Request for Proposals (RFP) for Sector Committees' Sponsored Research
Construction Industry Institute
2017

The Construction Industry Institute (CII) is currently soliciting proposals for the topics selected by its Sector Committees, listed in Appendix A. The five Sector Committees (SCs) are part of the new CII organization and aim to sponsor research projects that foster innovation in the delivery of capital projects and provide breakthrough impact on the business imperatives of each sector.

The proposals should address the questions and objectives outlined in each Research Topic Summaries (RTSs) listed in Appendix A. Most topics are broad areas of interest and the proposals will target an exploratory research phase that will ultimately narrow down the topics to more specific research questions. The final product of this exploratory research phase should be, in itself, a final full research proposal that could be developed further. It is a prerogative of each sponsoring sector to approve the continuation of the research. Note that the approval by each Sector Committee for further research will depend solely on the assessment of the potential impact and quality of the proposed research rather than via a competitive process.

Who May Submit

CII seeks Principal Investigators (PIs) experienced in academic research in Construction Engineering and Management. Any faculty member holding a terminal degree in their discipline from an accredited university is invited to respond to this RFP. CII also requires the participation of academics outside the Construction Engineering and Management field. **Proposals without this "outside" PI will be returned without review**. Each faculty member may submit proposals for up to two topics, in accordance with the format described in Appendix B. However, a faculty member cannot be selected as PI for more than one research topic starting in the same year. Proposals should not exceed a three-page limit, excluding the PIs information sheets. The full proposal, including the PI information sheet and any references are required to be submitted in a single .pdf or .doc file.

Submissions should be sent to Kristi Delaney at kldelaney@mail.utexas.edu no later than 5 pm CDT on January 25, 2017. Submitted proposals will be reviewed by the respective sponsoring sectors. Each sector will select projects based on the strength of the core concept/idea and the qualifications of the team. Results will be communicated on February 10, 2017.

Research Development

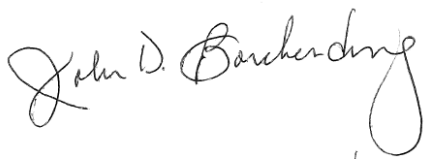
Following the selection of the PI team and assembly of the RT members, the team will be given approximately seven months to develop the research. The research work should consider the milestones and key dates provided in Appendix C. In this period, research teams (including academics and industry members) are expected to meet regularly in a series of face-to-face and virtual meetings. Each sponsoring sector will oversee the research development, including evaluating the interim report and reviewing the presentation for the BOA meeting. The results should be presented in CII's 2017 Fall Board of Advisors meeting, in October 2017.

Contracts

CII will enter into a Memorandum of Agreement (MOA) with each selected PI's University to complete the proposed research. CII intends, for each PI, to fund one-month of Summer salary and travel expenses for team meetings during the six/seven months exploratory research project. CII also intends to fund one graduate student for the project.

Support to Prospective PIs
Prospective PIs should address all questions concerning the RFP process to John Borcherding (see contact info below). CII will also provide a webinar to be held in early January in order to provide guidance for prospective PIs and to answer any questions about the RFP process. The session will also address specific questions about the RTSs. The call-in information and web link will be provided in early January.

Sincerely,



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Appendix A
Research Topic Statements

Power, Utilities and Infrastructure Committee
RTS 1 - Identifying and Evaluating the Impact of Regulations throughout the Project Life Cycle
Upstream, Midstream and Mining Committee
RTS 2 - True Cost of Custom Design in a UMM Commodity Market
Downstream and Chemicals Committee
RTS 3 - Construction Readiness Assessment for Productivity Improvement RTS 4 - How to Double Productivity
Healthcare and Facilities Committee
RTS 5 - The Relationship between the Built Environment and the Business Case
Manufacturing and Life Sciences Committee
RTS 6 - Flexible Facility Development for Manufacturing & Life

RTS 1

CII Power, Utilities & Infrastructure Sector Committee

Identifying and Evaluating the Impact of Regulations throughout the Project Life Cycle

Essential Question

What is the current best practice for decision making methodologies to proactively identify, evaluate, and respond to the impact of regulations throughout the different project life cycle phases?

Background

Throughout the project lifecycle, infrastructure projects experience different regulatory risks, such as decommissioning requirements or the Clean Power Plan (CPP) that was introduced in 2015. This research study seeks to assess and define existing methodologies used within the industry to proactively identify, anticipate, and respond to pre-existing and the ever-evolving regulatory requirements that are imposed on utilities. Included in this assessment are the unanticipated, dynamic changes that occur during the project life cycle (such as the introduction of the CPP). With this information, electric utilities and other infrastructure entities could better prepare for adaption and response during each phase of the life-cycle of their capital projects that includes front end planning, design, procurement, construction, operations and decommissioning.

