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High Reliability Management Operating on the Edge

Emery Roe and Paul R. Schulman
(Stanford University Press, July 2008)

"Paul Schulman and Emery Roe take us behind the scenes of high reliability managing in a complex network and find that the previously unarticulated role of 'reliability professionals' can make or break high reliability organizations. This well-grounded discovery is of utmost importance since it increases the paths by which higher reliability can be produced. Every manager who tries valiantly to 'keep up' with dynamic input, and every academic who puzzles over the mystery of how 'keeping up' is accomplished, will love this book!"

—Karl E. Weick, Co-author of *Managing the Unexpected, Second Edition*

"Reliability" has become a watchword in the business community. Increasingly, it refers to anticipation and resilience organizations' ability to plan for, absorb, and rebound from shocks. Across many sectors and cases, the approach to improving reliability in primary technical systems has been remarkably similar. Stakeholders assume that improved reliability lies in better design and technology.

This book speaks to the severe limits of formal design and technology relative to operational skills, experience, and knowledge. The debate over the vulnerability of critical infrastructures has far too often neglected the managerial dimension of public security and business continuity. *High Reliability Management* is the first book about the people who manage for high reliability, namely, those professionals who provide critical services continuously and safely, even during peak demand times or periods of stress.

Electrical grid and market restructuring in California is one huge example. Also computerized systems have been devised to automate dispatch instructions to generators based on an optimizing model incorporating market price, forecasted load, line conditions and a variety of other grid elements. It would seem hard to argue with these objectives, but many of these changes and the way they are being introduced can pose risks to the systems they are trying to improve.

The economists, engineers, software designers and policy-makers behind these changes believe as designers that they understand electricity, as with any other infrastructure, through the formal principles of their disciplines. But what designers do not fully understand is that their very efforts at improvement can seriously challenge the ability of control operators to manage essential systems reliably and safely. Important factors in the operation

of these systems, which are really networks of many participants with diverse motives, cannot be captured in the formal models of analysts. The exercise of market power by Enron was an unintended but still major consequence of the market design for California's electricity restructuring. In addition, many new software and hardware systems fail to work as intended. It is left to operators to fill in the gaps and cope with the glitches. On the basis of their experience they craft strategies (often called "workarounds") to manage the design errors that inevitably accompany uninformed or narrow policies, software or hardware.

The authors' argue that if we hope to safeguard the reliability of our infrastructures, we need to recognize and safeguard the skills and often hard won experience of their managers and operators before we rush headlong to replace them. We also need professional ethics to restrain the hubris of those who intervene in our infrastructures without being accountable for their mistakes. In the absence of a new approach, many technical, and policy fixes by these "experts" can be quite literally as threatening to infrastructure reliability as the terrorist assaults and security threats we are hoping to guard against.

The text draws on one of the most intensive studies of a critical infrastructure ever undertaken within a high reliability framework. From this research comes a new and useful perspective on critical managerial challenges confronting society. The book also offers much practical advice to professionals and researchers who address these reliability challenges daily.

Emery Roe lectures in the Public Affairs and Administration Program at California State University, East Bay. Paul R. Schulman is Professor of Government at Mills College in Oakland, CA.

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