



# **Ci3 *India***

## **Clients' - Consultants'**

### **Consolidation Roundtable**

**19<sup>th</sup> October 2016**  
**at IIT Madras**

**Summary Report**

**Ci3**



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## **1. Ci3 INDIA BACKGROUND**

### ***1.1 Background and Introduction***

The Indian construction industry is one of the oldest and the second largest economic sector in the country next to agriculture providing large scale employment. Investments of about 1 trillion USD were projected in the infrastructure sector in 2014-2017 (Make in India, 2014). This expansion of India's vast infrastructure presents enormous opportunities, along with magnified challenges. Therefore considerable efforts are required to boost the capacity of this sector and manage this growth in a sustainable manner.

The importance of proactive measures to improve the performance of the construction industry has been recognized over recent decades, in several countries at various levels of socio-economic development. Construction industry visionaries have also stressed the critical need for improving the performance of the construction industries of developing countries by envisioning linkages between construction industry development, infrastructure development and the broader role of national development. Dedicated agencies have been established in many countries/ jurisdiction such as the USA, UK, Australia, Canada, Singapore, Hong Kong, Sri Lanka etc. to administer the continuous improvement of the industry. Their experience 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 push them to improve in desired directions. Large clients spearheading such change will reap more and faster benefits; and with a stronger foundation as well. Therefore, the 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* are:

- (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. CI3 INDIA OVERVIEW & OVERALL STATUS**

### ***2.1 First Regional Roundtable***

As a first step towards Ci3 *India*, the inaugural cum first Regional Roundtable of Building Construction Clients was conducted on 14th October 2015 at IIT Madras, Chennai. 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. 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 at the first Regional Roundtable were Large Building Construction Clients invited from Chennai, Bangalore, Pune and Mumbai. The preliminary broad themes at this first Regional Roundtable were Project Management, Construction Management and Construction Project Ecosystem.

The welcome address and the launch of Ci3 *India* were followed by the morning plenary session, which included keynote speeches from industry and academia. In the afternoon, three Focus Groups brainstormed in parallel on the above mentioned three different broad themes. The aim of the Focus Group sessions was to identify and develop consensus on current and imminent critical issues identified under each of the three identified themes and suggested sub-themes. Focus Group presentations of 10 minutes each, were followed by a consolidation session. The following were the 16 critical issues identified in the three Focus group sessions at the first Regional Roundtable:

1. Lack of client involvement and competence
2. Lack of trust between stakeholders
3. Shortfalls in proper standards for better project formulation
4. Sub-standard and one-sided contracts
5. Acute shortage of skilled workmen
6. Low productivity
7. Lack of productivity benchmarks and standards
8. Lack of innovation
9. Hindrance to off-site (pre-cast/ pre-fab) construction
10. Inadequate quality
11. Inadequate governance by owners and transparency
12. Lack of proper facilities for workers
13. Improper supply chain management and need to shift to alternate contracting approaches
14. Lack of technology adoption
15. Reluctance to adopt new work practices such as Lean practices
16. Need for better contractor selection system

Focusing on first order prioritization of the emerging issues, this session also yielded an Action Plan with a Way Forward that led to the Second Regional Roundtable at Mumbai.

## ***2.2 Second Regional Roundtable***

In keeping with the imperative to mobilize the national construction industry, it was decided at the outset to hold the second major event of Ci3 *India* in another major regional hub. Thus “Ci3 *India* Developers’ Roundtable” (the Second Regional Roundtable) was arranged in Mumbai and held at Hotel Taj Lands End, Bandra, Mumbai on 23 February, 2016. The

participants at this roundtable were mostly high level representatives of large construction developers from the Mumbai region.

The focus of the second Regional Roundtable was to disseminate, verify, validate and then to consolidate the current and imminent critical issues in the Indian construction industry which were identified in the three parallel focus group session conducted at the first Regional Roundtable. For this purpose, it was organized in Mumbai, so as to bring on board another set of high caliber construction clients with potentially fresh insights. Another aim of this Developers' Roundtable was to also develop and disseminate the business case for moving over to holistic cost-efficient and time-efficient construction paradigms, i.e. moving away from the current disparate thrusts for individual stakeholder optimization, towards broader-based, longer-term and well-focused building construction industry eco system value maximization.

The second Regional Roundtable was conducted as one combined focus group, starting off with an overview of the issues identified at the first Regional Roundtable. While these outcomes from the first Regional Roundtable were commented on and endorsed, in general, the degree of emphasis varied on the relative importance/ criticality of each issue. In addition, a few other critical issues were identified, brainstormed and consolidated along with the base set, at this second Regional Roundtable. The additional 'critical' issues were summarized as:

17. Inefficient design process management
18. Uneconomical design codes and operational standards
19. Outdated operational design codes (i.e. to realistically update and rationalize relevant design codes to increase efficiencies, while also targeting quality, safety, and sustainability of construction processes and the built assets).

Consolidating with the previous findings, a total of 19 current and imminent critical issues were identified, verified and validated through the two Regional Roundtables.

### ***2.3 Action Items and Action Teams***

To address the identified 19 current and imminent critical issues in the Indian construction industry, these issues were rationalized and consolidated into specific Action Items. An Action Team was assigned to work on each Action Item. The Action Teams include industry participants from Chennai and Mumbai Roundtables, academicians, and other invited experts. The seven Action Teams are:

- Action Team – 1: Identification and formulation of KPIs
- Action Team – 2: Strategies for significantly reducing Construction Project Time-frames & Costs
- Action Team – 3: Design processes and Technology adoption
- Action Team – 4: Design codes and Standards
- Action Team – 5: Human capital (including Labour, Technical, and Managerial, and Skills Development) and Productivity
- Action Team – 6: Construction Clients' Charter
- Action Team – 7: Institutional Platform



Five of the Seven Action Teams, i.e. Action Teams 1, 2, 3, 5 & 6 had worked on their specific Action Items for about 6 months and produced some valuable outputs. The outputs of the Action Teams were presented as “Action Team Working Papers” at this Clients’ - Consultants’ Consolidation Roundtable.

### **3. CI3 INDIA CLIENTS’ - CONSULTANTS’ CONSOLIDATION ROUNDTABLE OBJECTIVES**

The objectives of the Clients’ – Consultants’ Consolidation Roundtable are:

- (1) Sharing, discussing and developing the interim outputs of each Action Team with the larger forum.
- (2) Joint brainstorming and deciding the best ways to finalize, disseminate and action our final outcomes and recommendations.

