

Course: Blast-Resistant Structural Design

Lecturer: Eric Williamson, Ph.D., P.E.

Date: 14/05/2018 – 18/05/2018

Classroom: 1-17 @ IUSS

Course schedule

Week	Date	Lecture hours	Tutorial hours	Subject	Tot h
		From____ To____	From____ To____		
1	14/05/2018	09:00-12:00 14:00-17:00		Introduction and Blast Phenomenology	6
	15/05/2018	09:00-12:00 14:00-17:00		Blast Effects Against Structures	6
	16/05/2018	09:00-12:00 14:00-17:00		Structural Response to Blast Loads and Performance of Cold-Formed Steel Components to Blast	6
	17/05/2018	09:00-12:00 14:00-17:00		Structural Response of Steel and RC Structures to Blast	6
	18/05/2018	09:00-12:00		Progressive Collapse of Structures	3

Brief Contents Description and Course Syllabus:

BACKGROUND

Blast loads resulting from acts of terrorism or accidental explosions can be an important design consideration for critical infrastructure. Disaster resiliency has received much attention in recent years and refers to the ability of a building (or community) to resume full functionality following an extreme event. Because buildings, bridges, and other structures play critical roles in providing emergency response, essential services, and shelter, and because of the significant economic costs and potential loss of life associated with building damage or collapse, design for blast loads or other extreme events is essential when evaluating the performance of structures. This course will describe the phenomenology of blast loads and how these types of loads affect structures. Analysis and design guidance will be presented to ensure that structures can be designed to safely mitigate such loads.

OBJECTIVES OF THE COURSE

The main objective of this course is to familiarize students with the current state-of-practice in blast-resistant structural design. Additionally, advanced topics representing the current state-of-the-art will be presented. At the end of the course, students should be able to:

- Determine the variation in pressure as a function of time for a given blast scenario.
- Compute the dynamic response of blast-loaded structural components, accounting for nonlinear effects.
- Identify response limits and failure modes associated with blast-loaded structural components.
- Size structural components to achieve a prescribed level of performance for a given blast scenario.
- Recognize parameters influencing structural performance in different progressive collapse scenarios.