CONSTRUCTION INDUSTRY INNOVATION

By Robert I. Carr

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The Construction Innovation Forum is a grass roots non-profit organization made up of people, companies, companies, and associations from the full breadth of construction.

Construction Innovation Forum (CIF), 350 S. Main St., Ann Arbor, Michigan, 48104-2131, (734) 995-1855, Fax (734) 995-5002, info@cif.org, www.cif.org.
The CIF is a 501C3 non-profit corporation. It originated in 1986 in Ann Arbor, Michigan by individuals from the different parts of the construction industry. It’s supposition is there is a lot of innovation in construction, from that required to solve unique problems on individual projects to solutions to major industry problems. The innovative problem solving is what so many of us in construction enjoy about our work. However, good news never gets told, and we hear little about innovation.

The sole purpose of the CIF is to recognize and encourage innovation in the construction industry. The CIF is really a virtual organization. It has no permanent office or staff. Most of its effort is by volunteers. It exists only because so many people in construction are interested in innovation.

The CIF is most known for the NOVA Awards presented each March at the Innovation Celebration Banquet in the Detroit area. It has no equal in construction. 600 people at $200 a ticket meet to celebrate the innovation in our industry worldwide. 35 NOVA Awards have been presented in the first 10 years.

All parts of the construction industry participate in the CIF. All are asked to “check your guns at the door” and work together on what we hold in common.
The CIF is a grass roots organization, built on broad, unselfish participation by any and all who believe in working together to advance the construction industry.

People and organizations participate as members, sponsors of projects, attendance at the March Innovation Celebration Banquet, nominators of innovations for the NOVA Award, NOVA Award Jurors, or Investigators of NOVA Award Nominations.
The CIF is particularly known for presenting the NOVA Awards each March to innovations from around the world that have proven to save cost and increase quality of construction.

The 10th Annual NOVA Awards were presented in March 1999.
NOVA AWARD CRITERIA

- Innovation judged by effect on construction process
  - Construction process or project
  - Material, design, equipment
  - Contract, labor, management, training
- Proven success on a project
- Significant advance
- Documentable and presentable

Criteria for the NOVA Award are described in the Nomination Form:

1. Each nominated innovation is judged on its effect upon the construction process. It can be an innovation in the construction process itself or in materials, design, equipment, detailing, contract administration, labor relations, management, training, procurement, etc. that improve the construction process. A project can be nominated for its innovative concepts or methods.

2. The innovation must be a proven success. It must have had a positive, important effect on construction, to improve quality or reduce cost. Innovation is the implementation of new methods and new technologies. It is not merely an idea that has merit and may be successful in the future. It must promote good, acceptable construction practices.

3. The innovation must be a significant advance, not just a natural evolution of existing methods, common sense, or good practice.

4. The innovation must be documentable and presentable. Innovators and their employers must disclose sufficient information about the innovation to allow documentation for the Jury and an informative presentation at the Construction Innovation Celebration.
The 3 Page format of the NOVA Award Nomination makes nominating simple: about 1 person day to prepare nomination.

Nominations come from all parts of the industry, as can be seen by searching the Nomination database.

Nominations come from all over the world, from innovators and projects worldwide. At least 20 countries and 6 continents are represented in nominations. Countries represented in NOVA Award Winners include America, Australia, Canada, Egypt, Holland, Japan, Norway, Switzerland, and the United Kingdom.

In addition to several engineering faculty at the University of Michigan, engineering faculty at U of Illinois, U of Wisconsin, Iowa State U, U of Cincinnati, U of California at Berkeley, U of Florida have also investigated nominated innovations.
3 Page Nomination:
1. Page that identifies those who are responsible for the innovation and those who can provide information about it.
2. One page of text that describes the innovation
3. One page of illustrations or other information on the innovation.
Nomination is simple, to make it easy to nominate
Preparing a nomination takes about a person-day.
The Jury uses nomination only to select short-list for investigation by CIF.
The NOVA Award is a bronze statue, emblematic of a construction worker prying a nova, a growing star, out of the soil from which construction springs.

At the March Innovation Celebration Banquet, the CIF presents a program on each NOVA Award winning innovation. People responsible for the innovation are introduced. The statue is presented to each NOVA Award winner.
## NOVA Award Winning Innovations Include

- Paving
- On-site child care
- Modular design
- Foundations
- Concrete technology
- Site positioning
- Labor/management
- Concrete formwork
- Structural steel
- Soil remediation
- Safety and training
- Connectors
- Underground
- Fiber reinforcement
- Innovative projects
- Automation
The CIF website at www.cif.org is heavily visited from all over the world.

It has won an award for the value it provides visitors.

We are constantly adding information and links to provide the world with information on innovations.
www.cif.org

- NOVA Award winners and finalists
- Keyword searchable database of nominations
- Descriptions and summaries of nominations
- NOVA Award mock jury kit
- New *Journal of Construction Innovation*
- NOVA Award nomination form/instructions
- Membership and banquet ticket forms

The CIF website includes these items.
This web page describes the 4 NOVA Award Winner innovations and the 4 other NOVA Award Finalist innovations for 1999. Thumbnail illustrations produce enlarged illustrations when clicked. Other Winners are shown for each of the 9 prior years.
This is the input page for the searchable database of innovations nominated for the NOVA Award.
The keywords “precast concrete” have been input for this example search. They are shown underlined in red here, for emphasis.
Click on the “Find” button and receive the next page in the browser that shows all of the nominated innovations that relate to precast concrete.
21 PRECAST CONCRETE NOMINATIONS

- This shows the 21 innovations in the database that relate to the keywords “precast concrete.”
- We can click on the title of any of them to receive its description.
- For example, we can click on “CON/SPAN Concrete Arch-Box,” here shown underlined in red for emphasis, to receive its description in our browser, as shown in the next slide.
CON/SPAN CONCRETE ARCH-BOX

This is description of the CON/SPAN Arch-Box Modular Bridge System, as shown in a browser window.