### **4. SUMMARIES OF CI3 INDIA ACTION TEAMS’ WORKING PAPERS AND PRESENTATIONS**

The following sub-sections summarize: (i) the Working Papers that were in the hand-out issued to participants, along with (ii) the corresponding presentations made by each Action Team.

#### ***4.1 Action Team 1 - Identification and Formulation of Knowledge Performance Indicators (KPI's)***

The potential value and indeed imperative for developing and deploying useful KPIs ‘appropriately’ in an industry improvement initiative such as Ci3 *India*, was conveyed, along with the need to differentiate between KPIs at (a) macro/industry level e.g. overall productivity; (b) ‘meso’ - organizational level e.g. financial ratios; (c) ‘meso’ – project performance level e.g. project time and cost performance or accident levels; (d) micro/ activity level e.g. of work norms of specific trades/ activities.

The original objectives of Action Team 1 were recapped as: (1) To identify and develop in stages, a set of useful Key Performance Indicators (KPIs) for the Indian Construction Industry; and (2) to formulate project level KPIs in stages, firstly focusing on building construction clients and initially targeting their use by a ‘Benchmarking club’ of leading building construction clients. *Note:* It was later proposed to extend these to other industry stakeholders, as well as other (non-building) sub-sectors such as highways.

The Team 1 Actions Flowchart showed how the current working KPI template was carefully developed in stages, with brainstorming, drafts and refinements at, and between a series of Conference Calls and working sessions. Examples were provided for comparison, of KPIs developed and publicized by the Hong Kong and UK industry. Feedback was again invited (in the relevant columns of the KPIs spreadsheet) on the value and viability of the KPIs listed in the eight A3 page working template. It was noted that (i) ‘weighting indicators’ to adjust typical values for specific contexts/ conditions and (ii) the typical values themselves, needed to be developed/derived. The latter may be best derived through the proposed benchmarking club.

## ***4.2 Action Team 2 - Study on Project Time and Cost***

The Ci3 *India* Action Team 2 was conceived to identify issues that impact time and cost overruns in construction projects. The objectives of this Action Team are: (1) To identify factors that impact time and cost in projects; (2) To recommend best practices, mitigation measures and appropriate policy recommendations to alleviate factors that impact time and cost; (3) To identify stage wise targets to reduce time and cost in construction projects.

As a first step, to set the context of the study, a kick off concept paper was developed by reviewing literature on time and cost in construction projects. Subsequently the Team members' experiences and perspectives on issues impacting time and cost were collected by means of an open ended discussion through a conference call. Also the members suggested that the issues to be studied pertaining to the three project phases viz. – Concept, Planning and Design, Execution. Literature was reviewed and issues specific to the aforementioned phases were identified. 52 issues were verified as relevant by the Team members and it was recommended that the issues should be sent to a broader audience to understand and possibly highlight the issues that have significant impact on time and cost. A questionnaire survey was designed and sent to around 60 people through Ci3 *India* participants. Respondents were asked to rate the impact of the issues in terms of both time and cost. A little more than 50% responded and the Relative Importance Index (RII) was calculated to find the issues that significantly impact time and cost. The identified issues are briefly covered in the working paper.

## ***4.3 Action Team 3 - Design Processes and Technology Adoption***

### ***4.3.1 Action Team 3A - Design Processes***

The efficiency and effectiveness of the design process contributes significantly to performance of a building construction project. During the initial stages of a project, the influence of design decisions is high, whereas the cost incurred in implementation is low. There are no standards specifying the building design process in India. Hence there are no benchmarks based on which activities in the initial project phases can be planned and monitored. This results in an adverse impact on the downstream phases. The Action Team collected and analysed design process data from different organizations developing building projects.

The analysis revealed that there was significant variability in design durations due to organizational priorities. However, there were no documented standards or benchmarks on the appropriate design duration for various types of projects. In order to develop such benchmarks, it is proposed to standardize milestones and durations associated with the design process. The preliminary work done towards developing a design management standard is reported in the Working paper. This includes the development of standard design workflows and phase durations based on project type. It is anticipated that the availability of a standard will enable better planning and implementation of the design phase.

### ***4.3.2 Action Team 3B - Technology Adoption***

The construction industry has generally been a late adopter of technologies that can improve project productivity. There are inherent characteristics of the industry that are identified as reasons for delayed adoption of technology. Anecdotal evidence indicates that most technology adoption efforts fail, if people, processes & policies are not in place to support the technology platform.



The objectives of this Action Team are to: (1) Discuss and understand the drivers of technology adoption process in the Indian construction industry; (2) Identify issues and barriers in the current technology adoption process and the root causes for the same; (3) Develop strategies for improving the technology adoption process in order to meet project delivery requirements of today and tomorrow as outlined by other action items. Barriers to adopting equipment and IT technologies were identified by the team members by means of a workshop. Recommendations were provided to focus the study on two different parts: (1) to study the barriers for effectively and fully using existing technologies in the industry (e.g. Software for time management i.e. MS Project/ Primavera); and (2) to conduct a survey to understand the industry perceptions on barriers to adopting technology in construction. The survey parameters have been chalked out and it is expected to float the survey in the near future.

For the first part, a pilot study was conducted to identify issues in effective usage of time management software. Project schedules were collected and assessed with the standards and benchmarks. Parameters such as logical ties, leads, lags, floats, and activity durations which are essentially 'mechanics' of a schedule were found to be erroneous. Issues such as lack of skilled planning engineers, clients not mandating good schedules, lack of benchmarks and standardized processes to develop, update and maintain schedules were found to be barriers for effective usage of time management tools.

#### ***4.4 Action Team 4 - Design Codes and Standards***

This Action Team requires a long term exercise, since each code/ standard has been laboriously compiled after agreement by teams of discipline experts. Also most codes/ standards have been in place for decades but need significant changes that suit recent and emerging design requirements of buildings.

A Team Leader has been identified and few members from those involved with ongoing review of the national building code will be nominated. The primary focus of the Team is to (a) work out a stage-wise strategy, and (b) identify which codes/ standards to target in the first stage.

