



Canada's Capital University

ANNOUNCEMENT

2018 SHORT COURSE ON BLAST-RESISTANT STRUCTURAL DESIGN

MAY 10-11, 2018
FACULTY BOARD ROOM
2014 MINTO CENTRE
CARLETON UNIVERSITY

Department of Civil and Environmental Engineering

Instructors

The course instructors have a wealth of experience in explosion effects, blast hazard assessment, structural dynamics and blast-resistant design. They are members of the Carleton Centre for Infrastructure Protection, Security, and Resilience (CIPSeR) and conduct experimental investigations of blast effects on critical infrastructure systems. They are also members of the CSA technical committee on blast resistant buildings.

Course Topics

Chemical explosives and explosions, blast load-structure interaction including blast loading of buildings, single-degree-of-freedom dynamics, blast-resistant design of reinforced concrete and structural steel structures, performance criteria for blast resistant structures in accordance with CSA 850-12.

Venue

The 2018 short course on "Blast-Resistant Structural Design" will be held in the Faculty Board Room, 2014 Minto Centre on the Campus of Carleton University—Canada's Capital University.

Who Should Attend

The short course on blast-resistant structural design is designed for engineers and project managers in need of an understanding of explosion effects, blast resistant design, and building response to and performance under blast loading. Design professionals in the fields of blast protective design against terrorist threats or in the petrochemical (oil & gas) industries will find this course very useful. Architects, first responders, and building design/construction professionals will also benefit from this course, especially aspects of the new and first Canadian Standard on blast (CSA 850-12: Design and assessment of buildings subjected to blast loads).

Registration

Regular registration:	\$950.00
\$840.71 +13%HST (\$109.29)	
<input type="checkbox"/> Parking for 2 days (\$17.70+ 13%HST(\$2.30)	\$20.00
Total Payment	\$
Registration at the door:	\$1250.00
\$1106.20 +13%HST (\$143.80)	

For online registration visit
[blast-resistant-structural-design](http://www.carleton.ca/conferenceservices/blast-resistant-structural-design)

If you would like to register with money order or bank draft complete the payment form below and mail to the address provided. Indicate "2018 Blast Course" on draft.

Payment method:

Cheque Money order Bank draft

Name: _____

Address: _____

Email Address: _____

Make cheques payable to **Carleton University** and mail to:

Civil and Environmental Engineering
3432 Mackenzie Building,
1125 Colonel By Drive
Ottawa, Ontario
K1S 5B6

Accommodation

For accommodation information visit
www.carleton.ca/conferenceservices/

www.ottawahotels.com

[http:// www.carleton.ca/elerg/](http://www.carleton.ca/elerg/)



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PROGRAM

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Thursday May 10, 2018

0730 – 0830 **Arrival/Registration**

0830 – 1000 **Session 1A**

Housekeeping

Introduction to blast-resistant design

Stand-off distance vs. Explosive charge mass

Blast threat risk assessment

Overview of CSA 850-12

1000 – 1030 **Coffee Break**

1030 – 1200 **Session 1B**

Chemical explosives, classification, initiation, TNT-equivalence, explosion effects, blast load categories, incident and reflected blast, blast wave parameters calculation

1200 – 1300 **Lunch Break**

1300 – 1460 **Session 1C**

Blast load-structure interaction: Contact/Near contact, close-in and far-field loading

Front face loading, blast clearing, stagnation pressure

Side wall and roof loading, back face loading, net loading on structure

1430 – 1500 **Coffee Break**

1500 – 1630 **Session 1D**

Single-degree-of-freedom analysis of structures: D'Alembert's principle, dynamic equation of motion, free and forced vibration, harmonic forced vibration, forced vibration to generalized loading, Duhamel integral, response to triangular loading (blast load)

1630 – 1700 **Hands on exercise**

Friday May 11, 2018

0730 – 0830 **Arrival/Registration**

0830 – 1000 **Session 2A**

Equivalent SDOF analysis of structural elements, SDOF analysis of nonlinear systems, pressure-impulse diagrams for elastic system and elasto-plastic systems

1000 – 1030 **Coffee Break**

1030 – 1200 **Session 2B**

Design and analysis of reinforced concrete elements subjected to blast loading:

Concrete and steel reinforcement behaviour under high strain rates (DIF), Reinforced concrete section properties, Resistance function, Response limits

1200 – 1300 **Lunch Break**

1300 – 1430 **Session 2C**

Design and analysis of structural steel elements subjected to blast loading:

Structural steel behaviour under high strain rates (DIF)

Structural steel section properties

Resistance function

Response limits

1430 – 1500 **Coffee Break**

1500 – 1630 **Session 2D**

Performance criteria, building level of performance, and response limits for structural members in accordance with CSA 850-12

1630—1700 **Hands on exercise**