



Tom Mackin reviews
Ted Lewis, *Critical Infrastructure
Protection in Homeland Security:
Defending a Networked Nation*

By Tom Mackin

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When Ted Lewis penned this book, there were no comprehensive works that tackled the incredible breadth and scope of the infrastructure problem. The approach to infrastructure was as chaotic as the initial formation of DHS: many different sectors, all of enormous size and disparate function, were managed by individuals happily ensconced in the silos of their expertise. Just as DHS attempted to cram unwilling partners into a structured framework, there were no scientific/engineering frameworks that were applied, broadly, across sectors.

Lewis changed this. His pioneering work, written during a brief stay in the hospital, offered the first comprehensive approach to the infrastructure problem. It detailed the regulatory frameworks that governed each sector, and applied the concept of emergence to the formation of structure under the forces of economics, geography and regulation. He introduced a network approach that could be applied to many infrastructure systems, and explained how that approach could be used to identify the most critical functional components of the system. He introduced an entirely new audience to the use of fault trees as a descriptive tool to organize system components in a logical framework that served to enumerate which components, if disabled, could lead to system failure. This text introduced new tools to evaluate infrastructure while also providing case studies, across many sectors, that applied these tools. Prior to Lewis' work, infrastructure topics were siloed and missing any descriptive framework that could answer the question of "What is critical in critical infrastructure protection?" Lewis offered the first comprehensive overview of the systems problem associated with this question. His text revolutionized our approach to CIP and kick-started a new era of understanding that has transformed the CIP landscape. Every homeland security practitioner should have a copy of this text on their bookshelf.

About the Author

Tom Mackin is Professor of Mechanical Engineering at the California Polytechnic State University in San Luis Obispo California, Adjunct Professor in the Center for Homeland Defense and Security at the Naval Post Graduate School, former Chief Science Officer at Synbotics, Inc., and founding member of the Board at Mission Street Manufacturing. He received his Ph.D. in Engineering Science and Mechanics from Penn State in 1991, where he developed a fractal geometric theory for the failure of ceramic materials. From 1991 to 1993 he worked as a research engineer in the Materials Department at UC Santa Barbara developing micro-mechanical models and test methods for high temperature composite materials. In 1993 he joined the faculty in Mechanical and Industrial Engineering at the University of Illinois where he conducted fundamental research in composite materials, polymers, and MEMS. While at the U of I he developed a patented construction material (Cornboard), a patented method for measuring film thickness during deposition, and developed two new scientific tools: the grey

field infrared polariscope, and a novel micro-tool for measuring the mechanical properties of nano-thin films. From 2002-2003 he served as an ASME Executive Office Fellow in the White House Office of Science and Technology Policy, where he served as a technology policy analyst and White House Liaison to the National Nanotechnology Initiative, White House Liaison to the Networking and Information Technology Research and Development program, and as a member of the transition planning team for the Department of Homeland Security. In 2004 he became the Founding Director of the Illinois Homeland Security Research Center, and an affiliate faculty member in the Arms Control, Disarmament and International Security program at the University of Illinois. He also became a faculty member at the Center for Homeland Defense and Security at the Naval Post Graduate School. In 2005 he was hired as Chair of the Mechanical Engineering Department at Cal Poly. He co-founded the Center for Collaborative Engineering Research and Education (CCERE) with UCSB, and the Center for Renewable Energy and Alternative Transportation Technologies at Cal Poly. He was product development lead and project manager on four start-ups, served as on-screen and technical expert for the Discovery Channel show “The Colony”, and served as engineering consultant for the Small Business Development Center and the Center for Innovation and Entrepreneurship in San Luis Obispo. He may be reached at tmackin@calpoly.edu.

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