

Resilience Engineering In Practice Volume 2 Becoming Resilient Ashgate Studies In Resilience Engineering

There has not yet been a comprehensive method that goes behind 'human error' and beyond the failure concept, and various complicated accidents have accentuated the need for it. The Functional Resonance Analysis Method (FRAM) fulfills that need. This book presents a detailed and tested method that can be used to model how complex and dynamic socio-technical systems work, and understand both why things sometimes go wrong but also why they normally succeed.

Multisystemic Resilience brings together in one volume a wide range of resilience scholars who have been wrestling with how to explain processes of recovery, adaptation, and transformation in contexts of change and adversity. Together this collection shows that considering the resilience of multiple systems at once is instrumental to understanding the processes of change and sustainability.

Teaching is hard work. Teaching is rewarding work. An abundance of research on teachers' mental health, teacher burnout, and attrition in the profession has proven the truth of the first claim. And, without reading a word of academic research, teachers know the truth of the second: there are numerous challenges and complexities involved in this noble profession. Teachers also know the truth of our second claim—that teaching is immensely rewarding work. The editors and authors of *Joyful Resilience as Educational Practice: Transforming Teaching Challenges into Opportunities* argue that the reciprocities of teaching keep them and countless other teachers in the profession. While teaching is one of the most demanding professions on earth, it is also one of the most rewarding professions. Editors Michelle C. Hughes and Ken Badley hope readers and teaching colleagues alike will be reminded of the rewards and the unexpected paybacks found in teaching. *Joyful Resilience as Educational Practice* is offered as a love letter, a "hang-in-there, you've got this" message to teacher colleagues everywhere. May readers be reminded that teaching is a calling. The editors invite readers to wrestle with, take courage, and find joyful resilience in the professional challenges named in this book.

Nothing has been more prolific over the past century than human/machine interaction. Automobiles, telephones, computers, manufacturing machines, robots, office equipment, machines large and small; all affect the very essence of our daily lives. However, this interaction has not always been efficient or easy and has at times turned fairly hazardous.

Building Capacity to Absorb Disturbance and Maintain Function

Safety-I and Safety-II

Resilience Engineering in Practice, Volume 2

Resilience and Risk

Improving Smallholder and Subsistence Farming

Concepts and Precepts

***Resilience Engineering in Practice, Volume 2 Becoming Resilient* CRC Press**

This is the fifth book published within the Ashgate Studies in Resilience Engineering series. The first volume introduced resilience engineering broadly. The second and third volumes established the research foundation for the real-world applications that then were described in the fourth volume: Resilience Engineering in Practice. The current volume continues this development by focusing on the role of resilience in the development of solutions. Since its inception, the development of resilience engineering as a concept and a field of practice has insisted on expanding the scope from a preoccupation with failure to include also the acceptable everyday functioning of a system or an organisation. The preoccupation with failures and adverse outcomes focuses on situations where something goes wrong and the tries to keep the number of such events and their (adverse) outcomes as low as possible. The aim of resilience engineering and of this volume is to describe how safety can change from being protective to become productive and increase the number of things that go right by improving the resilience of the system.

No person or place is immune from disasters or disaster-related losses. Infectious disease outbreaks, acts of terrorism, social unrest, or financial disasters in addition to natural hazards can all lead to large-scale consequences for the nation and its communities. Communities and the nation thus face difficult fiscal, social, cultural, and environmental choices about the best ways to ensure basic security and quality of life against hazards, deliberate attacks, and disasters. Beyond the unquantifiable costs of injury and loss of life from disasters, statistics for 2011 alone indicate economic damages from natural disasters in the United States exceeded \$55 billion, with 14 events costing more than a billion dollars in damages each. One way to reduce the impacts of disasters on the nation and its communities is to invest in enhancing resilience—the ability to prepare and plan for,

