

2007 Research Grant Awards: Summary

Grantee	Topic	Grant Amount
San Diego State University	Improved Tolerance Management in Concrete Construction	\$140,000
University of California Berkeley	Performance-Based Seismic Design Guidelines for Tall Buildings	\$250,000
Applied Technology Council	Development of Industry Foundation Classes (IFCs) for Structural Components	\$400,000
Construction Specifications Institute Foundation	GreenFormat: Sustainable Product Reporting Guide	\$153,000
University of Arizona	Development and Design of Precast Concrete Diaphragm Systems: CPF Supplement	\$305,000

2007 Research Grant Awards: Details

Title: Improved Tolerance Management in Concrete Construction

Grantee: San Diego State University

Grant Award: \$140,000

Period: September 2006 - October 2009

P.I.: Professor Colin Milberg

Industry Champion: Eldon Tipping, Chair, ACI Committee 117 and Fellow, ACI

Research Purpose: To address the need for quantum-level improvements in the design, specification, and construction of cast-in-place concrete and its interfaces with other elements as related to dimensional tolerances.

Deliverable: A proven, pilot-tested protocol that identifies standard construction process capabilities (CPC) for dimensional properties of CIP elements using statistical distribution of dimensional variations, accompanied by an online data base and a manual of practice that will enable practitioners to apply the resulting new ACI 117 Standard.

Title: Performance-Based Seismic Design Guidelines for Tall Buildings

Grantee: University of California Berkeley

Grant Award: \$250,000

Period: September 2007 - August 2009

P.I.: Professor Jack Moehle

Industry Champion: Ron Klemencic, President, MKA Associates and Member, CPF Advisory Council

Research Purpose: To develop performance-based seismic design guidelines, ready for adoption by local jurisdictions and code-writing organizations, to facilitate the rapid acceptance of tall buildings in seismically active regions designed by alternative procedures.

Deliverable: A Final Report, documenting the final results of the research project, to include: a summary of the activities of the working group; findings of the trial designs; a comment log documenting disposition of all comments received from the community; final design guidelines, and specific building code change proposals on topics such as modeling, selection and scaling of ground motions, and determination of design values.

Title: Development of Industry Foundation Classes (IFCs) for Structural Components

Grantee: Applied Technology Council

Grant Award: \$400,000

Period: October 2007 - March 2010

P.I.: Chris Rojahn, ATC

Industry Champion: Board of Directors, Applied Technology Council

Research Purpose: To develop an extended set of IFCs for Structural Components for inclusion in the International Alliance for Interoperability (IAI). The project outcomes will improve productivity in the design and construction industry by developing a basis for incorporating and integrating structural design codes, analysis tools and methods into the IFCs of the IAI effort.

Deliverables:

- a. A User Requirements and Business Processes Report that will cover the set of specific business processes; user and data exchange requirements, and practical guidance for applying the IFC supported business processes.
- b. A Structural Model View Definitions Report that will define the new IFC extensions and how they are integrated into the IFC data model, including a data set with specific data-elements required for structural engineering data exchanges, to enable rapid implementation of the capability into industry software.
- c. A Validation Test Report that will describe the IAI testing program, conducted against the IFC Structural Model View implemented in software, to include certification that the Structural Model View data is correctly implemented.
- d. A Final Report providing a comprehensive overview of the Deliverables for all stakeholders and users of the research, to include implementing procedures and certifications that the procedures are suitable for adoption and use in building design and construction practice.

Title: GreenFormat: Sustainable Product Reporting Guide

Grantee: Construction Specifications Institute Foundation

Grant Award: \$153,000

Period: November 2007 - March 2009

P.I.: Mr. Roger Grant

Industry Champions: CSI; USGBC; Building Green, Inc.; and NIBS

Research Purpose: To complete the development and fielding of GreenFormat, a new CSI Format for presenting structured product data about sustainability for the purpose of evaluation and specification of building products. The project will produce an industry standard reporting format and a database-driven website for manufacturers to list, and for construction professionals to find, sustainable performance data on building products.

Deliverables:

- a. A standard reporting format for manufacturers concerning environmental claims, and other environmental attributes based on accepted standards and certifications.
- b. A web interface that allows manufacturers to self-complete and update GreenFormat for their product(s), with open access to completed product data forms for building teams to use when selecting and evaluating products.
- c. A relational database for storing manufacturer product data with specific modules for key product categories built on the framework of CSI MasterFormat 2004 Edition.
- d. Usage guidelines, procedures and a support system to enable manufacturers to readily provide product information and help users understand the information.
- e. An ongoing operation that promotes the open use of the GreenFormat by designers and the listing of product information by manufacturers, to include the marketing, maintenance and management of the process.

Title: Development and Design of Precast Concrete Diaphragm Systems: CPF Supplement

Grantee: University of Arizona

Grant Award: \$305,000

Period: November 2007 - March 2009

P.I.: Prof. Robert Fleischman

Industry Champions: PCI and the PCI DSDM Task Group

Research Purpose: To extend and complete the tasks required to finish the 4-year, \$2-million-plus project that will support final design guidelines for the design and construction of robust, non-proprietary precast concrete diaphragm systems comprised of topped and untopped double tee units and a combination of ductile and strong connectors for application in seismic zones. Tasks to be accomplished under this grant include: construction and testing of 1/2-scale specimens at the UCSD shake table; broadening the study scope to a topped composite system as well as an untopped system; extending the demonstration and design procedure of these systems to all seismic hazards; producing three-dimensional nonlinear dynamic earthquake simulations of prototype structures; producing adaptive, computer analysis driven, experiments of critical joints from the untopped diaphragm systems to evaluate the emerging design procedure; half-scale isolated tests of details from the diaphragm systems to calibrate/verify shake table test information, and delivery of formal technology transfer mechanisms not previously intended.

Deliverables: A Final Report covering comparison of analytical results to shake table test results; comparison of half-scale results and hybrid results to shake table test results; a cost study, and finally the final precast concrete diaphragm system design procedure document, in sufficient detail to attain building

code adoption and to allow a knowledgeable engineer to replicate the design using this deliverable as the sole source of technical information.