#### ***4.5 Action Team 5 - Human capital (including Labour, Technical, and Managerial, and Skills Development) and Productivity***

Action Team 5 was formulated to look at “Human Capital (including Labour, Technical & Managerial, and Skills Development) and Productivity” addressing the issues such as low productivity, acute shortage of skilled workers, lack of proper facilities for workers, need for up-skilling construction professionals, inadequate quality and lack of productivity benchmarks and standards. Based on the discussions with the Action Team members the following agenda was proposed in the Working paper.

##### ***a. Business case for Quasi-Formalization of workforce***

Payment delays and manager-sub-contractor-crewmen inter-personnel dynamics were identified as one of the major reasons for high ‘human turnover in the industry resulting in the average age of construction workers being only 28 years. Thus the following initiatives for ‘Quasi-formalization’ of workforce were suggested and could be demonstrated in ‘Demo-project sites’:

- i) *Mandatory digital bank account wage- payments for monitoring actual wages to last-mile-sub-contracted workers.*
- ii) *Provision of ‘Site-id’ with access control-based attendance to digitally log attendance to be used for time-sheeting of wage/OT calculations.*

***b. Making construction sector ‘aspirational’ for workers***

The construction industry, unlike the manufacturing industry does not engender the same sense of ‘aspiration’ from a professional perspective. The following initiatives can be piloted:

- i. *Uniforms like ‘overalls’ for all site-workers (to be issued along with helmets, shoes) to ensure a ‘factory-like’ environment at construction site*
- ii. *Weather-resistant accommodation (using pre-fab materials like Bison boards), along with on-site canteen, entertainment, bus-travel facility (to be provided, if need be on a deductible basis) like in the Middle East.*

***c. Formally trained and certified workforce to be mandated and measured at least for semi-skilled and skilled jobs to understand impact on productivity over time. Up-skilling of professionals on advanced technologies is also proposed***

- i. *Monitoring of productivity-wages-paid based on skill levels to ensure a premium over minimum wages is paid to semi-skilled/skilled workers for ensuring their retention and also understand RoI in terms of productivity for the same.*
- ii. *Formal training to ensure entry of ‘semi-skilled’ assistants instead of unskilled helpers.*
- iii. *‘Finishing school’ for professionals with up-skilling on latest technologies.*

***d. Productivity-linked wages as against government-set minimum wages:***

The current ‘bipolar paradigm’ of rate contract vs. wage contract represent two ends of spectrum with rate contract being 100% variable pay, ridden with full performance risk to the sub-contractor but zero risk to the manager, but also leading to minimal loyalty by a sub-contractor who switches if he detects possible loss making, or if he gets a chance to earn more or risk less in a neighboring site, thus creating delays. The other end of the spectrum is the wage contract which has no performance risk for the sub-contractor but transfers complete risk, cost to the manager. A new possibility is a composite metric of productivity linked wages with government-set minimum wages as fixed component and productivity linked-incentive as variable component. For rate contract seekers, the same can be reversed with productivity linked incentive/rate being the substantial component and headcount related incentive as incentive component. Thus a research study is needed for:

1. Designing a productivity-linked-payment system with both fixed and variable components for both rate and wage contract.
2. Usage of technologies like pre-cast to understand their RoI from a scientific perspective in terms of wage-productivity-investment-RoI calculations.

#### **4.6 Action Team 6 - Construction Clients' Charter**

The '*purpose*' of the Charter is to obtain a joint commitment of industry leaders and set an example, with a pledge to commit to and practise sound core values and progressive strategies as Construction Clients, that would benefit all construction industry stakeholders including end-users of the constructed products.

The '*Draft Charter with a Framework for development*' was presented with (A) four groups of underpinning *priorities* i.e. (i) overall, (ii) expectations from supply chain, (iii) pledges to supply chain, (iv) pledges to end-users; and (B) a *Charter Structure with indicative Examples* of 'Core Principles & Key Protocols' under six themes – Procurement & Contracting Strategy, Overall Project Implementation & Delivery Strategy, Design Management, Construction Management, Supply Chain Management, Overall Project Monitoring & Control.

The above had been developed in stages by Action Team 6 with a Literature Review and Conference Calls etc., followed by Focus Group Meetings within Sub-Team 6A. *Note:* Sub-Team 6A was formed more recently to focus further on developing this Draft Charter that was initially brainstormed by the whole Team 6 together. Action Sub-Team 6B (set up in parallel with 6A) initiated a framework for a 'Contractor Rating System' - so that signatories to the Clients' Charter could eventually choose to declare that they would only employ Contractors who have achieved a certain 'rating'. This was expected to extend to the rest of the supply chain, including consultants and could eventually loop back to a rating of clients too.

The Construction Clients' Charter is expected to be *pivotal* to the success of Ci3 India, since "*all other Action Teams would feed us their own relevant critical inputs* in terms of core principles and best practices in their domains that they believe should be enshrined in the 'Charter'". Explicit top management endorsement by signing this Charter should make implementation much easier.

***Appendix III shows the Current Action Teams list.***

#### **5. OUTCOMES OF THE CI3 INDIA CONSULTANTS' ROUNDTABLE (18<sup>th</sup> OCT. 2016)**

The following summarizes the key points discussed in the consultants brainstorming session,

- Late 'untimely' decisions
- Lack of 'ownership' of important Client decisions – avoid taking responsibility for decisions e.g. in 'signing-off' on designs. Indeed some project management software facilitates 'ownership', if client must 'press a button' to pass on to next stage, but this should happen even without such software.
- Delayed payments
- Need to upskill' / upgrade competencies of some key personnel of clients including supervisors and even some middle and top management
- Need to upskill consultants too
- Need to inject contractor and operator inputs into designs
- Planning is badly neglected, the emphasis being on scheduling

