Foreword

The 2012 Structures and Composites Special Issue

Professor Glyn Davies CEng FRAeS

The theme of the papers in this special issue relate closely to the work and interests of Glyn Davies who recently fully retired from Imperial College. This brief resume presents aspects of his work and achievements during his time in the Aero-Structures section of the Department of Aeronautics.

Glyn joined Imperial as a Senior Lecturer in Aircraft Structures in January 1966 having previously worked in Liverpool University, Cranfield and MIT. He gained his PhD at the University of Sydney, Australia, in Aeronautical Engineering. At Imperial he rose to be Head of the Aeronautics Department from 1982 to 1989 and Pro-Rector (Resources) from 1997 to 1999. He served on many and various boards and committees during his academic career.

I had joined the Department three years earlier than Glyn, as an undergraduate on the three year aero-engineering course. In my final undergraduate year in 1963 the Aeronautics Department announced that it was starting a one year MSc course, with specialization either in Aerodynamics or in Structural Mechanics, and I eagerly enrolled. This was a time when the aviation industry was going through a difficult time with the cancellation of TSR2 and its intention to buy the American F-111 so the immediate prospects of a career in the aircraft industry was not good. However it was an exciting time to be in engineering as computers were just becoming accessible to university departments and the concepts of finite element methods (or energy methods as they were called then) were being developed. John Argyris was the Head of the Aero-Structures section assisted by Sidney Kelsey. Other lecturers on the M.Sc. course included Kevin Thomas, Peter Throsby, Anthony Chan, Ken Stevens and Peter Gasson. When Glyn joined the Department we were half way through the first M.Sc. course so I have not been formally taught by him but a great deal of what I know about aero-structures has come from him. I have a striking recollection of being in the Aero building and of walking behind a well built man dressed more in summer than winter clothes and thinking that this must be the new lecturer from Australia. This was the first time that I saw Glyn.

The Imperial Aero Structures group (together with the Swansea Civil Engineering group) were world leaders in finite element methods at the time and we lowly MSc students were very fortunate in having immediate access to their developing ideas. As time has shown, these ideas and methods were to revolutionise engineering design and analysis. Electronic computers were just beginning to be used as regular tools by engineering departments and both Glyn and I remember sending off rolls of punched paper tape in small white cardboard boxes with our

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latest programming efforts. The results came back the next morning. This delay was in some ways good in that it taught students (and staff!) to check and recheck their programs to avoid a wasted day by a silly mistake.

In 1968, following Professor Argyris's move to Stuttgart, Glyn became the Head of the Aero-Structures Section of the Department, and I was one of his first recruits. His vast practical and theoretical knowledge of all things structural meant that he could talk to any of the members of the structures staff with confidence, always giving suggestions and advice that was relevant and applicable. He monitored and guided me through the first few years of my time in the Department, holding regular meetings, exchanging ideas on dynamics and finite element methods and the use of computers for their calculation.

This led to one of our first significant collaborations. Glyn was invited by the National Engineering Laboratory to talk with like minded people about setting up a National Agency for Finite Element Methods and Standards – NAFEMS. He had suggested to the group that we would write a primer on the theory and practical use of finite elements. Glyn would address the theory for the first half and I would write the second. This was the origin of the NAFEMS Finite Element Primer. Glyn continued to work on the Steering Committee for many years and was responsible for designing and writing most of the range of benchmarks and the text book 'Background to Benchmarks'.

Composite structures became increasingly important in Glyn's time in the Department. The Centre for Composite Materials was set up within the College, based in the Aeronautics Department, headed up by Frank Mathews. Low velocity impact rigs for testing damage modelling were used by most if not all of the structures staff. Glyn set up a modelling and testing programme acquiring a high velocity gas gun. Being in the centre of London the energy of the gun was limited to give a maximum velocity of about Mach 0·8 with a realistic mass for a spherical steel ball.

During his time as Pro Rector, Glyn still liked to visit the Department to 'keep his hand in' and after retiring from full-time employment, returned to the Department as a Senior Research Investigator. By now I had also retired but continued to teach a dynamics course, and one day a week we met in the Department to continue our research collaboration. We investigated ways of modelling composite spars joined to composite skins with the aim of minimising failure, especially delamination failure, under a variety of configurations and loads. I believe that this was possibly the research time that Glyn enjoyed most at Imperial. For my part, I consider myself to have been extremely lucky to have such a close association with such an inspiring person. He pushed me in directions that I was uncertain I wanted to go but it always led me to very satisfying conclusions.

Dennis Hitchings

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