

# The University of Sheffield

## Degree Congregation, 24 July 1997

### David Edward Newland

Chancellor,

Werner Heisenberg, the eminent German physicist and Nobel Prize-winner, once said that “An expert is someone who knows some of the worst mistakes that can be made in his subject and how to avoid them”. David Newland is indeed an expert in his field of mechanical engineering, and his expertise helped to solve the mystery behind one of the worst industrial accidents in this country in recent years.

Early signs of an expert in the making were evident during his undergraduate years at Selwyn College, Cambridge: first class honours and the Rex Moir Prize in the Mechanical Sciences Tripos Part I; a distinction and the Ricardo Prize in Part II. He arrived at Imperial College of Science and Technology in 1964, via the English Electric Company and Massachusetts Institute of Technology, where he had gained a doctoral degree for his thesis on Nonlinear Vibration. Three years after his appointment as a lecturer at Imperial College, he was occupying the Chair of Mechanical Engineering here at Sheffield, at the age of thirty-one. In 1976 he returned to his Alma Mater as Professor of Engineering and last year was appointed Head of Department.

David Newland is one of the world’s leading experts in vibration engineering and its application to mechanical design. Much of his work has involved applications of vibration theory to railway and road-vehicle engineering and to the isolation of buildings from ground vibration. For many years he acted as a consultant to London Transport on vehicle dynamics, and to British Rail in connection with design aspects of high-speed trains. This work led to pioneering studies of noise and vibration transmission from roads and railways into buildings.

While he was in Sheffield, David Newland wrote a standard text on vibration engineering, entitled *An Introduction to Random Vibrations and Spectral Analysis*, which is now in its third edition. His other major work, *Mechanical Vibration Analysis and Computation*, was published in 1989. The emphasis in both of these books is on making numerical procedures accessible for problem-solving in engineering.

More recently, David Newland has turned his attention to vibration analysis by “wavelets”. Wavelet theory allows the changing frequency composition of non-stationary vibration signals, for example those comprising speech and music, to be studied. It also enables digitised data to be compressed for economical video and speech transmission.

Perhaps as a young man, David Newland saw episodes of the Perry Mason series, and was intrigued at the way in which the truth was extracted from occupants of the witness box. He could never have imagined that one day he himself would stand in the witness box, although not, I hasten to add, as a felon. I am referring to the Government Court of Inquiry into the Flixborough disaster of 1974, when a massive explosion at the Nypro chemical plant killed 29 people and injured many more. David Newland was called as a key technical witness at a time when a number of rival theories to account for the disaster were in existence. He proved that the explosion was caused by the dynamic instability of a bellows expansion joint in a temporary bridging pipe. After the enquiry, he was put in charge of preparing a new British Standard for these components, to prevent similar failures in the future.

One of the blights on the countryside used to be the practice of stubble burning by farmers during the summer months. If you have wondered why this doesn't happen any more, look no further than our honorary graduand, for he helped to extinguish this antisocial activity. As a member of the Royal Commission on Environmental Pollution, David Newland contributed to three important studies, involving the management of domestic waste, environmental planning, and the release of genetically-engineered organisms into the environment. I note from the letters page of *The Times* that he has turned his attention towards another of our environmental eyesores – telecommunication masts.

Chancellor, there was never much chance that David Newland's enthusiasm for innovation would be confined to the research laboratory. During his years in Sheffield he was a champion of his department's short courses for industrialists, which Alfred Tuplin had set up to give the University a national lead in this area of education. At Cambridge, he has been instrumental in establishing the Manufacturing Engineering Tripos, in planning the transition to a four-year undergraduate engineering course, and in setting up the Engineering Design Centre. In his Inaugural Lecture at Sheffield, delivered thirty years ago, he highlighted the need for universities 'to develop new and broader PhD programmes in engineering which will educate the leaders and innovators of the future'. His vision is at last turning into reality, both in Cambridge and at Sheffield.

In many respects I am envious of our honorary graduand, for he has discovered the perfect way of avoiding telephone calls – by running marathon races for charitable causes. In recent years he has completed five marathons, all in the capital city, and in 1995 he achieved the excellent time of 3 hours 31 minutes. The antidote to all this physical activity is the well-appointed organ in the Church of St Mary Magdalene in Ickleton.

We honour today one of this country's foremost engineers, a man of vision and achievement, and a good friend of the University of Sheffield.

Chancellor, I present David Edward Newland as eminently worthy to receive the degree of Doctor of Engineering *honoris causa*.