. The summaries convey interpretations of the main points from the above by the recorders. They are certainly not exhaustive and may not accurately reflect the specific views or priorities of the speakers, focus groups or whole Roundtable. The reported outcomes are thus to be taken as broad collective outputs from the first Regional Roundtable that are provided for interim indicative purposes.

Organizing Committee

Prof. Mohan Kumaraswamy, T.N. Subba Rao Brigade Group Adjunct Chair Professor, IIT Madras

Prof. K. N. Satyanarayana, Professor of Civil Engineering, IIT Madras

Prof. Koshy Varghese, Professor of Civil Engineering, IIT Madras

Santhosh Loganathan, PhD Research Scholar, IIT Madras

Purshothaman Srinath, PhD Research Scholar, IIT Madras

with special thanks to:

Office Staff, Building Technology and Construction Management division, Dept. of Civil Engineering, IIT Madras

APPENDIX I - Programme

REGIONAL ROUNDTABLE PROGRAMME		
OPENING PLENARY SESSSION		
09.30 – 09.50	Registration and Fellowship	**ALL**
09.50 – 10.00	Welcome Address	**Prof. Meher Prasad,** Head, Dept. of Civil Engineering, IIT Madras
10.00 – 10.20	Construction Clients' Aspirations & Shortfalls - *What building clients really need from the industry*	**Mr. S. Mahalingam,** Former CFO & Executive Director, Tata Consultancy Services
10.20 – 10.25	Launching Ci3 INDIA	**Prof. Bhaskar Ramamurthi,** Director, IIT Madras
10.25 – 10.45	Developing the Industry to deliver Clients' & Societal needs	**Prof. K.N. Satyanarayana**, Professor of Civil Engineering, IIT Madras
10.45 – 11.05	Industry Improvement Initiatives overseas - *What can we learn and how can we do better?*	**Prof. Mohan Kumaraswamy,** T.N. Subba Rao Brigade Group Adjunct Chair Professor, IIT Madras
11.05 – 11.25	**Refreshments**	
11.25 – 11.45	Challenges, Barriers & Potential Solutions	**Mr. Hari Hegde,** Senior Vice President & Global Head – Operations, Wipro Ltd.
11.45 – 12.45	**Joint Brainstorming for Collective Breakthroughs - through Ci3 INDIA**	**ALL** (moderated by: **Dr. Ashwin Mahalingam,** Associate Professor, Dept. of Civil Engineering, IIT Madras)
12.45 – 12.50	Briefing on Focus Group Expectations	**Prof. Mohan Kumaraswamy**
12.50– 13.50	**LUNCH**	
FOCUS GROUP SESSION		
13.50 – 14.50	**'BREAKOUT' BRAINSTORMING IN FOCUS GROUPS** *Focus Group 1:* **Procurement & Delivery**: Programme Packaging, Contract types & formats, Project team Selection, Ethics & Professionalism, Time & Cost Over-runs, Payments, Stakeholder & Relationship Management, Dispute Reduction & Resolution... *Focus Group 2:* **Productivity, Quality & Sustainability:** Designing for life-cycle 'value' & for Built Asset Management, Lean, Green, Off-site, Technology & Materials Innovations, Safety & Health, Environment & Society, Benchmarking & KPIs… *Focus Group 3:* **Construction Project Eco system:** SWOT-type analysis, Upskilling, Culture-change and optimizing inputs from Tradespersons, Engineers & Managers and Stakeholders & Supply Chains; Computer integrated systems, BIM, ICT tools…	
14.50 – 15.00	**Refreshments**	
CONCLUDING PLENARY SESSSION		
15.00 – 15.30	3 Focus Group Presentations (of **10 mins. each**)	**3 Group Leaders/ Rapporteurs**
15.30 – 15.45	Feedback and Consolidation	**ALL** (moderated by: **Prof. Koshy Varghese,** Professor of Civil Engineering, IIT Madras)
15.45 – 15.55	Way Forward – Roadmap with Milestones?	**Prof. K.N. Satyanarayana and Prof. Mohan Kumaraswamy**
15.55 – 16.00	Closing Remarks & Vote of Thanks	**Prof. Koshy Varghese**

APPENDIX II – FOCUS GROUP MEMBERS

Focus Group 1 - Procurement and Delivery: Programme Packaging, Contract types & formats, Project team Selection, Ethics & Professionalism, Time & Cost Over-runs, Payments, Stakeholder & Relationship Management, Dispute Reduction & Resolution...

Chaired by:

Ashwin Mahalingam

Group Members:

1. Ananthanarayanan K (IIT Madras)
2. Chandramouli R (TVS Motors)
3. Gangadhar Magesh (NIT Karnataka)
4. Parthasarathy B R (TCE)
5. Ravi Vaithilingam (TCS)
6. Stephen Daniel (Prestige)
7. Vats P K (CPWD)
8. Viren Prasad Shetty (Narayana Hrudayalaya)

Group Recorder:

Marimuthu

Focus Group 2 - Productivity, Quality and Sustainability: Designing for life-cycle 'value' & for Built Asset Management, Lean, Green, Off-site, Technology & Materials Innovations, Safety & Health, Environment & Society, Benchmarking & KPIs

Chaired by:

K. N. Satyanarayana

Group Members:

1. Das M R (MRF)
2. Harsha Reddy (TCS)
3. Hemant Kshirsagar (Mahindra)
4. Lalit Varma (Apollo Hospitals)
5. Roshin Mathew (Brigade)
6. Srimanikandan Ramamoorthy (CTS)
7. Srinivasan P P (CPWD)
8. Sivakumar Palaniappan (IIT Madras)

Group Recorders:

V. G. Ram and Pinky Devi

Focus Group 3 - Construction Project Eco System: SWOT-type analysis, Up-skilling, Culture-change and optimizing inputs from Tradespersons, Engineers & Managers and Stakeholders & Supply Chains; Computer integrated systems, BIM, ICT tools

Chaired by:

Koshy Varghese

Group Members:

1. Benny Raphael (IIT Madras)

2. Chakravarti K (Apollo Hospitals)

3. Chitty Babu (Akshaya Homes)

4. Ganesh P (CTS)

5. Mahalingam S (TCS)

6. Ramakrishnan G A (TCS)

7. Ravi Namboodiri (Shobha Developers)

8. Unnikrishnan A R (Saint Gobain)

Group Recorder:

A. Thirumalai Rajan