

Research Seminar

A new analytical tool for quantitative process safety: *Friday 13th risk modelling*

Despite increasing predictive and control capability, everyone will have experienced one of those Friday 13th (*Fr 13*) days when everything seems to combine unexpectedly and cause failure; the idea is not new and appears universal in human experience.

In this seminar the fundamentals of *Fr 13* risk modelling, a new quantitative risk analysis, are introduced and illustrated with quantitative analyses of unexpected failure in a number of processes including: sterilisation, fermentation, Clean-In-Place, UV irradiation for potable water, large-scale coal-fired boiler plant and, deliberations of a jury in a criminal case. These processes are essential to the preparation and processing of a wide range of foods and pharmaceuticals and administration of justice.

A key insight of this original research is to show that an accumulation and combination of a series of stochastic (random) changes in otherwise well-operated and well-maintained parameters can lead unexpectedly in one-direction and leverage highly significant, and sometimes catastrophic, changes in process or product. Key findings are distilled into a general methodology.

Results are compared with current risk assessments and are shown to offer a number of practical surprises.

The benefits of *Fr 13* models and their exciting potential for coupling with existing software e.g. Aspen Plus® or Batch Process Developer® to provide more powerful design tools than are currently available, and; their use in targeted intervention strategies to improve safety, is discussed.

Mini Biography

Dr K R (Ken) Davey lectures in chemical engineering at The University of Adelaide. He is interested in practical risk assessments for engineering operations. Ken is a FIChemE, FAIFST and FIEAust and has won numerous awards for his published work including the: *John A Brodie Medal* for best paper (IEAust), *The J R Vickery Medal* (International Institute of Refrigeration), the *Premier's Science Excellence Award* (SA) and *SA Great Award* and *Jack Kefford Medal* for best paper (AIFST). His work was shortlisted for the IChemE 2012 *Awards for Innovation and Excellence*.

Ken's other contributions to research include a class of equations that bear his name for bacterial growth, death and survival.

SJTU:

时 间 : 4 月 19 日(周五)13:30

地 点 : 电院群楼 2-530