- Scheduling should include not just the construction phase, but also the planning and design and post-construction phases
- Unrealistic Durations imposed on projects – but this point also triggered a debate on how compressed durations may provoke/ generate ‘outside the box’ innovations to shorten durations if really needed and feasible.
- Some other industries have standardized design processes & practices – e.g. we can learn lessons from heavy civil infrastructure e.g. design programme milestones such as ‘procurement initiation after 30% design’; ‘substructure construction after 70% design ...
- Documentation process needs to be stronger and workflow driven
- Many Design Codes are seriously out-dated.
- Unnecessarily high partial safety factors and high tolerances to compensate for uncertain workmanship
- Lack of ‘performance-based design’ and ‘service life designs’
- Need to design for maintainability, durability, sustainability and longer design life. Should change emphasis from CAPEX to OPEX
- Industry image needs a significant boost
- Ci3 *India* Clients Charter should help improve image
- Workers need better facilities & other attractions to stay longer in our industry
- Slow to adopt new technology, including modern systems, equipment & tools – worse / slower in non-urban centers
- Slow to develop and deploy sustainable systems & technology
- Inequitable Risk allocation across stakeholders and lifecycle
- Clients should be prepared to pay extra for safety, environmental safeguards and other desired improvements e.g. as in the Qatar Foundation mandatory EHS (Environment, Health & Safety) standards
- Role of Insurance industry and Financiers in incentivizing industry improvements?
- The Construction Owners’ Association of Alberta <<http://www.coaa.ab.ca/>> have developed an industry support programme comparable to some of the Ci3 *India* proposals; and a group of 4 to 5 clients took charge of (and championed) each of the many initiatives. Can Ci3 *India* follow a similar strategy?
- ‘Change management’ needs emphasis throughout the cycle
- Ci3 *India* should act as a ‘change guide’ for construction industry. Important to remain and to be seen as independent and neutral to retain respect.

## **6. BRAINSTORMING OUTCOMES INCLUDING PROPOSED WHITE PAPER CONTENTS FROM EACH ACTION TEAM**

### ***6.1 Action Team 1 - Identification and Formulation of Knowledge Performance Indicators (KPI's)***

The hitherto developed KPIs, as listed in an eight A3 page working template, had been presented at both the Consultants' Roundtable of 18 Oct. 2016 (the previous day) and also at the plenary sessions of this Consolidation Roundtable, as a broad set from which organisations could draw and refine their own preferred set. This brainstorming focus group considered the general feedback from a couple of participants at the foregoing earlier sessions, that while these were good for companies to track and internally compare their own performance at project level, (a) there seemed to be too many in general; while (b) some KPIs that could be compared across like-minded companies would also be welcome.

It was thus decided to extract two 'higher level' KPI sets from what had been developed mostly for project level so far – (1) at organisational benchmarking level and (2) at industry benchmarking level (to compare with other countries (note – they could also be compared across States in India). Three team members undertook to extract these within each of the three KPI groups in the template – (i) Design stage, (ii) Construction stage and (iii) Business Outcomes. These would be submitted to the rest of Action Team 1 on 05 Nov. and discussed at a Conference Call on 10 Nov. 2016, so that they may be finalised in advance and included in the Draft White Paper of Action Team 1 by the deadline of 10 Dec. 2016.

It was noted that 'weighting indicators' to adjust typical values for specific contexts/ conditions would need to be developed after the White Paper. Collecting data for and deriving typical KPI values (e.g. averages in a certain group) could be organised after the formation of the proposed benchmarking club. This may be initiated if at least some of those signing the Construction Clients Charter agree to submit some agreed data sets to C3 India, after which derived averages (only, not raw data) may be shared across such a 'benchmarking club'. A suitably experienced Research Associate would need to be deployed on this as well; and could later help with the development of the weighting indicators too.

### ***6.2 Action Team 2 – Strategies for Significantly Reducing Construction Project Time-frames and Cost***

The results of the working paper were presented to the participants at the Roundtables on 18<sup>th</sup> and 19<sup>th</sup> October 2016. The points discussed at the brainstorming session are as follows: (1) a single window clearance mechanism is required for approvals; (2) a strong stakeholder involvement is required at the early stages of the project to reduce the issues during the later stages of the project; (3) decision makers do not take ownership in many cases, hence the culture should change; (4) owners have maximum influence to control time and cost during the execution phase compared to the other two phases (i.e. concept, design and procurement).

Also the following way forward points were discussed (1) actual data on prioritized issues should be collected (i.e. the qualitative data from survey conducted for Action Team 2 should be validated with actual quantitative data) (2) strategies for reducing time and cost should be recommended based on the analysis of results from quantitative data (3) the aforementioned brainstorming contents, way forward and results of the questionnaire survey conducted will be included in white paper.

### ***6.3 Action Team 3 - Design Processes and Technology Adoption***

The points discussed at the brainstorming session were as follows: (1) need for process documentation and standardisation of the design processes; (2) need for control of the process using tools and technology; (3) early involvement of contractors and operators in the design process for constructability, maintainability and sustainability – “Collaborative approach”; (4) need for a design framework that directly delivers value to the client/end user; (5) clients should mandate quality schedules; (6) there is a lack of skilled planning engineers to prepare quality schedules; (7) activities in a schedule should holistically consider activities in project phases (concept, design, procurement and construction, rather than just activities pertaining to construction. Standards and Benchmarking are required to compare the quality of project schedules.

Furthermore, the following way forward points were discussed: (1) draft standardised Swim Lane Diagrams developed shall be shared with the participating organisations for validation; (2) subsequently two questionnaire survey should be conducted which will form a part of the white paper - [i] to collect data for developing the Ci3 India Standard Design Process templates; and [ii] to understand the status of technology adoption in construction (*Note: a third party should be employed to circulate the survey to industry*).

### ***6.4 Action Team 5 - Human capital (including Labour, Technical, and Managerial, and Skills Development) and Productivity***

The Action agendas proposed in the Working paper were presented at the Consultants’ and Consolidation Roundtable and feedback was collected. The same has been discussed in the breakout brainstorming session to deliberate the way forward steps for the proposed Action agendas. The steps include:

- (1) Conducting field studies in five Ci3 *India* member organizations who agreed to participate in mapping the current practices (also best practices) in workforce management.
- (2) Compare the identified practices (also best practices) with international practices.
- (3) Recommend best practices to the forum and identify a demo site to pilot the recommended best practices. The following practices were initially identified and that can be piloted at the demo site:

- *Mandatory digital bank account wage- payments*
- *Provision of ‘Site-id’ with access control-based attendance*
- *Skill testing of all workers*
- *Monitoring of productivity-wages-paid based on skill levels to ensure premium*
- *‘Finishing school’ for professionals with up-skilling on latest technologies.*
- *Uniforms like ‘overalls’ for all site-workers*
- *Weather-resistant accommodation along with on-site canteen, bus-travel facility like in the Middle East.*

- (4). Designing productivity-linked-payment system for sub-contractors, merging appropriate aspects of rate and wage-contracts for optimization at the whole project level.