absorb, recover from and more successfully adapt to adverse events. Disaster Resilience: A National Imperative addresses the broad issue of increasing the nation's resilience to disasters. This book defines "national resilience", describes the state of knowledge about resilience to hazards and disasters, and frames the main issues related to increasing resilience in the United States. It also provide goals, baseline conditions, or performance metrics for national resilience and outlines additional information, data, gaps, and/or obstacles that need to be addressed to increase the nation's resilience to disasters. Additionally, the book's authoring committee makes recommendations about the necessary approaches to elevate national resilience to disasters in the United States. Enhanced resilience allows better anticipation of disasters and better planning to reduce disaster losses—rather than waiting for an event to occur and paying for it afterward. Disaster Resilience confronts the topic of how to increase the nation's resilience to disasters through a vision of the characteristics of a resilient nation in the year 2030. Increasing disaster resilience is an imperative that requires the collective will of the nation and its communities. Although disasters will continue to occur, actions that move the nation from reactive approaches to disasters to a proactive stance where communities actively engage in enhancing resilience will reduce many of the broad societal and economic burdens that disasters can cause.

Preparation and Restoration addresses issues such as the nature of resilience; the similarities and differences between resilience and traditional ideas of system performance; how systems cope with varying demands and sometimes succeed and sometimes fail; how an organization's ways of preparing before critical events can enable or impede restoration; the trade-offs that are needed for systems to operate and survive; instances of brittle or resilient systems; how work practices affect resilience; the relationship between resilience and safety; and what improves or erodes resilience.

Methods and Application in Environment, Cyber and Social Domains

A Practitioner's Guide to Cognitive Task Analysis

Reconciling Work-as-Imagined and Work-as-Done

Multisystemic Resilience

FRAM, the Functional Resonance Analysis Method

Building Climate Resilience in Agriculture

Supporters of environmental well-being and climate resilience are awakening and mobilizing – cities, states, business, academia, community-based organizations, and the military.

They understand the imminent and long-term risks of climate deterioration and they are creating new structures beyond the top-down government policy efforts of the past. This highly practical book provides a clear insight into these collaborative solutions by real organizations in real time. It demonstrates how people from disparate fields and stakeholders cooperate to address climate issues at ground level and reveals how this can be undertaken effectively. Through case studies of key organizations such as the NYC Sustainability Office, Detroiters Working for Environmental Justice, IBM, and West Point Military Academy, readers will understand each party's role in a cooperative enterprise and the means by which they support climate resiliency, their institutional goals, and their communities. Of particular value, the book illustrates the co-benefits of multi-party resilience planning: faster approval times; reduced litigation; ability to monetize benefits such as positive health outcomes; the economic benefits of cooperation (for example, capacity building through financing climate planning and resilience across public, private, and other sources of funding); and developing a shared perspective. The book will be of great interest to business managers, policymakers, and community leaders involved in combating climate change, and researchers and students of business, public affairs, policy, environment, climate, and urban studies.

Properly performing health care systems require concepts and methods that match their complexity. Resilience engineering provides that capability. It focuses on a system's overall ability to sustain required operations under both expected and unexpected conditions rather than on individual features or qualities. This book contains contributions from international experts in health care, organisational studies and patient safety, as well as resilience engineering. Whereas current safety approaches primarily aim to reduce the number of things that go wrong, Resilient Health Care aims to increase the number of things that go right.

Health systems everywhere are expected to meet increasing public and political demands for accessible, high-quality care. Policy-makers, managers, and clinicians use their best efforts to improve efficiency, safety, quality, and economic viability. One solution has been to mimic approaches that have been shown to work in other domains, such as quality management, lean production, and high reliability. In the enthusiasm for such solutions, scant attention has been paid to the fact that health care as a multifaceted system differs significantly from most traditional industries. Solutions based on linear thinking in engineered systems do not work well in complicated, multi-stakeholder non-engineered systems, of which health care is a leading example. A prerequisite for improving health care and making it more resilient is that the nature of everyday clinical work be well understood. Yet the focus of the

