

October Meeting Speaker– Colin Chipperfield M.A., Ph.D

Will speak on The Science of Fracture and Structural Failures



Everything contains cracks, flaws and defects. The good news is that they are innocuous unless the defect size and / or the local loading are sufficiently large.

The talk seeks to introduce the relationship between crack size, stress and a material property called ‘toughness’ to explain the behaviour of defects and the resistance of materials and structures to failure by fracture. Various materials and their fracture behaviour and performance are considered including steel, glass and carbon fibre

composites, aluminium alloys, diamond. Some key structural failures over the past 80 years will be discussed in detail as a means of illustrating the principles of fracture mechanics and the behaviour of defective structures under stress. These examples include:

- Liberty ship failures in the 1940s
- Early crashes of the Comet 1 aircraft (1954)
- Melbourne’s Kings Street bridge failure (1962)
- Gas pipeline failures
- Automotive windscreens
- Oceangate’s Titan submersible disaster on descent to the Titanic Wreck (2023).

Biography

- Bachelor, Masters & PhD degrees, Cambridge University, UK, majoring in Materials Science
- Over 50 years of experience in the conduct, management and implementation of R&D, innovation and commercialisation programs
- Author or co-author of over 50 peer-reviewed technical papers
- Extensive experience in senior research management positions both in the public and private sectors in the areas of manufacturing, steelmaking, mining, railway technology (including 17 years with BHP), nuclear science and engineering
- Extensive experience in developing and managing multi-disciplinary teams.
- Research management experience particularly in the areas of the steel development, metals manufacturing, the life extension and through-life cost reduction of materials and components (including, by way of example, welding and joining innovation and new surfacing technologies)
- Awards have included an Honorary Professorship at the University of Wollongong, an Adjunct Professorial appointment at the University of Swinburne and an Honorary Fellowship at the Welding Technology Institute of Australia (now Weld Australia).