### **6.5 Action Team 6 - Construction Clients' Charter**

It was proposed that the Construction Clients' Charter should have two parts. The *first part* should spell out: (1) Mission statement and expectations from the charter; (2) Main objectives, overall goal, as well as initial priorities and focus areas; (3) Governance - how to operationalise this Charter and with what possible oversight mechanisms; (4) Roadmap on how to advance the charter in stages to develop its maturity and implementability.

The *second part* should contain a declaration that clients can sign off on. Initially, this declaration may be in the form of relatively generic principles, 10-15 or so, that cover the project lifecycle. The charter will be dynamic and is expected to 'grow' over time, along with industry maturity and priorities.

Once prepared, we should invite 15-20 clients currently associated with Ci3 *India* to a well-publicised signing event. As a next step, we can approach bodies such as the Builders Association of India (BAI), Confederation of Indian Industries (CII) and invite their members to sign. We could then approach some infrastructure sector leaders – GVK, GMR, Birla, Godrej, Smart City Owners, Metro Rail SPVs and so on. We could thereafter approach government bodies such as NHAI, CIDC etc. to join in this common declaration.

We should target an initially signed charter with the signatures of the core 'charter members' before June 2017. Note: It could then also form part of the White Paper targeted for June 2017. The charter may also be uploaded on our Ci3 *India* website, inviting any other interested parties to approach us if interested in joining.

## **7. ACTION PLAN AND WAY FORWARD**

The Ci3 *India* trajectory was traced, as in the attached Fig. 1, from the first 'shots fired' at its launch in Oct 2015 that also heralded the first Clients' Roundtable in Chennai. Having identified some critical barriers and other 'issues' hampering the industry at this event, these were verified, expanded somewhat and consolidated at the Developers' Roundtable in Mumbai in Feb. 2016. Action Teams were mobilized in March 2016 to address these issues. The time-line projected down the left of Fig. 1 along with the Action 'Activators' progressing down the right side of Figure 1, indicate the drivers fueling the Actions and Outputs that flow from top to bottom in the center part of the Figure.

Ci3 *India* is now well-positioned in the lower rectangle of the 2nd box from the top in this center part of Figure 1, having completed 'Phase 1' as planned, if not better. The Working Papers were distributed and presented at the two Roundtables on 18<sup>th</sup> and 19<sup>th</sup> Oct. 2016. Based on the feedback, the outputs are considered valuable and well worth pursuing further. The clear consensus was that Ci3 *India* should now launch 'Phase 2' for formulating strategies and tools to address the identified issues and overcome the barriers,

In launching Phase 2, the Action Groups would upgrade and further develop their Working Papers into Draft White Papers by 10<sup>th</sup> Dec, 2016, after which these could be consolidated into a Draft Ci3 *India* White Paper in Jan. 2017 and finalized by June 2017.

Encouraged by the steadily snowballing support from industry, it is proposed to implement mutually selected industry improvement recommendations in pilot or demonstration projects from as soon as resources can be made available. Based on any lessons learned from these pilots, wider 'system improvements' could then be launched in stages, starting with any volunteering organisations or a group of organisations working together, hence injecting a benchmarking benefit as well.

‘Phase 3’ envisages engaging more industry clients and their principal supply chain members, as well as key Government bodies, apart from wider general dissemination. To ‘complete the loop’ for continuous improvements’, a provision should be made as in Fig. 1, for periodic review of implementation and improvements. Being mindful of the need to pursue moving targets, Ci3 *India* could thereby continue to position and empower our industry to target dynamic priorities and changing contexts.

Furthermore, we need to next extend our methodology and spread the industry improvement ‘net’ and benefits beyond ‘buildings’ to other sub-sectors of the construction industry including transport (with roads, bridges, airports etc.) and irrigation, water, sewerage & drainage etc.

The final discussion was on the possible options for the well-structured institutional platform that is an imperative for Ci3 *India* to move forward as above. Funding and human resources would also be essential as shown on the top right of Figure 2, which was projected to trigger brainstorming as ‘one option’ for positioning and fueling the way forward. Other options and ideas/ suggestions as regards a viable institutional platform, were also invited.

Discussion ensued, on the option of setting up a non-profit Section 8 Society if needed, as well as on other possibilities and implications.

