

# Research Grants

for Academic Year 2018-2019

## RESEARCH GRANTS

Full-time faculty of engineering or engineering technology programs of Canadian universities and colleges are invited to apply for research grants offered by the Canadian Institute of Steel Construction. Grants are awarded for research during the 2018 - 2019 academic year on subjects judged to be of value in advancing the use of steel in construction. Grants to a total value of up to \$100,000 will be announced by June 1, 2018. Each grant is awarded for a one year period. Grants are awarded at the discretion of the CISC Research Committee on the merits of the applications received. In addition, the principal researcher of the highest ranked proposal will receive the H. A. Krentz Research Award and a gift of \$5,000. The recipient will be invited as a guest of the CISC to accept the H.A.Krentz Research Award at the CISC Canadian Steel Conference which will be held in Halifax, NS, from September 19-21, 2018.

**Applications shall be received no later than Monday April 2, 2018** and should be submitted electronically in PDF format to:

Maura Lecce, Ph.D., Research Grant Manager  
Canadian Institute of Steel Construction  
mlecce@cisc-icca.ca.

### Late submissions will not be accepted.

Descriptions of some suggested research topics and conditions pertaining to the award of grants are given herewith.

### SOME SUGGESTED TOPICS (NOT PRIORITIZED)

Applications for topics not listed are also encouraged and will receive equal consideration, including applications for support of projects not on the list. *More than one research proposal may be suggested by some of the listed topics.*

- 1) CONNECTIONS SUBJECT TO COMBINED LOADING  
Design guidelines, verified by experimental testing, are needed in CSA S16 for determining the resistance of various connections subject to combined loading. This work would consolidate and build on experimental results from past Canadian and US research programs.
- 2) DUCTILE SEISMIC CONNECTIONS FOR CONVENTIONAL CONSTRUCTION  
Research is required to establish minimum ductility design criteria for connections of primary framing members of seismic load resisting systems used in Conventional Construction.
- 3) BEAMS REINFORCED UNDER LOAD  
Designers are asking for guidance on predicting the resistance and deflection of reinforced beams (reinforced with cover plates or other steel). The effects of reinforcing beams while under load and effects of welding on the strength of the member should be considered. Also, the evaluation of the strength and serviceability performance of wide flange beams reinforced asymmetrically is required.
- 4) HSS JOINT WELDING  
Branch to chord weld connections are difficult to detail, cut, fit and weld. Details for gapped and overlapped joints present even more difficulties. Research is required to investigate ways to reduce welder skill requirements, reduce cutting difficulties, minimize requirements to weld under adjacent branches and accommodate variations in fit up.
- 5) ASSEMBLIES THROUGH THERMAL BREAKS  
Research is required to determine the structural performance of steel assemblies involving thermal breaks. This work would extend and build on the recent US research programs.
- 6) ECONOMICAL INNOVATIVE LOW-STOREY HEIGHT SOLUTIONS  
Research is required to develop innovative steel floor solutions which would allow two-way systems and minimize storey height. Consideration should be given to constructability and fabrication requirements.
- 7) IMPROVED EVALUATION METHODS FOR FATIGUE LIFE AND TOUGHNESS OF STEEL BRIDGES  
There are thousands of steel bridges that were built before structural grade steels had minimum toughness requirements that would meet current requirements. As these steel bridges age, the probability of fatigue cracks forming increases, which also increases the demand for fracture toughness. Reliability-based methods to assess the impact of lower fracture toughness on the safety of these bridges are required.
- 8) SFRSs FOR REGIONS OF LOW AND MODERATE SEISMICITY  
There is an ongoing need for innovative Seismic Force Resisting Systems that will keep steel competitive with all other framing materials in regions of low and moderate seismicity. Consideration should be given to simplified design rules, fabrication requirements, handling and erection.

## 9) MODULAR STEEL CONSTRUCTION

There is a need for research on innovative, generic modular structural steel systems that will keep steel competitive. Consideration should be given to constructability, fabrication requirements, handling and erection.