majority of policy or management solutions, as well as that of accreditation and regulation, is work as it ought to be (also known as ‘work-as-imagined’). The aim of policy-makers and managers, whether the priority is safety, quality, or efficiency, is therefore to make everyday clinical work - or work-as-done - comply with work-as-imagined. This fails to recognise that this normative conception of work is often oversimplified, incomplete, and outdated. There is therefore an urgent need to better understand everyday clinical work as it is done. Despite the common focus on deviations and failures, it is undeniable that clinical work goes right far more often than it goes wrong, and that we only can make it better if we understand how this happens. This second volume of Resilient Health Care continues the line of thinking of the first book, but takes it further through a range of chapters from leading international thinkers on resilience and health care. Where the first book provided the rationale and basic concepts of RHC, the Resilience of Everyday Clinical Work breaks new ground by analysing everyday work situations in primary, secondary, and tertiary care to identify and describe the fundamental strategies that clinicians everywhere have developed and use with a fluency that belies the demands to be resolved and the dilemmas to be balanced. Because everyday clinical work is at the heart of resilience, it is essential to appreciate how it functions, and to understand its characteristics.

This book is the 3rd volume in the Resilient Health Care series. Resilient health care is a product of both the policy and managerial efforts to organize, fund and improve services, and the clinical care which is delivered directly to patients. This volume continues the lines of thought in the first two books. Where the first volume provided the rationale and basic concepts of RHC and the second teased out the everyday clinical activities which adjust and vary to create safe care, this book will look more closely at the connections between the sharp and blunt ends. Doing so will break new ground, since the systematic study in patient safety to date with few exceptions has been limited.

Resilience Engineering in Practice

Proceedings of ESREL 2016 (Glasgow, Scotland, 25-29 September 2016)

Building Resilience to Natural Hazards in the Context of Climate Change

Working Across Boundaries

Resilience in Ecology and Urban Design

Resilience Practice

The contributors to this volume propose strategies of urgent and vital importance that aim to make today’s urban environments more resilient. Resilience, the ability of complex systems to adapt to changing conditions, is a key frontier in ecological research and is especially relevant in creative urban design, as urban areas exemplify complex systems. With something approaching half of the world’s population now residing in coastal urban zones, many of which are vulnerable both to floods originating inland and rising sea levels, making urban areas more robust in the face of environmental threats must be a policy ambition of the highest priority. The complexity of urban areas results from their spatial heterogeneity, their intertwined material and energy fluxes, and the integration of social and natural processes. All of these features can be altered by intentional planning and design. The complex, integrated suite of urban structures and processes together affect the adaptive resilience of urban systems, but also presupposes that planners can intervene in positive ways. As examples accumulate of linkage between sustainability and building/landscape design, such as the Shanghai Chemical Industrial Park and Toronto’s Lower Don River area, this book unites the ideas, data, and insights of ecologists and related scientists with those of urban designers. It aims to integrate a formerly atomized dialog to help both disciplines promote urban resilience.

In the resilience engineering approach to safety, failures and successes are seen as two different outcomes of the same underlying process, namely how people and organizations cope with complex, underspecified and therefore partly unpredictable work environments. Therefore safety can no longer be ensured by constraining performance and eliminating risks. Instead, it is necessary to actively manage how people and organizations adjust what they do to meet the current conditions of the workplace, by trading off efficiency and thoroughness and by making sacrificing decisions. The Ashgate Studies in Resilience Engineering series promulgates new methods, principles and experiences that can complement established safety management approaches, providing invaluable insights and guidance for practitioners and researchers alike in all safety-critical domains. While the Studies pertain to all complex systems they are of particular interest to high hazard sectors such as aviation, ground transportation, the military, energy production and distribution, and healthcare. Published periodically within this series will be edited volumes titled Resilience Engineering Perspectives. The first volume, Remaining Sensitive to the Possibility of Failure, presents a collection of 20 chapters from international experts. This collection deals with important issues such as measurements and models, the use of procedures to ensure safety, the relation between resilience and robustness, safety management, and the use of risk analysis. The final six chapters utilise the report from a serious medical accident to illustrate more concretely how resilience engineering can make a difference, both to the understanding of how accidents happen and to what an organisation can do to become more resilient.

