Dr. Robert E. Nickell

See:
http://www.asme.org/about-asme/history/biographies/m-p-biographies/nickell,-robert-e-
http://www.worldcat.org/identities/lccn-n79-108153
http://65.54.113.26/Author/12620629/robert-e-nickell

Work in the area of structural stability

A considerable amount of the research conducted while a graduate student at the University of California at Berkeley was related to solid rocket propellant thermo-mechanical behavior and spilled over into the buckling behavior of composite-material rocket motor shells. While much of this work was in a computational support capacity for technical papers authored by others, I did receive credit as a co-author for one paper with Bob Taylor that was published in a conference proceedings while I was still a graduate student [1]. This particular paper should be considered as classical bifurcation buckling analysis of shells constructed from composite materials.

After I received my Ph.D. in Engineering Science from U.C. Berkeley in March 1967, my career path at the

Rohm & Haas Company (February 1967 to June 1968) and at Bell Telephone Laboratories (June 1968 to September 1971) did not involve publishable work in the area of structural instability. However, at the same time, I became involved with the American Society of Mechanical Engineers (ASME) and, in particular, its Pressure Vessels & Piping (PVP) technical division, as well as with the ASME Boiler & Pressure Vessel Code and its technical support arm – the Pressure Vessel Research Committee (PVRC) of the Welding Research Council. This involvement led to many volunteer activities, one of which was unpublished work on buckling of pressure vessel heads of various knuckle shapes due to internal pressure. This was fascinating technical work, and I was able to collaborate with many distinguished colleagues on this effort, including the late Harry Kraus.

A little while later, while on assigned teaching from Bell Labs to Brown University from September 1971 to August 1973, and especially during my year as the winner of the AIAA/ONR Naval Structural Mechanics Award grant, I was able to study the effects of naval structures – in particular, submarine and surface ship hulls – subject to close-proximity external blast loads that could cause dynamic, localized buckling and extremely damaging post-buckling deformations. This work, which was not published until I was later re-employed in the Bell System at Sandia National Laboratories (September 1973 to July 1977) [2] represented a break-through in the analysis of dynamic buckling. I was extremely proud of that effort.

Most of my work in the area of structural instability since the mid-1970s has been associated with time-dependent structural instability, including creep buckling at elevated temperature [3] and dynamic buckling due to impact and blast [4]. Much of this latter work has been carried out in support of potential changes to the design requirements for pressure vessels and other structures covered by the ASME Code rules in Section III, Divisions 1 (nuclear power plant components) and Division 3 (radioactive material transport and storage casks), and – more recently – Section VIII, Division 3 (design rules for vessels subject to blast and internal detonations.)

1. Stability of Laminated Orthotropic Shells (with R. L. Taylor), in: Developments in Mechanics, Vol. 3 (ed. by T. C. Huang and M. W. Johnson, Jr.), John Wiley & Sons, New York, pp. 115-127 (1965).
2. Nonlinear Dynamics by Mode Superposition, Computer Methods in Applied Mechanics and Engineering, Vol. 7, No. 1, pp. 107-129 (January 1976).
3. Creep Buckling of Shells (with C. M. Stone), in: Proceedings, 4th International Conference on Structural Mechanics in Reactor Technology (SMiRT), Paper No. L7/8 (August 1977).
4. Buckling Design Analysis for Impact Evaluation (with R. Sauve and W. Teper), Transactions ASME, Journal of Pressure Vessel Technology, Vol. 107, No. 2, pp. 165-171 (May 1985).