Research would be conducted to take full advantage of not only preexisting incorporation of regulations, but, also, what can be learned when on-going projects are disrupted by new or changing regulatory requirements.

Notes to the Research Team

Regulatory impacts are readily changing (e.g., CPP currently pending judicial review). During these times of disruption, before the dynamic conditions become the new norm is when the organization and project changes can be best captured to evaluate how companies are responding to unanticipated and imposed requirements. CII has not conducted a regulatory impact project. If funded, this would be the first CII research study that would identify and evaluate the impact of regulations on capital projects.

Expected Outcomes

Although consulting firms may be analyzing the potential effects of the regulations for their clients, the information is unlikely to be provided to or shared among other utilities. The value of this CII research is to provide an open exchange that obtains shared responses from utilities that participate in the study and could be shared among utility companies.

RTS 2

CII Upstream, Midstream, and Mining Sector Committee

Achieving Higher Levels of Standardized Facility Design in the Upstream, Midstream, and Mining (UMM) Commodity Market

Essential Question:

How can higher levels of facility design standardization be achieved in the UMM Sector?

UMM Background/Context:

- Uncontrolled and variable product commodity markets in the Upstream, Midstream, and Mining sectors
- Custom vs. standard design may be relative to the maturity of the manufacturing technology
- Customization occurs in planning, design, procurement, and fabrication
- Existing plant/facility/site conditions (such as brownfield) must be considered and often drive customization
- Customization efforts are reflected in design/specifications
- Industry cooperation vs. competitive edge is a consideration
- Industry-standards vs. company-standards is a consideration

In order to determine the potential of standardization, the Sector needs to better understand how much UMM value is lost from excessive design customization in a commodity market, the cost of added/strained capacity (from standardization), and the fundamental tradeoffs with design standardization.

- Where/when (what project types and under what circumstances) should standardization be sought vs. customization?
- What are the volume considerations (i.e., break-even quantities vs fixed cost & variable cost) pertaining to higher levels of design standardization?
- How are the economics linked to a factory production-approach to construction?
- What about design standardization in the unique brownfield context?
- How does OEM equipment design/supply market need to change?
- How does engineering education/training need to change?
- When/how to analyze and justify standardization?
- What about organization cultural “discipline follow-through” to prevent regressing back to customization?
- How are industry-, supplier-, and company-level standardization different?
- How to avoid proprietary sensitivities in achieving standardization?

Relevant Prior Studies/Initiatives:

- Consider working with PIP or benefit from their learnings
- Learnings from ship-building, auto manufacturing, etc.
- Look at learnings from standard skids/modules
- Look at CII Modularization IR 283 (standardization strategy solution element)

RTS 3
CII Downstream and Chemicals Sector Committee
Construction Readiness Assessment for Productivity Improvement

Essential Question

How can construction readiness be assessed at any point of the project delivery process to ensure proper planning and implementation of productivity practices?

Motivation and Objective

Effective project execution planning requires a comprehensive and systematic approach to ensure construction readiness aspects are properly analyzed and incorporated. There are many productivity practices that should be considered in the execution plan to make a project more productive. Planning for these productivity practices should start as early as during the capital budgeting phase.

This research should first identify the steps for proper planning and implementation of construction driven productivity practices. Then, the study should develop a methodology and a fully formed tool to assess construction readiness at different points of the project life cycle.

Background

Past CII studies have developed guidelines and assessment tools for implementing specific construction driven execution practices, such as constructability, modularization, activity analysis, and advanced work packaging. This study should utilize and combine some of these findings to create an integrated assessment of construction readiness.

For instance, IR 252-3d Best Productivity Practices Implementation Index (BPPII) – Industrial Projects is a tool designed to assist project managers or superintendents in planning jobsite activities for making construction sites more productive. It measures the planning and implementation level of practices that have the potential to improve construction labor productivity on industrial projects, including those of the Downstream and Chemicals sector. BPPII was designed to be used at the end of the detailed scope phase or the beginning of the execution phase to help project managers identify practices to be implemented at the construction site. However, the proper planning and implementation of the best productivity practices described in BPPII require pre-requisite steps that should be conducted during the capital budgeting, front end planning, engineering, and procurement phases of the project. Learnings from BPPII can support the development of a readiness assessment method to properly plan, track, and monitor the implementation of productivity practices.