This text offers comprehensive and principled, yet practical, guidelines to critical infrastructures resilience. Extreme events and stresses, including those that may be unprecedented but are no longer surprising, have disproportionate effects on critical infrastructures and hence

on communities, cities, and megaregions. Critical infrastructures include buildings and bridges, dams, levees, and sea walls, as well as power plants and chemical factories, besides lifeline networks such as multimodal transportation, power grids, communication, and water or wastewater. The growing interconnectedness of natural-built-human systems causes cascading infrastructure failures and necessitates simultaneous recovery. This text explores the new paradigm centered on the concept of resilience by approaching the challenges posed by globalization, climate change, and growing urbanization on critical infrastructures and key resources through the combination of policy and engineering perspectives. It identifies solutions that are scientifically credible, data driven, and sound in engineering principles while concurrently informed by and supportive of social and policy imperatives. Critical Infrastructures Resilience will be of interest to students of engineering and policy.

Health care is under tremendous pressure regarding efficiency, safety, and economic viability. It has responded by adopting techniques that have been useful in other industries, such as quality management, lean production, and high reliability - although with limited, and all-too-often disappointing, results. The Resilient Health Care Network (RHCN) has worked since 2011 to facilitate the interaction and collaboration among practitioners and researchers interested in applying concepts from resilience engineering to health care and patient safety. This has met with considerable success, not least because the focus from the start was on developing concrete ways to complement a Safety-I perspective with a Safety-II perspective. Building on previous volumes, Delivering Resilient Health Care presents documented experiences and practical guidance on how to bring Resilient Health Care into practice. It provides concrete advice on how to prepare a study, how to choose the right data, how to collect it, how to analyse the data, and how to interpret the results. This fourth book in the Resilient Healthcare series contains contributions from international experts in health care, organisational studies and patient safety, as well as resilience engineering. This book provides a practical guide for delivering resilient healthcare, particularly for clinicians on the frontline of care unsure how to incorporate resilience into their everyday work, managers coordinating care, and for policymakers hoping to steer the system in the right direction. Other groups - patients, the media, and researchers - will also find much of interest here.

Foundations of Cognitive Systems Engineering
Theory, Practice and Future Perspective
The Science and Practice of Resilience
Resilience Engineering Perspectives, Volume 1

Working Minds

Risk, Reliability and Safety contains papers describing innovations in theory and practice contributed to the scientific programme of the European Safety and Reliability conference (ESREL 2016), held at the University of Strathclyde in Glasgow, Scotland (25-29 September 2016). Authors include scientists, academics, practitioners, regulators and other key individuals with expertise and experience relevant to specific areas. Papers include domain specific applications as well as general modelling methods. Papers cover evaluation of contemporary solutions, exploration of future challenges, and exposition of concepts, methods and processes. Topics include human factors, occupational health and safety, dynamic and systems reliability modelling, maintenance optimisation, uncertainty analysis, resilience assessment, risk and crisis management.

14. TOWARDS A RESILIENT APPROACH OF SAFETY ASSESSMENT: EXPERIENCES BASED ON THE DESIGN OF THE FUTURE AIR TRAFFIC MANAGEMENT SYSTEM

Health systems everywhere are expected to meet increasing public and political demands for accessible, high-quality care. Policy-makers, managers, and clinicians use their best efforts to improve efficiency, safety, quality, and economic viability. One solution has been to mimic approaches that have been shown to work in other domains, such as quality management, lean production, and high reliability. In the enthusiasm for such solutions, scant attention has been paid to the fact that health care as a multifaceted system differs significantly from most traditional industries. Solutions based on linear thinking in engineered systems do not work well in complicated, multi-stakeholder non-engineered systems, of which health care is a leading example. A prerequisite for improving health care and making it more resilient is that the nature of everyday clinical work be well understood. Yet the focus of the majority of policy or management solutions, as well as that of accreditation and regulation, is work as it ought to be (also known as 'work-as-imagined'). The aim of policy-makers and managers, whether the priority is safety, quality, or efficiency, is therefore to make everyday clinical work - or work-as-done - comply with work-as-imagined. This fails to recognise that this normative conception of work is often oversimplified, incomplete, and outdated. There is therefore an urgent need to better understand everyday clinical work as it is done. Despite the common focus on deviations and failures, it is undeniable that clinical work goes right far more often than it goes wrong, and that we only can make it better if we understand how this happens. This

second volume of Resilient Health Care continues the line of thinking of the first book, but takes it further through a range of chapters from leading international thinkers on resilience and health care. Where the first book provided the rationale and basic concepts of RHC, the Resilience of Everyday Clinical Work