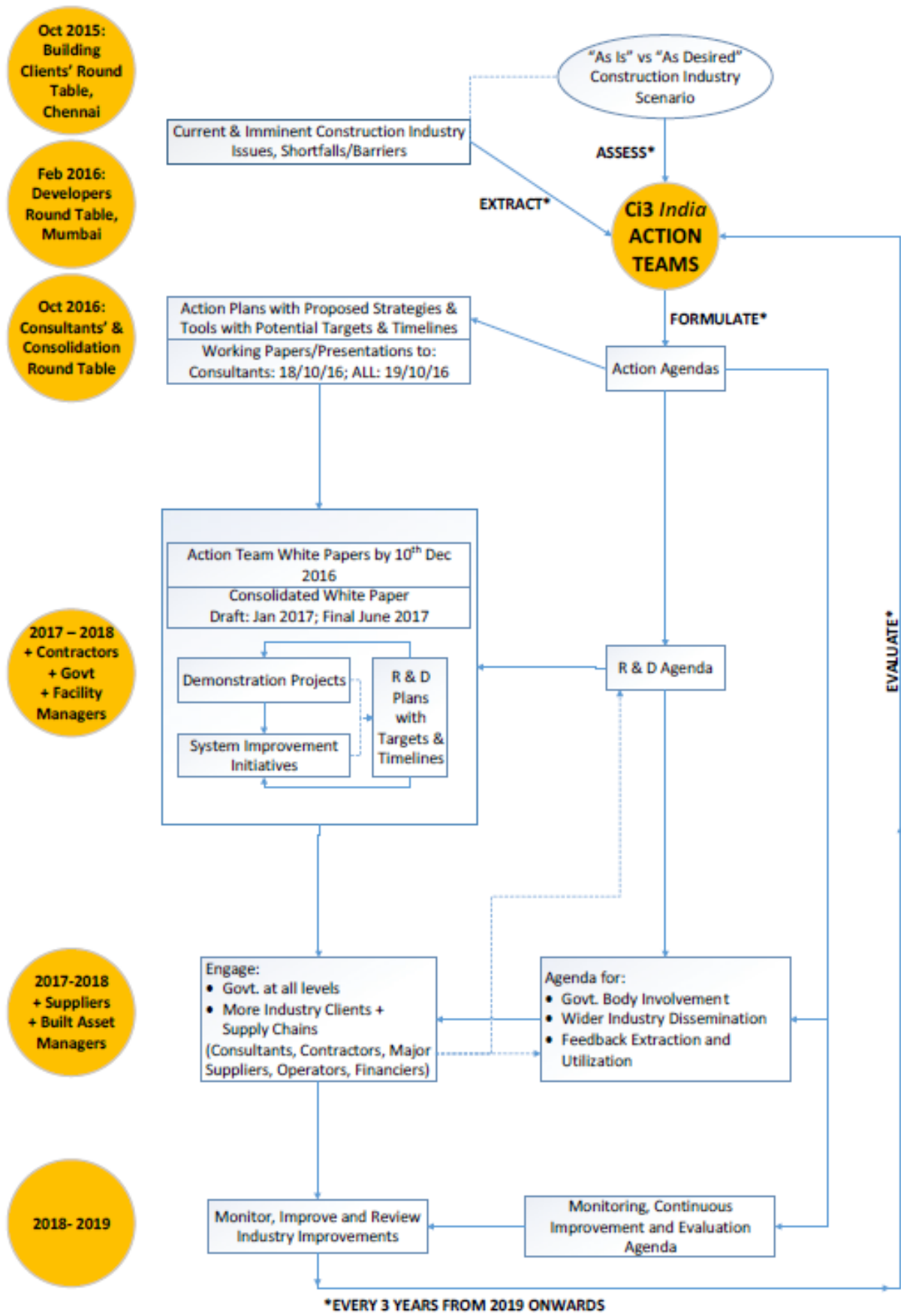
As regards ‘financial’ and ‘people’ resources, it was noted that ILCE (Institute for Lean Construction Excellence) had already agreed to fund Ci3 *India* to cover the budgeted costs of a Research Associate and associated expenses for 12 months. It was announced, with a request to spread the word, that we urgently need a suitable person for this position, as well as a more senior high-profile industry person who could be the ‘Project Director’ to start with, and could eventually be the ‘Director General’ of the envisaged organisation. While participants noted that donor funds could be mobilized from other supporting organizations too, it was proposed and agreed that some of the leading clients already involved in the Action Teams, could also second for say, 3-6 months at a time, one of their mid-level and suitably motivated staff to work as ‘Actions Co-coordinators’ so as to help drive and oversee some of the data collection, analyses and pilot projects envisaged in Phase 2. It was suggested that (a) about INR 1 Crore would be a suitable starting point to kick-start the initial work and (b) about 6 to 7 pioneer organizations who have already been involved may see fit to contribute about INR 1.5 lakh each to set this up.

Other interesting ideas and suggestions were also noted for further development after the Roundtable.

#### Important Post-Roundtable Notes:

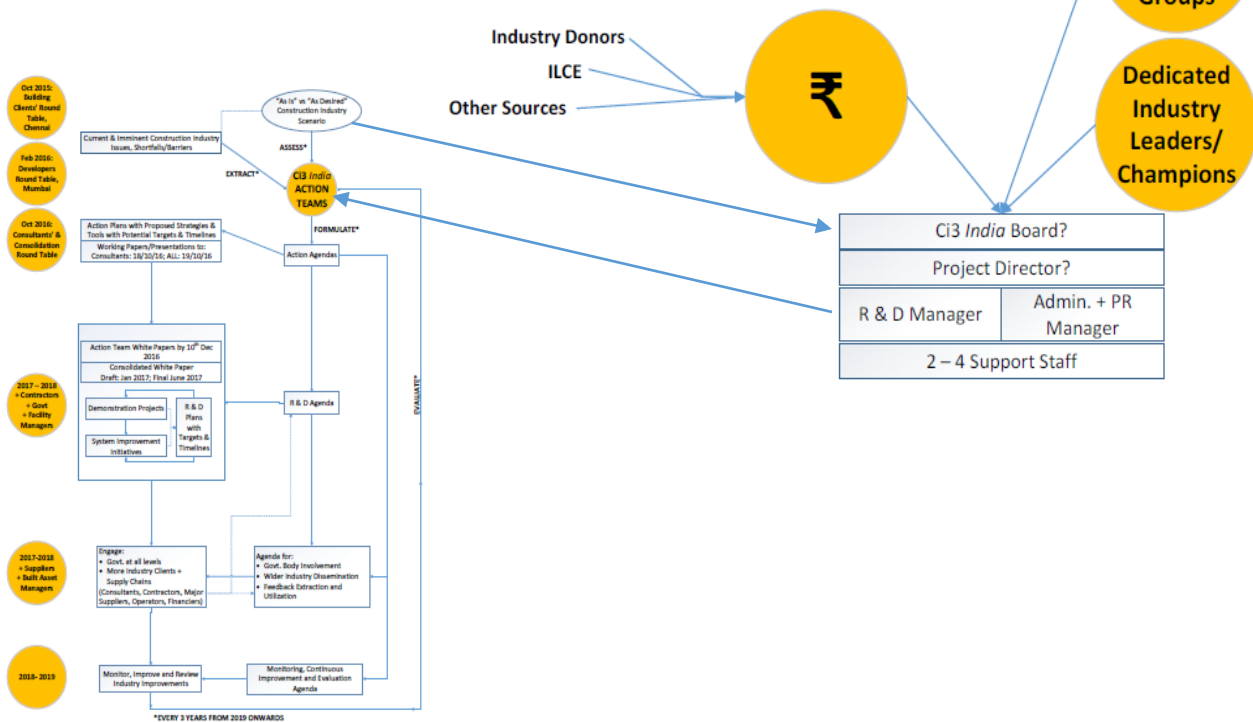
1. Name: As Prof. Meher Prasad mentioned in his Welcome Address by, Ci3 India has outlived its identity as an ‘Industry Improvement Initiative’, having moved beyond a mere ‘initiative’. It has been agreed to name the envisaged entity that should propel Phase 2 and Phase 3 (starting with the White Papers) as the CONSTRUCTION INDUSTRY INSTITUTE INDIA. This will also retain the Ci3 identity, as well as enable comparisons with the Construction Industry Institute in USA which has beneficially linked industry to academia and produced much valued outputs from the 1980’s.
2. Another Option for the Institutional Platform: A suggestion is being explored with ongoing discussions on the possibility of housing Ci3 (CONSTRUCTION

