

Organized by the University of Western Australia and the GexCon Australia

Supported by Structures Panel, Engineers Australia WA Division



Explosion Modelling and Blast Resistant Design and Analysis Short Course

**Monday and Tuesday, 17-18 October 2011, 9:00 A.M. – 5:30 P.M.
Seminar Rm 3, Uni Club, the University of Western Australia**

Dr. Madhat Abdel-jawad, President, GexCon Australia

Prof. Hong Hao, Winthrop Professor, The University of Western, Australia

Dr. Prankul Middha, Senior Research Engineer, GexCon



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Course Program

Session	Title/Theme (Duration)	Contents	Time
Day 1			
1:1	Introduction (30 minutes) HH & MA	<ul style="list-style-type: none"> • Overview Explosion (MA) • Explosion Case Histories: Previous Explosion Cases (MA) • Overview of Blast Loads and Structural Response (HH) • Earthquake Vs Blast Design (HH) 	9:00 am – 9:30 am
1:2	Explosion Effects (60 minutes) HH	<ul style="list-style-type: none"> • Blast wave • Explosion types and scaling • Blast loads on structures • Blast loads behind a barrier • Internal explosion 	9:30 am – 10:30 pm
Morning Tea Break 10:30 am – 10:50 am			
1:3	Explosion Fundamentals (100 minutes) MA	<ul style="list-style-type: none"> • Combustion mechanisms, • Fuel reactivity, • Positive feedback mechanism, • Effect of geometrical aspects, • Explosion tests 	10:50am- 12:30 pm
Lunch Break 12:30 – 13:30 pm			
1:4	Structural Response Analysis and Design (100 minutes) HH	<ul style="list-style-type: none"> • Fundamental Structural Dynamics – Lumped mass Vs Continuum models • SDOF simplification – shape function, resistance function • Dynamic increase factor • Elastic analysis, elastic-plastic analysis • SDOF response charts – UFC 3-340-02/TM5-1300 • Analysis and design examples 	• 13:30 pm – 15:10 pm
Afternoon Tea Break 15:10-15:30 pm			
1:5	Explosion Risk Analysis (60 minutes) MA	<ul style="list-style-type: none"> • Worst case, • Case study, • Advantages/disadvantages 	• 15:30 pm – 16:30 pm
1:6	Explosion modelling (60 minutes) MA	<ul style="list-style-type: none"> • Explosion modelling, • Why simple models do not work, • CFD, • FLACS 	• 16:30- 17:30 pm
END OF DAY 1			

Session	Title/Theme (Duration)	Contents	Time
Day 2			
2.1	Numerical Modelling of Structural Responses (90 minutes) HH	<ul style="list-style-type: none"> Structural FEM modelling Formulations: explicit, implicit, Lagrangian, Eulerian Material models for blast effects: concrete, steel, soil, rock, masonry, polymers Examples: RC columns and RC slabs with or without FRP strengthening, Masonry walls, Cable-stayed bridge 	<ul style="list-style-type: none"> 9:00am-10:30 am
Morning Tea Break 10:30-10:50 am			
2:2	P-I curves for structural response assessment (80 minutes) HH	<ul style="list-style-type: none"> P-I curve definition P-I curves of reinforced concrete columns with or without FRP strengthening P-I curves for concrete slabs with or without FRP strengthening 	<ul style="list-style-type: none"> 10:50 am – 12:30 pm
Lunch Break 12:10 –13:10 pm			
2.3	Ignition Sources (30 minutes) MA	<ul style="list-style-type: none"> Mechanical ignition sources, Static electricity, Electrical ignition sources, Statistics 	<ul style="list-style-type: none"> 13:10 pm – 13:40 pm
2:4	Blast mitigation and control (50 minutes) MA	<ul style="list-style-type: none"> Layout, Use of explosion venting devices, Effect of waterspray, Escalation: Loading on equipment and piping, Passive fire protection 	<ul style="list-style-type: none"> 13:40 pm – 14:30 pm
2:5	FLACS (60 minutes) PM	<ul style="list-style-type: none"> Dispersion with FLACS Pool spread 	<ul style="list-style-type: none"> 14:30 pm-15:30 pm
Afternoon Tea Break 15:30 –15:50 pm			
2:6	Practical session (90 minutes) PM	<ul style="list-style-type: none"> Demo of FLACS Dispersion / explosion calculation 	<ul style="list-style-type: none"> 15:50 pm – 17:00 pm
2:7	Q&A (30 minutes)	<ul style="list-style-type: none"> Questions and Answers Close 	<ul style="list-style-type: none"> 17:00 pm-17:30 pm

Any question regarding this short course please direct to

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Dr. Madhat Abdel-jawad,

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Tax Invoice / Registration Form (ABN 37 882 817 280)

Registration fee: \$1000.0 per person (including GST)
Registration also covers morning and afternoon tea breaks, lunches and course materials

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School of Civil and Resource Engineering
The University of Western Australia
35 Stirling Highway, Crawley, WA 6009
Tel: 61-8-6488-3092 or 61-8-6488-2446
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Attention: Ms Selynn Chan or Alison Walker at office@civil.uwa.edu.au

For catering purpose, please send in your registration before 10 October 2011