Urban resilience and building resilience are “hot topics” of research and practice on sustainability in the context of climate change. The edited volume advances the “state of art” of urban resilience research through focusing on three important processes of building resilience: knowledge integration, implementation, and learning. In the volume, knowledge integration primarily refers to the combination of specialized knowledge domains (e.g., flood risk management and urban planning). Implementation refers to realized specific changes of the building stock and related green, blue and grey infrastructures at local level (e.g., for dealing with rising temperatures and heat waves at the neighborhood scale in cities). Learning requires moving beyond single projects and experiments of resilience to enhance sustainability at city and regional scale. The editors adopt an interdisciplinary approach to this volume of the Springer series on resilience. The volume includes contributions from civil engineering, physical geography, the social sciences, and urban planning.

Resilient Health Care

Resilient Health Care, Volume 2

The Future for a Changing World

Modelling Complex Socio-technical Systems

A National Imperative

A Guidebook

Safety has traditionally been defined as a condition where the number of adverse outcomes was as low as possible (Safety-I). From a Safety-I perspective, the purpose of safety management is to make sure that the number of accidents and incidents is kept as low as possible, or as low as is reasonably practicable. This means that safety management must start from the manifestations of the absence of safety and that - paradoxically - safety is measured by counting the number of cases where it fails rather than by the number of cases where it succeeds. This unavoidably leads to a reactive approach based on responding to what goes wrong or what is identified as a risk - as something that could go wrong. Focusing on what goes right, rather than on what goes wrong, changes the definition of safety from ‘avoiding that something goes wrong’ to ‘ensuring that everything goes right’. More precisely, Safety-II is the ability to succeed under varying conditions, so that the number of intended and acceptable outcomes is as high as possible. From a Safety-II perspective, the purpose of safety management is to ensure that as much as possible goes right, in the sense that everyday work achieves its objectives. This means that safety is managed by what it achieves (successes, things that go right), and that likewise it is measured by counting the number of cases where things go right. In order to do this, safety management cannot only be reactive, it must also be proactive. But it must be proactive with regard to how actions succeed, to everyday acceptable performance, rather than with regard to how they can fail, as traditional risk analysis does. This book analyses and explains the principles behind both approaches and uses this to consider the past and future of safety management practices. The analysis makes use of common examples and cases from domains such as aviation, nuclear power production, process management and health care. The final chapters explain the theoretical and practical consequences of the new perspective on the level of day-to-day operations as well as on the level of strategic management (safety culture). Safety-I and Safety-II is written for all professionals responsible for their organisation's safety, from strategic planning on the executive level to day-to-day operations in the field. It presents the detailed and tested arguments for a transformation from protective to productive safety management.

GSP 180 honors Dr. John H. Schmertmann for his contributions to civil engineering and includes 17 papers by him as well as 28 invited papers on related geotechnical subjects.

The first volume in the Ashgate Studies in Resilience Engineering series deals with important issues such as measurements and models, the use of procedures to ensure safety, the relation between resilience and robustness, safety management, and the use of risk analysis. The chapters utilize a report from a serious medical accident to illustrate more concretely how resilience engineering can make a difference, both to the understanding of how accidents happen and to what an organization can do to become more resilient.

For Resilience Engineering, 'failure' is the result of the adaptations necessary to cope with the complexity of the real world, rather than a breakdown or malfunction. The performance of individuals and organizations must continually adjust to current conditions and, because resources and time are finite, such adjustments are always approximate. This definitive new book explores this groundbreaking new development in safety and risk management, where 'success' is based on the ability of organizations, groups and individuals to anticipate the changing shape of risk before failures and harm occur. Featuring contributions from many of the worlds leading figures in the fields of human factors and safety, Resilience Engineering provides thought-provoking insights into system safety as an aggregate of its various components, subsystems, software, organizations, human behaviours, and the way in which they interact. The book provides an introduction to Resilience Engineering of systems, covering both the theoretical and practical aspects. It is written for those responsible for system safety on managerial or operational levels alike, including safety managers and engineers (line and maintenance), security experts, risk and safety consultants, human factors professionals and accident investigators.