INDUSTRY INSTITUTE INDIA) under the umbrella of the soon to be established CUBE – Center for Urbanization, Buildings and the Environment. This itself will be registered as a Society and will have a Governing Council that includes members from IIT Madras, relevant Governmental agencies and industry. It is spearheaded by Dr. Ashwin Mahalingam who has been with Ci3 India from its launch and will help formulate and action mutually beneficial agendas. It will be housed at the IIT-Madras Research Park as an applied research center whose mission is to innovate and translate academic research into actionable solutions. The listed activities also resonate and overlap with some of those envisaged by Ci3, but also move into developing policies, capacity building and convening techno-policy dialogues etc., suggesting many synergies and mutual benefits. On the other hand, depending on how both Ci3 and CUBE develop in the next few years, Ci3 could be considered to be in an incubation mode, where Ci3 could take-off on its own if it is considered preferable by either party (or indeed both) at any future appropriate point of time. Feedback is welcome on the above option, while any alternative options may also be suggested.



**Fig. 1. Ci3 India Roadmap**

# Way Forward - One Option?



\*ILCE – Institute for Lean Construction Excellence

**Fig. 2.** Ci3 India Roadmap with Funding and Human Resource Inputs – One Option?

## 8. ACKNOWLEDGEMENTS

All Roundtable participants and the participating Action Team Members are gratefully acknowledged for their valuable contributions and sustained support. Prof. Meher Prasad who gave the welcome address is thanked for his inspiring and visionary words. The incisive insights provided by Mr. S. Mahalingam helped to set the scene for the expectations from Ci3 India, neatly complementing the presentation by Prof. Mohan Kumaraswamy who provided the Overview and Overall Status of Ci3 India. The Action Team Leaders and Members are also thanked for presenting the outcomes of the Action Team Working Papers in the Roundtable. The Roundtable participants, Action Team Members and rapporteurs did excellent jobs in facilitating and consolidating the valuable outcomes of the joint brainstorming session which led to the discussion of potential future Actions and the ‘Way forward’. 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.

## **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 and rapporteurs. They are certainly not exhaustive and may not accurately reflect the specific views or priorities of the speakers, focus groups or whole Roundtable.

## **10. 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:*

Mr. Mathew Joe and Ms. Vijayalaxmi for helping with diagrams preparation and presentations support

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



## APPENDIX I - Programme

### CONSOLIDATION ROUNDTABLE PROGRAMME

#### OPENING PLENARY SESSSION

09.30 – 09.50	Registration and Fellowship	<b>ALL</b>
09.50 – 09.55	Welcome Address	<b>Prof. Meher Prasad</b> , Head, Dept. of Civil Engineering, IIT Madras
09.55 – 10.00	Expectations from Ci3 <i>India</i>	<b>Mr. S. Mahalingam</b> , Former CFO & Executive Director, Tata Consultancy Services
10.00 – 10.20	Ci3 <i>India</i> – Overview and Overall Status	<b>Prof. Mohan Kumaraswamy</b> , T.N. Subba Rao Brigade Group Adjunct Chair Professor, IIT Madras
10.20 – 10.30	Consolidation Roundtable Objectives and Expectations	<b>Prof. K.N. Satyanarayana</b> , Professor of Civil Engineering, IIT Madras
10.30 – 11.00	Action Team 1: Approach, Outcomes and Discussion	<b>Action Team: 1 Members</b>
11.00 – 11.20	<b>Refreshments</b>	
11.20 – 11.50	Action Team 2: Approach, Outcomes and Discussion	<b>Action Team: 2 Members</b>
11.50 – 12.20	Action Team 3: Approach, Outcomes and Discussion	<b>Action Team: 3 Members</b>
12.20 – 12.50	Action Team 5: Approach, Outcomes and Discussion	<b>Action Team: 5 Members</b>
12.50 – 13.10	<b>Joint Brainstorming</b> to consolidate all Action Teams Outcomes	<b>ALL</b> (moderated by: <b>Prof. Mohan Kumaraswamy</b> )
13.10– 14.00	<b>LUNCH</b>	
14.00 – 14.40	Ci3 <i>India</i> Construction Clients' Charter – Proposal and Joint Brainstorming	<b>ALL</b> (moderated by <b>Dr. Ashwin Mahalingam</b> and <b>Prof. Mohan Kumaraswamy</b> , IIT Madras)
<b>'BREAKOUT' BRAINSTORMING SESSION – specifically for Action Teams 1, 3, 5 and 6</b>		
14.40 – 15.20	<b>'Breakout' Brainstorming session: for Action Teams to agree their White Paper Structure and Contents</b>	
15.20 – 15.35	<b>Refreshments</b>	
<b>CONCLUDING PLENARY SESSSION</b>		
15.35 – 16.15	Action Teams' 'Way Forward' Presentations (10 mins. each for Action Teams 1, 3, 5 and 6)	<b>ALL Action Team Members</b>
16.15 – 16.30	Ci3 <i>India</i> – Institutional Platform (Action Team: 7)	<b>ALL</b> (moderated by: <b>Prof. K.N. Satyanarayana</b> , <b>Prof. Koshy Varghese</b> and <b>Prof. Mohan Kumaraswamy</b> , IIT Madras)
16.30 – 17.00	Ci3 <i>India</i> – Way Forward (with Roadmap & Milestones)	<b>ALL</b> (moderated by: <b>Prof. Mohan Kumaraswamy</b> , <b>Prof. K.N. Satyanarayana</b> and <b>Prof. Koshy Varghese</b> , IIT Madras)