The name and address of the person to contact for further information on the innovations is also shown.

The database has descriptions and contacts for all 357 innovations nominated, all searchable by keyword.

This is a unique resource of construction innovations.
### Innovations in Nominations

These are the number of nominations that are retrieved from the 360 Nominations in our searchable database when they are searched for the keyword shown.

For example

- 52 Nominations describe themselves as safety related.
- 46 Nominations are described as quality related
- 77 Nominations are described as cost related.
- 48 Nominations are described as computer related.

<table>
<thead>
<tr>
<th>Keyword</th>
<th>Nominations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>52</td>
</tr>
<tr>
<td>Quality</td>
<td>46</td>
</tr>
<tr>
<td>Cost</td>
<td>77</td>
</tr>
<tr>
<td>Structure</td>
<td>92</td>
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<tr>
<td>Composite</td>
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<td>Concrete</td>
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<tr>
<td>Computer</td>
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<td>Soil</td>
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<tr>
<td>Plastic</td>
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<td>Seismic</td>
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<td>Human</td>
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<tr>
<td>Crane</td>
<td>17</td>
</tr>
<tr>
<td>Contractor</td>
<td>58</td>
</tr>
<tr>
<td>Owner</td>
<td>31</td>
</tr>
</tbody>
</table>
An innovation created by the CIF is the NOVA Award Mock Jury. This shows the Mock Jury web page at www.cif.org.

People on a Mock Jury read the descriptions of the innovations nominated for the NOVA Award. Then they meet and select the innovations they feel should be investigated, just like the real National Jury.

A complete Mock Jury Kit can be downloaded free from the CIF website for any Mock Jury.

Mock Juries have been held at the University of Michigan for several years. Others have been held at the University of California at Berkeley, Purdue University, University of Florida, and University of Texas, that we know of.
The CIF is launching an electronic Journal of Construction Innovation, freely accessible at the CIF website by anyone in the world. The CIF freely permits and encourages copying and distribution of papers in the Journal.

This shows the first Journal paper, which is a short description and the name and address of a contact for each of the innovations nominated for the 2000 NOVA Awards.
**BENEFITS OF INNOVATION**

- Improve quality & decrease cost of your projects
- Owner core business benefits from cost and quality improvements of suppliers and customers
- Improves our construction industry
  - Makes us look better
  - Makes our work more fun
  - Attracts good people
These are the NOVA Award Winners of 1990, the first NOVA Awards, which are an example of benefits of innovation in construction.

- **F-Number System** specifies and measures concrete slab flatness
  - Has upgraded concrete slab quality, which benefits all owners who build concrete slabs.
  - Better equipment has been developed to meet the specification, the Somero Laser Screed in particular.
  - Benefits contractors, concrete suppliers, architects, engineers

- **U.S. Post Office Kit of Parts** provides flexible, modular design for post offices.
  - U.S. Postal Service benefits as owner
  - Everyone benefits from better, less expensive, quickly constructed post offices.

- **Mt. MacDonald Tunnel Ventilation**: Fans and gates ventilate diesel locomotive heat and exhaust in a 9 mile uphill tunnel through the Canadian Rocky Mountains.
  - Ventilation system increased Canadian transcontinental capacity 30 %
  - Broke the bottleneck of transcontinental rail travel in Canada.
  - Benefits the Canadian Pacific Railroad as owner, and everyone else.
  - Interesting project for Parson Brinkerhoff engineers and others.
**Owner’s Role in Innovation**

- Construction innovation primarily benefits owners
- If owners don’t demand innovation, little will occur
- All too little occurs now
  - 8-12% of U.S. GNP is construction
  - Construction invests 0.5% of gross in R&D (vs 2-15% in other industries)

- Construction innovation primarily benefits owners
  - Contractors, labor, architects, engineers feel they benefit very little from innovation
- If owners don’t demand innovation, little will occur
- All too little occurs now
  - Construction is 8-12% of U.S. GNP
  - Construction invests 0.5% of gross in R&D (vs 2-15% in other industries).
  - Most of the 0.5% is in construction materials, not construction processes.
DTE Energy’s construction innovation program is an example for owners.

Inspired by and largely built around DTE Energy involvement in CIF

It involves DTE top management, including managers of power plants and DTE Energy President and CEO

DTE Energy evaluates contractor innovation program as part of contractor selection process. It requires its major contractors to have an innovation program.

DTE Energy has implemented an extensive supply side management program for all procurement, including construction. Construction procurement includes a computerized contractor evaluation system.

DTE Energy has developed partnering with major contractors as part of its supply side management program.

DTE Energy estimates it has invested $320,000 in CIF, including volunteer’s time (particularly CIF Chair Roger Lane).

DTE Energy savings and quality from its Construction Innovation program have been substantial. It saved $200,000,000 on just one recent large project.
YOUR INNOVATION PROGRAM

- Find, develop, and use innovations
  - Steal with pride
- Require contractor/vendor innovation
  - Like safety and quality programs
- Recognize innovations on your projects
  - Create an award or nominate for NOVA Award
- Support Construction Innovation Forum
  - CIF member / sponsor & attend Banquet
The Construction Innovation Forum is a grass roots non-profit organization made up of people, companies, companies, and associations from the full breadth of construction.