Resilience Engineering Perspectives

The Reliability of Expert Systems

Knowledge Integration, Implementation and Learning

Transforming Teaching Challenges into Opportunities

Disaster Resilience

Critical Infrastructures Resilience

This book offers a comprehensive view on resilience based upon state-of-the-science theories and methodological applications that resilience may fill. Specifically, this text provides a compendium of knowledge on the theory, methods, and practice of resilience across a variety of country and case contexts, and demonstrates how a resilience-based

approach can help further improved infrastructure, vibrant societies, and sustainable environments and ecologies, among many others. Resilience is a term with thousands of years of history. Only recently has resilience been applied to the management of complex interconnected systems, yet its impact as a governing philosophy and an engineering practice has been pronounced. Colloquially, resilience has been used as a synonym for 'bouncing back'. Philosophically and methodologically, however, it is much more. In a world defined by interconnected and interdependent systems such as water, food, energy, transportation, and the internet, a sudden and unexpected disruption to one critical system can lead to significant challenges for many others. The Science and Practice of Resilience is beneficial for those seeking to gain a rich knowledge of the resilience world, as well as for practitioners looking for methods and tools by which resilience may be applied in real-world contexts.

The book demonstrates how Resilient Health Care principles can enable those on the frontline to work more effectively towards interdisciplinary care by gaining a deeper understanding of the boundaries that exist in everyday clinical settings. This is done by presenting a set of case studies, theoretical chapters and applications that relate experiences, bring forth ideas and illustrate practical solutions. The chapters address many different issues such as resolving conflict, overcoming barriers to patient-flow management, and building connections through negotiation. They represent a range of approaches, rather than a single way of solving the practical problems, and have been written to serve both a scientific and an andragogical purpose. Working Across Boundaries is primarily aimed at people who are directly involved in the running and improvement of health care systems, providing them with practical guidance. It will also be of direct interest to health care professionals in clinical and managerial positions as well as researchers. Presents the latest work of the lauded Resilient Health Care Net group, developing applications of Resilience Engineering to health care, furthering safety thinking and generating applicable solutions that will benefit patient safety worldwide Enables health care professionals to become aware of the boundaries that affect their work so that they are able to use their strengths and overcome their weaknesses Written from a Safety-II perspective, where the purpose is to make sure that as much as possible goes well and the focus therefore is on everyday work rather than on failures. There are at present no other books that adopt this perspective nor which go into the practical details Provides a concise presentation of the state of resilient health care as a science, in terms of major theoretical issues and practical methods and techniques on the overarching and important topics of boundary-crossing and integration of care settings

The goal to improve the resilience of social systems - communities and their economies - is increasingly adopted by decision makers. This unique and comprehensive Handbook focuses on the interdependencies of these social systems and the technologies that support them. Special attention is given to the ways in which resilience is conceptualized by different disciplines, how resilience may be assessed, and how resilience strategies are implemented. Case illustrations are presented throughout to aid understanding.

How to collect data about cognitive processes and events, how to analyze CTA findings, and how to communicate them effectively: a handbook for managers, trainers, systems analysts, market researchers, health professionals, and others. Cognitive Task Analysis (CTA) helps researchers understand how cognitive skills and strategies make it possible for people to act effectively and get things done. CTA can yield information people need—employers faced with personnel issues, market researchers who want to understand the thought processes of consumers, trainers and others who design instructional systems, health care professionals who want to apply lessons learned from errors and accidents, systems analysts developing user specifications, and many other professionals. CTA can show what makes the workplace work—and what keeps it from working as well as it might. Working Minds is a true handbook, offering a set of tools for doing CTA: methods for collecting data about cognitive processes and events, analyzing them, and communicating them effectively. It covers both the "why" and the "how" of CTA methods, providing examples, guidance, and stories from the authors' own experiences as CTA practitioners. Because effective use of CTA depends on some conceptual grounding in cognitive theory and research—on knowing what a cognitive perspective can offer—the book also offers an overview of current research on cognition. The book provides detailed guidance for planning and carrying out CTA, with chapters on capturing knowledge and capturing the way people reason. It discusses studying cognition in real-world settings and the challenges of rapidly changing technology. And it describes key issues in applying CTA findings in a variety of fields. Working Minds makes the methodology of CTA accessible and the skills involved attainable.