The Startup Planning Evaluation Rating (SuPER) Tool (IR121-2) was developed to enable the tracking and monitoring of startup planning efforts. The concept is that at any point of the project execution process startup planners should assess the current level of startup planning and compare that level with the target planning level. A similar concept can be used for the development of a construction readiness assessment tool.

RT323 has been studying the topic of “Best Practices for Preventing Out-of-sequence Construction Activities and Minimizing their Impacts.” Their findings should also be incorporated into this research as appropriate.

RTS 4
CII Downstream and Chemicals Sector Committee
How to Double Productivity

Essential Question

What research should be conducted in the next five years to double productivity in capital projects of the DCC sector?

Motivation and Objective

The DCC Sector Committee ranked "How to Double Productivity" as its top bold research topic. This bold topic is comprehensive and will require a series of smaller but integrated research projects to achieve its goal.

The goal of this study is to establish a roadmap for research of ground breaking, bold game changing ideas, technologies, and practices that lead to double or greater productivity. The roadmap should be specific to DCC members and drive for "wins" for all parties – owners, contractors, subcontractors, suppliers, consultants.

The work should include enough quantitative analysis to show the pathway to the intended results.

Background

DCC expects that the following topics will be addressed in the research roadmap.

Provide Definitions

- Define productivity across the capital lifecycle, and the metrics to measure it consistently.
- Define the lifecycle that will be included.

Perform Gap Analysis

- Review of existing CII work on productivity.
- Map applicable tools/practices that CII has and where they fit into the project lifecycle.
- Assess current state of implementation of each CII "productivity" tool/practice.
- Identify how current productivity tools/practices drive outcomes (i.e. project success factors)
- Investigate ways contractors get recognized for driving productivity improvement.
- Identify the workforce skills and attributes required to implement existing and new productivity practices
- Identify and evaluate barriers to improving productivity in construction: What is broken? What is new forward looking? What is missing?

Create Research Roadmap

- Propose a portfolio and roadmap of research studies to be conducted by DCC in the next five years that could lead to the desired productivity improvement, including the preliminary quantitative analysis of the potential improvements for each proposed study.

RTS 5
CII Healthcare & Facilities Sector Committee
The Relationship between the Built Environment and the Business Case

Essential Question

Beyond the capital cost, how does the built environment impact the business case for a project?

Background

The built environment, defined here as a single building, impacts the business processes, operations, and costs of those organizations that occupy the building. Research suggests that for every dollar spent in construction, the business returns for that dollar can be $15-$200 (Saxon 2006). However, how to identify those features of the built environment that impact the business case for an organization remains nebulous. Moreover, measuring that impact can be even more challenging (e.g., for a $1 investment during construction, does the feature provide $15 in return in terms of improved business? $100 of return?). These challenges, taken together, limit the opportunity for capital project planning teams to convince business decision-makers that additional investment into the built environment will, in fact, deliver predictable returns for the business.

Achieving optimal levels of financial returns from capital projects is CII's mission. While the institute has accomplished much to reach this aim, more remains to be done. The purpose of this project is to find further ways to achieve optimal business results, specifically by providing a life-cycle cost estimating tool to capital project teams to justify how and why features of the built environment support and/or enhance the business case of an organization.

Notes to team

The team may find CII resources that discuss delivering value to be helpful. In particular, the findings from RT 243 – *Enhancing Innovation in Construction* and RT 266 – *A Standardized Approach to Identifying and Defining Owner Value Interests and Aligning the E&C Response* may be helpful.

References

Saxon, R. (2006). "Be Valuable: A Guide to Creating Value in the Built Environment." Constructing Excellence in the Built Environment, London, UK Available at http://www.saxoncbe.com/be-valuable.pdf.

RTS 6
CII Manufacturing & Life Sciences Sector Committee
Flexible Facility Development for Manufacturing & Life Sciences

Essential Question:

How can the Manufacturing and Life Sciences (MLS) sector develop a methodology for generalizing a long lead facility with an undefined manufacturing process?

Background

There are times when the MLS sector has the requirement to deliver a facility quickly, ahead of a final product decision, essentially driven by "Speed to Market" with minimum investment for a "Flexible Facility". As a starting point, the research team will query CII MLS member companies about any existing Flexible Facility tools or processes that may exist in their organization or they have created while trying to resolve this delivery issue.

