Imperial College London

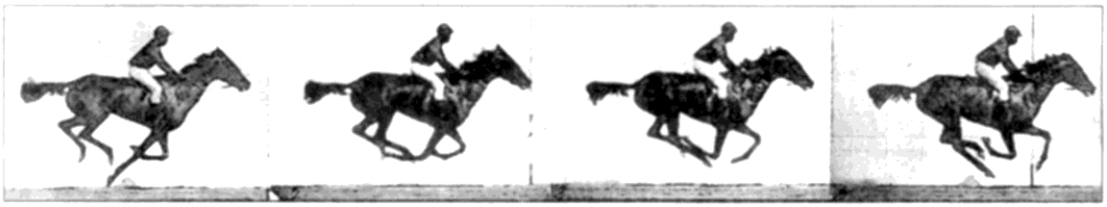
AWE

INSTITUTE OF SHOCK PHYSICS

Introduction to DYNAMIC PHENOMENA

A three day short course, given by Dr. W G Proud, Director of the ISP

Aim: An introductory course suitable for scientists and engineers who are new to, or who wish to broaden their knowledge of, the field of the dynamic behaviour of materials.



One of the most famous high-speed photographic sequences. A horse galloping, taken by Edward Muybridge in California (1870's). A technical breakthrough in its day; modern cameras can take images with sub- nanosecond exposure.

SUBJECTS

Background:
the history of shock waves, asteroid impact, natural explosions, blast waves.

Explosive Compositions and Detonation:
Detonation, deflagration, initiation, ignition; Propellants and pyrotechnics; High explosives, primary and secondary explosives, thermal explosion theory; Modern explosives and their applications; Detonation processes.

High-speed Photography, Experimental Methods, Ballistics:
Photoelasticity, caustics, moiré, speckle, shadowgraph, schlieren; Gauges, X-rays techniques; Effects of strain rate; Hopkinson bar; Taylor test; Plate impact; Adiabatic shear, experimental observations of shear localisation; The Culver criterion; Classification of impacts; Ballistic mechanisms; Shaped charge jets; Hydrodynamic penetration; The demise of the Shoemaker-Levy comet; The death of the dinosaurs.

Shock Waves:
Shocks in materials with strength - the Hugoniot elastic limit; Brittle processes; Glasses, ceramics, geological materials; Ductile processes, metals; Equations of State and Shock-induced transformations - EoS for gaseous explosive products; Hydrodynamic solids; Mie-Gruneisen's equation; Shock-induced temperature; Phase transitions; Demonstrations.

Hydrocodes and characteristic codes for modelling shock problems:
Lagrangian and Eulerian hydrocodes; Application of modelling and experimental work to real applications.

Date: Proposed W/C 10th September 2012
Venue: Likely to be Imperial College London, depending on interest expressed.

Express your interest by **July 12th 2012 – space will be limited.**
Please contact Eva Gledhill e.gledhill@imperial.ac.uk at the Institute of Shock Physics, ICL.

ISP Students and ISP Associates free of charge
Students £200/Non-ISP Associated Academics £400/Non-ISP Associated Industry attendees £1000