Resilience Engineering Perspectives: Remaining sensitive to the possibility of failure

Linking Theory and Practice for Sustainable Cities

Handbook on Resilience of Socio-Technical Systems

Cognitive Systems Engineering

Resilient Health Care, Volume 3

Remaining Sensitive to the Possibility of Failure

Resilience has become an important topic on the safety research agenda and in organizational practice. Most empirical work on resilience has been descriptive, identifying characteristics of work and organizing activity which allow organizations to cope with unexpected situations. Fewer studies have developed testable models and theories that can be used to support interventions aiming to increase resilience and improve safety. In addition, the absent integration of different system levels from individuals, teams, organizations, regulatory bodies, and policy level in theory and practice imply that mechanisms through which resilience is

linked across complex systems are not yet well understood. Scientific efforts have been made to develop constructs and models that present relationships; however, these cannot be characterized as sufficient for theory building. There is a need for taking a broader look at resilience practices as a foundation for developing a theoretical framework that can help improve safety in complex systems. This book does not advocate for one definition or one field of research when talking about resilience; it does not assume that the use of resilience concepts is necessarily positive for safety. We encourage a broad approach, seeking inspiration across different scientific and practical domains for the purpose of further developing resilience at a theoretical and an operational level of relevance for different high-risk industries. The aim of the book is twofold: 1. To explore different approaches for operationalization of resilience across scientific disciplines and system levels. 2. To create a theoretical foundation for a resilience framework across scientific disciplines and system levels. By presenting chapters from leading international authors representing different research disciplines and practical fields we develop suggestions and inspiration for the research community and practitioners in high-risk industries. This book is Open Access under a CC-BY licence.; Explores different approaches for operationalization of resilience across scientific disciplines and system levels Creates a theoretical foundation for a resilience framework across scientific disciplines and system levels Develops suggestions and inspiration for the research community and practitioners in high-risk industries Presents chapters from leading international authors representing different research disciplines and practical fields This work was published by Saint Philip Street Press pursuant to a Creative Commons license permitting commercial use. All rights not granted by the work's license are retained by the author or authors. This volume addresses the challenges associated with methodology and application of risk and resilience science and practice to address emerging threats in environmental, cyber, infrastructure and other domains. The book utilizes the collective expertise of scholars and experts in industry, government and academia in the new and emerging field of resilience in order to provide a more comprehensive and universal understanding of how resilience methodology can be applied in various disciplines and applications. This book advocates for a systems-driven view of resilience in applications ranging from cyber security to ecology to social action, and addresses resilience-based management in infrastructure, cyber, social domains and methodology and tools. Risk and Resilience has been written to open up a transparent dialog on resilience management for scientists and practitioners in all relevant academic disciplines and can be used as supplement in teaching risk assessment and management courses. This volume provides an exceptional perspective on the nature, evolution, contributions and future of the field of Cognitive Systems Engineering (CSE). It is a resource to support both the teaching and practice of CSE. It accomplishes this through its organization into two complementary approaches to the topic. The first is an historical perspective: In the retrospections of leaders of the field, what have been the seminal achievements of cognitive human factors? What are the "lessons learned" that became foundational to CSE, and how did that foundation evolve into a broader systems view of cognitive work? The second perspective is both pedagogical and future-looking: What are the major conceptual issues that have to be addressed by CSE and how can a new generation of researchers be prepared to further advance CSE? Topics include studies of expertise, cognitive work analysis, cognitive task analysis, human performance, system design, cognitive modeling, decision making, human-computer interaction, trust in automation, teamwork and ecological interface design. A thematic focus will be on systems-level analysis, and such notions as resilience engineering and systems-level measurement. The book features broad coverage of many of the domains to which CSE is being applied, among them industrial process control, health care, decision aiding and aviation human factors. The book's contributions are provided by an extraordinary group of leaders and pathfinders in applied psychology, cognitive science, systems analysis and system design. In combination these chapters present invaluable insights, experiences and continuing uncertainties on the subject of the field of CSE, and in doing so honor the career and achievements of Professor David D. Woods of Ohio State University.