## **APPENDIX II – ROUNDTABLE PARTICIPANTS**

1. Dr. Gangadhar Mahesh, NIT Surathkal
2. Dr. Harshavardhan Subba Rao, Construma Consultancy
3. Mr. Subramani, Apollo Hospitals
4. Mr. Hrishikesh Joshi, TRIL
5. Mr. Jeevadayalan. K, PWD Pondicherry
6. Mr. Kalyan Chakravarthy, PanIIT
7. Mr. Kalyan Vaidiyanathan, Nadhi Technologies
8. Mr. Mahalingam, TCS
9. Mr. Meenakshi Sundaram, WTP India
10. Mr. Mithun Raj, Jacobs Engineering Group
11. Mr. Nikhil Kanade, SP Realty
12. Mr. Poornalingam, Retd. IAS
13. Mr. Prakash Patil, TRIL
14. Mr. Ramamoorthy Vekateswaran, WIPRO
15. Mr. Sanjay Ubale, TRIL
16. Mr. Santhosh Jayarajan, TRIL
17. Mr. Shabbir Kanchwal, K Raheja Group
18. Mr. Shahnawan, PanIIT
19. Ms. Stella, PanIIT
20. Mr. Suresh. PWD Pondicherry
21. Mr. Tamil Selvan, TVS EHRL
22. Mr. Thirumanan, Brigade Group
23. Mr. V T Chandrasekhara Rao, Shreshta Solutions LLP
24. Prof. N. Raghavan, IIT Madras
25. Prof. Mohan Kumaraswamy, IIT Madras
26. Prof. K N Satyanarayana, IIT Madras
27. Prof. Koshy Varghese, IIT Madras
28. Dr. Ashwin Mahalingam, IIT Madras
29. Dr. Benny Raphel, IIT Madras
30. Dr. Sivakumar Palaniappan, IIT Madras

31. Mr. Santhosh Loganathan, IIT Madras
32. Mr. S. P. Srinath, IIT Madras
33. Mr. Vijayalakshmi, IIT Madras
34. Mr. Mathew Joe, IIT Madras
35. Mr. Marimuthu, IIT Madras
36. Mr. Johan Ninan, IIT Madras
37. Mr. Ram V G, IIT Madras
38. Mr. Harssh Singh, IIT Madras

## Appendix III – CURRENT ACTION TEAMS LIST

Team No #	Action Item 'header' #	Team Members from Academia * (Leader/ Co-ordinator highlighted)	Team Members from Industry *	
			From Oct. 2015 & Oct. 2016 Chennai Roundtablers AND nominees	From Feb. 2016 Mumbai Developers' Roundtablers AND nominees
1	Identification and formulation of KPIs	Prof. Mohan Kumaraswamy (IITM) Dr. Gangadhar Mahesh (NIT Surathkal) Dr. Venkata Delhi (IITB) Mr. Santhosh Loganathan (IITM)	Mr. Chandramouli (TVS) Mr. Thirumanan, Vice President (Projects) (Brigade) Mr. Tamil Selvan (TVS) Mr. S. Hari (Jones Lang LaSalle)	Mr. Sanjay Ubale (TRIL) Mr. Kekoo Colah (SP) Mr. Kishore Bhatija (K. Raheja Corp.) Mr. Prakash Patil (TRIL) Mr. Hari Govind (TRIL) Mr. Shabbir Kanchawala (K. Raheja Corp.)
2	Strategies for significantly reducing Construction Project Time-frames & Costs	Prof. K N Satyanarayana (IITM) Mr. Srinath (IITM)	Mr. Ramamoorthy Venkateswaran (Wipro) Mr. Kalyan Vaidyanathan (Nadhi Technologies) Mr. E. Tamilselvan (TVS) Mr. B. Parthasarathy (TCE)	Mr. Prakash Patil (TRIL) Mr. Venugopalan Machiraju (SP) Mr. Shabbir Kanchwala (K. Raheja Corp.) Mr. Joshi (TRIL) Mr. Santhosh Jayarajan (TRIL)
3	Design processes and Technology adoption	Prof. Koshy Varghese (IITM) Dr. Gangadhar Mahesh (NIT Surathkal) Mr. Srinath (IITM)	Dr. Harshavardhan Subba Rao (Construma Consultancy) Mr. Hari Hegde (Wipro) Mr. Kalyan Vaidyanathan (Nadhi Technologies) Mr. Tamil Selvan (TVS) Mr. Mohan Ramanathan (ACT) Mr. B. Parthasarathy (TCE)	Mr. Prakash Patil (TRIL) Mr. Venugopalan Machiraju (SP) Mr. Shabbir Kanchwala (K. Raheja Corp.) Mr. Joshi (TRIL) Mr. Santhosh Jayarajan (TRIL)
4	Design codes and standards	Agreed that this needs a <b>long term exercise</b> , since each code/ standard has been laboriously compiled after agreement by teams of discipline experts. Also most codes/ standards have been in place for decades <b>as per many examples discussed at the Consolidation Roundtable on 19 Oct. 2016</b> . Mr. Hari Hegde (Wipro) had volunteered to lead this Team and Dr. Harshavardhan Subba Rao (Construma Consultancy), Mr. Sharad Sabnis (TRIL) volunteered to join this Team. <b>We invite you to nominate</b> any suitable/ well positioned persons e.g. those currently or previously involved with up-dating codes/ standards <b>who would (a) work out a stage-wise strategy, and (b) identify which codes/ standards to target in the first stage.</b>		
5	Human capital, incld. Labour, Skills Development & Productivity (covers Action Items 5.1-5.4 in the detailed Action Items listing, now 5a, 5b, 5c, 5d)	Prof. K N Satyanarayana (IITM) Dr. Sivakumar Palaniappan (IITM) Mr. Santhosh Loganathan (IITM)	Mr. Mahalingam (TCS) Mr. Chitty Babu (Akshaya Homes) Mr. Kalyan Chakravarthy (PanIIT) Mr. Srinivasan P P (CPWD) Mr. Suresh (PWD-Pondicherry) Mr. Jeevadayalan (PWD-Pondicherry)	Mr. Prakash Patil (TRIL) Dr. Venkata Delhi (IITB) Prof. Cyrus Dordi (IITB) Ms. Anita Rajan (TRIL)
6	Construction Clients' Charter	Prof. Mohan Kumaraswamy (IITM) Dr. Ashwin Mahalingam (IITM) Dr. Gangadhar Mahesh (NIT Surathkal) Dr. Venkata Delhi (IITB) Mr. Santhosh Loganathan (IITM)	Mr. Mahalingam (TCS) Mr. Srimanikandan Ramamoorthy (CTS) Mr. P. Ganesh (CTS)	Mr. Sanjay Ubale (TRIL) Mr. Kekoo Colah (SP) Mr. Kishore Bhatija (K. Raheja Corp.) Mr. Shabbir Kanchwala (K. Raheja Corp.) Mr. Joshi (TRIL) Mr. Santhosh Jayarajan (TRIL)