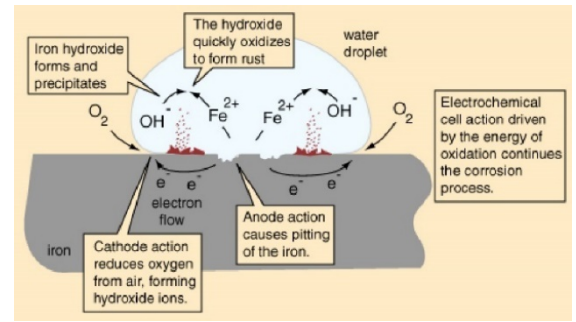




DR. GWÉNAËLLE PROUST *BE(Fr) ME(USA) PhD(USA)*

- Senior Lecturer, Faculty of Engineering and IT, at the University of Sydney.
- Gwénaëlle has written numerous journal articles on various metals and the mechanics of materials.



WORKSHOP SUMMARY

The construction industry in Australia today is going through major changes especially in light of imported building products. Engineers are therefore not only having to design structures but also now be aware of the potential variance in material properties of the construction materials used in their design. In particular, structural steels being imported into the country often vary in their chemistry and material properties compared to Australian steels.

This workshop will allow both structural and mechanical engineers to fully understand the chemical, physical and structural properties of steels and the alloys that are included within them. The course will then address the potential failure of these metals with regards to fatigue, fracture and corrosion.

Tutorial exercises (and solutions) will follow at the end of each session.

PROGRAMME (8.30 - 9.00 Zoom invite link will be emailed)

9.00 - 11.00 Session 1

- IRON, CAST IRON AND STEEL PROPERTIES

- Stages of the production of iron and cast iron and how these differ from the production of steel
- Atomic and crystalline structure of metals (including the effects of atom position and bonding), BCC vs FCC
- Typical stress strain curves for various steel types
- Elastic Modulus, Yield Strength, Strain Hardening, Ultimate Tensile strength, Ductility, Necking and Fracture.
- Tutorial

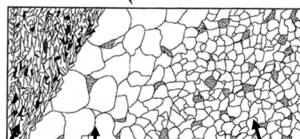
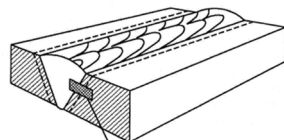
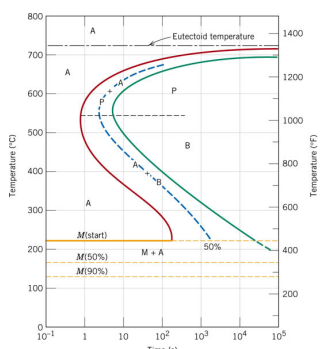
11.00 - 11.15 Morning Break

11.15 - 1.00 Session 2

- PHASE DIAGRAMS, SOLIDIFICATIONS AND DEFECTS AND TEMPERATURE TREATMENTS

- Phases that constitute steel (eg austenite, ferrite, cementite, bainite, martensite) and the different types of microstructure components that can be present (pearlite, bainite)
- Types and effects of various alloys (eg Mn, Ni, Cr V, Co, Si)
- Effect of temperature treatments eg Annealing, Quenching and Tempering (which achieve specific types of phases and microstructure constituents such as martensite, bainite etc) which produce steels such as Q & T steels (eg Bisalloy) or outer core tempered reinforcing bars (N bars vs mesh).
- The properties and effects of defects, vacancies, grain boundaries, interstitial and substitutional atoms.
- Tutorial

1.00 - 1.30 Lunch Break



1.30 - 3.00 Session 3

- FRACTURE AND FATIGUE FAILURE OF METALS

- Elastic vs Plastic failure of steel with respect to deformation
- Fracture mechanics of metals (and how to measure it experimentally)
- Importance and determination of crack widths
- Interpretation of fatigue strength vs no of cycles graphs
- Methods of improving fatigue life in structures
- Determination of steel failure (ie yielding vs fracture)
- Tell tales signs of impending failure
- Tutorial

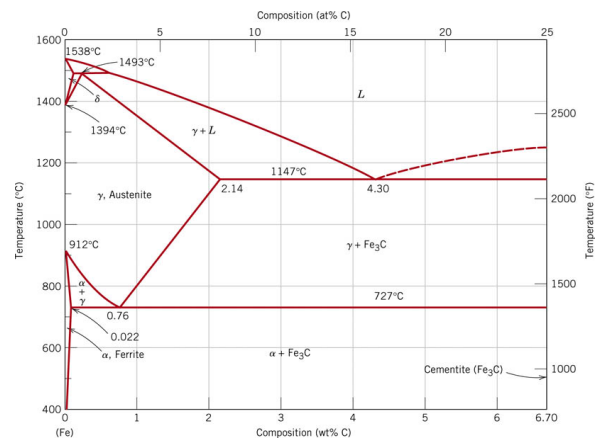
3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 4

- CORROSION OF METALS

- Ten corrosion mechanisms
- Anode vs cathode reactions
- Electron transfer processes, Faraday Law concepts
- Formation of ferrous hydroxides to ferrous oxide transformation
- Galvanic vs Cathodic protection of steels
- Passivation of steel
- Life expectancy of ferrous alloyed steels (marine vs non marine environments)
- Tutorial

Certificate of Attendances will be emailed



Live streamed via 

CALCULATORS REQUIRED

COURSE COST

- 1 day course – \$735 pp

DATES, VENUES & REGISTRATION

- Registration form (back of catalogue)
- Visit our website www.etia.net.au

FURTHER INFORMATION

- Office (02) 9899 7447
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- Email registrations@etia.net.au