This volume describes how safety can change from being protective to being productive, thereby improving the resilience of the system. This is the fifth book published within the Ashgate Studies in Resilience Engineering series. The first introduced resilience engineering broadly. The second and third established the research foundation for the real-world applications that then were described in the fourth volume: Resilience Engineering in Practice. The current volume continues this development by focusing

on the role of resilience in the development of solutions.

Joyful Resilience as Educational Practice

Becoming Resilient

The Past and Future of Safety Management

Delivering Resilient Health Care

Food Security, Gender and Resilience

Policy and Engineering Principles

Through the integration of gender analysis into resilience thinking, this book shares field-based research insights from a collaborative, integrated project aimed at improving food security in subsistence and smallholder agricultural systems. The scope of the book is both local and multi-scalar. The gendered resilience framework, illustrated here with detailed case studies from semi-arid Kenya, is shown to be suitable for use in analysis in other geographic regions and across disciplines. The book examines the importance of gender equity to the strengthening of socio-ecological resilience. Case studies reflect multidisciplinary perspectives and focus on a range of issues, from microfinance to informal seed systems. The book's gender perspective also incorporates consideration of age or generational relations and cultural dimensions in order to embrace the complexity of existing socio-economic realities in rural farming communities. The issue of succession of farmland has become a general concern, both to farmers and to researchers focused on building resilient farming systems. Building resilience here is shown to involve strengthening households' and communities' overall livelihood capabilities in the face of ongoing climate change, global market volatility and political instability.

Resilience engineering has since 2004 attracted widespread interest from industry as well as academia. Practitioners from various fields, such as aviation and air traffic management, patient safety, off-shore exploration and production, have quickly realised the potential of resilience engineering and have become early adopters. The continued development of resilience engineering has focused on four abilities that are essential for resilience. These are the ability a) to respond to what happens, b) to monitor critical developments, c) to anticipate future threats and opportunities, and d) to learn from past experience - successes as well as failures. Working with the four abilities provides a structured way of analysing problems and issues, as well as of proposing practical solutions (concepts, tools, and methods). This book is divided into four main sections which describe issues relating to each of the four abilities. The chapters in each section emphasise practical ways of engineering resilience and feature case studies and real applications. The text is written to be easily accessible for readers who are more interested in solutions than in research, but will also be of interest to the latter group.

In 2006, Resilience Thinking addressed an essential question: As the natural systems that sustain us are subjected to shock after shock, how much can they take and still deliver the services we need from them? This idea caught the attention of both the scientific community and the general public. In Resilience Practice, authors Brian Walker and David Salt take the notion of resilience one step further, applying resilience thinking to real-world situations and exploring how systems can be managed to promote and sustain resilience. The book begins with an overview and introduction to resilience thinking and then takes the reader through the process of describing systems, assessing their resilience, and intervening as appropriate. Following each chapter is a case study of a different type of social-ecological system and how resilience makes a difference to that system in practice. The final chapters explore resilience in other arenas, including on a global scale. Resilience Practice will help people with an interest in the "coping capacity" of systems—from farms and catchments to regions and nations—to better understand how resilience thinking can be put into practice. It offers an easy-to-read but scientifically robust guide through the real-world application of the concept of resilience and is a must read for anyone concerned with the management of systems at any scale.

Remaining sensitive to the possibility of failure : [based on presentations made at the Second Resilience Engineering Symposium ... November 8 - 10 2007 in Juan-les-Pins, France]

Collaborating for Climate Resilience

Exploring Resilience

The Resilience of Everyday Clinical Work

Joint Cognitive Systems

Resilience Engineering