MACE61054: Explosion Engineering

Schedule week 9 (May 14, Monday) – week 12 (May 6, Tuesday)

	Monday	Tuesday
week 9	projects announcement with introduction	no lecture, office hour (Pariser/B14, 9am-11am)
week 10	no lecture, office hour (Pariser/B14, 12pm-1pm)	no lecture, office hour (Pariser/B14, 9am-11am)
week 11	Tutorial assignment; lecture on Underwater Explosion	lecture on Underwater Explosion
week 12	lecture on Underwater Explosion	Tutorial solutions

Projects

Choose from the following suggested topics, or you can develop a topic in explosion engineering from the lectures.

1, Explosive demolition in nuclear decommissioning
2, Jetting angle, stand-off distance and detonation velocity for explosive welding
3, Shock expansion
4, Damage in solid propellants and its effect on deflagration-to-detonation transition
5, Hot-spot ignition of condensed phase energetic materials
6, Shock and blast mitigation though the energy absorbing of granular materials
7, Material design for shock mitigation
8, Stress waves scattered from a sudden debonded interface

You should submit a report of 4-5 pages for the project to the George Begg course work box by the end of week-12. The report contributes 15% to the final mark.

The report should contain

- an introduction of the topic (5 marks), and
- a case study (10 marks).

The total for the project is 15 marks.

You are encouraged to discuss the project with Dr. Tan, by emailing (henry.tan@manchester.ac.uk), office visiting (Pariser/B14), or going to the discussion Blog at http://imechanica.org/node/2979

Exam (contribute 70% to the final mark); Date: May 21

Exam questions are given based on lectures and tutorial questions.

Please check your lecture notes. You can download class notes from course website.

Topic: Physics of Explosions • Physics of Explosions – part I • Physics of Explosions – part II • Spalling and Fragmentation – part I • Spalling and Fragmentation – part II	 physics-I.pdf physics-II.pdf spall-I.pdf spall-II.pdf
Topic: High Energy Rate Processes • Energy Related Materials • Explosive Welding	 energy.pdf welding.pdf
Topic: Underwater Explosion	underwater.pdf (to be uploaded)