## 10) GALVANIZED STEEL IN SEISMIC APPLICATIONS

Research is required to determine the effects of galvanizing on structural steel material properties and their impact on ductility for seismic applications.

### CONDITIONS PERTAINING TO AWARD OF CISC RESEARCH GRANTS

1. In keeping with the CISC's mandate to support the development of expertise, knowledge and innovation in steel design and construction while maximizing the benefits to the steel industry as a whole, CISC Research Grants shall not be used for the development of patentable products or systems.
2. Funds will be paid to the University or College, to be held in trust. Unless otherwise agreed upon, payment will be made in equal quarterly installments commencing September 15, 2018. The 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> payments will be made upon receipt of the progress report from the previous quarter (see Item 5). **No payments will be made after April 30, 2020.** It is assumed that a portion of the grant normally will be used for a research fellowship for a post-graduate student and, as such, the CISC does not entertain inclusion of overhead charges in applications for Research Grants.
3. Acceptance of an award constitutes an agreement to undertake and complete the research project described in the application. Unless otherwise agreed upon, the CISC is not obliged to provide supplementary funds nor to donate material and/or supply equipment.
4. The Research Committee of the CISC shall appoint a Project Coordinator for each project to provide liaison between the Project Director (applicant) and the Committee and to assist the Project Director when necessary.
5. During the course of the work, the CISC shall be provided with progress reports in PDF format covering the first, second and third quarters of the period in which the research is underway. Progress reports normally will be submitted December 15, March 15 and June 15. It is expected that the first progress report will include an evaluation of the existing literature. The progress report shall be sent to the Research Grant Manager of the CISC.
6. Upon completion of the work, the CISC shall be provided with a final detailed report in PDF format. In cooperation with the Project Director (applicant), the final detailed report or contents thereof may be used for CISC publication purposes (eg., CISC web site, Advantage Steel magazine). The detailed report shall be sent to the Research Grant Manager of the CISC.
7. Where a computer program is developed as a major part of a CISC-sponsored project; the CISC shall be supplied a copy of the source code and any resource files or libraries necessary to compile and

link the program. The CISC shall also be supplied with sufficient documentation to allow easy use of the program including a sample problem with printed output. The program source code must contain fully identified data structures, variables, functions and logic.

8. Grants are awarded for a period of one year only. Award of grants in succeeding years for additional phases of projects will be subject to approval each year. Projects intended as one phase of a larger project extending over a period of more than one year shall be so identified in the application.
9. The Project Director (applicant) may prepare a paper, or papers, based on his research and submit same for publication in an appropriate engineering journal (e.g. Canadian Journal of Civil Engineering) or equivalent publication. Should a paper not be prepared within six months of receipt of the final report, the CISC may, at its option, request the recipient to prepare a paper suitable for publication.
10. The recipient of the H.A.Krentz Award may be asked to write an article about their research for publication in CISC's Advantage Steel Magazine and/or the CISC website.
11. Research grant applications, progress and final reports, in cooperation with the Project Director (applicant), may be shared with other national and international steel construction organizations.
12. The following information shall be included in the application (max. 4 pages preferred, not including Curriculum Vitae):
  - \* Name of Applicant (Project Director).
  - \* Name of university/college and relevant faculty, department, etc.
  - \* Position of applicant.
  - \* Title, Scope and Objectives of proposed research project.
  - \* Description of how the proposed research advances the use of steel in construction and the potential benefits to the steel industry.
  - \* Brief description of general procedure to be followed, including personnel, equipment, specimens, etc., likely to be required.
  - \* Proposed time schedule.
  - \* Funds to be provided by other sponsors, if any. In particular, applicants are encouraged to indicate how the CISC Research Grant and possible in-kind Contributions provided by others in the steel industry might be used to partner additional funding from federal or provincial granting agencies.
  - \* Amount of money requested, with a brief statement of anticipated disbursements.
  - \* A statement signifying that the conditions pertaining to award of CISC research grants (as stated herein) are acceptable to the applicant.
  - \* Curriculum Vitae of applicant, as an Appendix to the application. (NSERC-format CV is acceptable).