The expectation for this research team is to build upon the other work CII has performed (i.e. Fast Track, FEP planning, modularization, etc.) and generate deliverables that would provide a methodology or tool for evaluating which specific parts of a project can be generalized to aid in the development of a flexible facility. In addition, it should provide guidance on the common core building components and modules that can easily be decoupled from the process component, with considerations for building components and modules that are difficult to decouple from the process. This research team will identify innovative methods required to increase flexibility in difficult to decouple components/modules, defined and recommend by the research team leveraging the MLS sector Subject Matter Experts.

After the exploratory stage, any further research approved by the MLS Committee should address the design of a tool to support the MLS sector, with research findings being a result of the effort, not vice versa.

Notes to Team

The team may find CII resources that discuss delivering value to be helpful. In particular, the findings from *CII RT 171 - Modularization & Offsite Assembly, CII RT 283 – Modularization, CII RT 222 - Best Practices for Design in Fast Track Projects, or CII RT 311 - Successful Delivery of Flash Track Projects* may be helpful in this effort.

Appendix B
Proposal Outline

The following items should be included in the proposal (not to exceed three pages). The full proposal, including the PI information sheet and any references are required to be submitted in a single .pdf or .doc file.

1) Proposal Title

2) RTS Number and Name

For instance, RTS 6: Flexible Facility Development for Manufacturing & Life, MLSC.

3) PIs name, position, and affiliation

4) Objective

The PIs should clearly and succinctly identify the objectives of the research or, alternatively, the main research question(s) should be addressed.

5) Description of Concept/Idea

The PIs should provide a description of the problem to be addressed and potential benefits of the results, with emphasis on the impact and benefits for the sponsoring sector. The core concept of the proposal should be stated with emphasis on the innovative aspects of the proposal.

6) Proposed research approach

The PIs should provide a brief description (preferably, a visual) of the expected research approach, including major data collection efforts/approaches, data analysis and validation approach (including, when possible, quantitative validation approach).

7) PIs qualifications (not included in the 3-page limit).

Each PIs should provide:

- A short statement about their qualifications related to the research topic. The statement may refer to publications, past research projects, and any other academic or professional work that is relevant to the topic. Here, emphasis needs to be placed on new ideas coming from disciplines other than mainline construction engineering and management.
- A PI information sheet, following the format provided in Appendix D – PI Information Sheet.

7) References (not included in the 3-page limit).

Appendix C – Milestones and key dates

(Tentative)

Proposal Submission: January 25, 2017

RFP Results' Announcement: February 10, 2017

Kickoff meeting: Late March/Early April, 2017

Interim Report: Week of June 26, 2017

Presentation review (In preparation for the BOA presentation), late September/early October, 2017

Fall BOA meeting, October 2017

Appendix D – PI Information Sheet

PI Information Sheet (Complete separate PI Information sheets for each PI)

Do not exceed four pages in total length for each PI Information Sheet.

PI Name	
Personal Information	Title Program Department College or School University Address Email Phone Website (if available)
Education	
Academic Appointments	
Research Interests & Specialization	Emphasis on the specific topic
(Relevant) Courses taught	Graduate level courses taught
Professional Registration	
Industrial Experience	Employers, positions, responsibilities and applicability to the specific topic
Professional Memberships	
Honors & Awards	
Your Publications Most Relevant to this Specific Topic	Books, journals, conference proceedings, technical reports, etc. **(Max 5)**
Example(s) of Highly Innovative Research You Have Conducted	
Previous CII Research Team/ Committee Activities	CII Research Topic / RT #, CII committee assignments
Other Funded Research Activities	**- Most relevant to this specific topic (last 10 years)** - List 3 to 5 research projects that you completed which best demonstrate your qualifications for this research.
Number of Graduate Student Supervision Completed	# MS # Ph.D.
Other Professional Related Experience Relevant to this Specific Topic	(Last 10 years only)
Leveraged Funding Opportunities (available or possible)	

University and Program Information

Program Name	**Program**/Department/College or School/University
Number of Faculty Members	# Professor
	# Associate Professor
	# Assistant Professor
	# Adjunct Professor / Lecturer
Related/Supporting Research Centers at Your University	Construction related research centers (Program/Department)
National/World Rankings (School/Department)	U.S. News & World Report and Thomson Reuters The World University Rankings (most recent available)

Graduate Student Information (if known)

Number of Graduate Students in the Program	# MS # Ph.D.
Admissions Requirements	(e.g., BS degree from ABET accredited engineering schools, minimum GRE scores, minimum one year of work experience in the construction related fields)
Where do Program Students go after Graduation? (Please estimate %)	% Academic % Industry % Others
Graduate Degrees Offered by the Program	MS, ME, Ph.D., Certificates, etc.