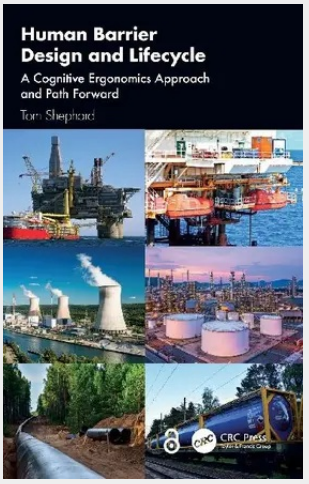
Shephard

Human Barrier Design and Lifecycle

A Cognitive Ergonomics Approach and Path Forward



A common source of failure in a human-dependent barrier or safety critical task is a designed-in mismatch error. The mismatch is a cognitive demand that exceeds the human capability to reliably and promptly respond to that demand given the plausible situations at that moment. Demand situations often include incomplete information, increased time pressures, and challenging environments. This book presents innovative solutions to reveal, prevent, and mitigate these and many other cognitive-type errors in barriers and safety critical tasks. The comprehensive model and methodologies also provide insight into where and to what extent these barriers and task types may be significantly underspecified and the potential consequences. This title presents a new and comprehensive prototype design and lifecycle model specific to human-dependent barriers and safety critical tasks. Designed to supplement current practice, the model is fully underpinned by cognitive ergonomics and cognitive science. The book also presents a compelling case for why a new global consensus standard specific to human-dependent barriers is needed. Taking a novel approach, it presents its suggested basis, framing, and content. Both solutions seek to redress deficiencies in global regulations, standards, and practice. The model is guided by industry recommendations and best practice guidance and solutions from globally recognized experts. Its processes are fully explained and supported by examples, analysis, and well-researched background materials. Real-life case studies from offshore oil and gas, chemical manufacturing, transmission pipelines, and product storage provide further insight into how overt and latent design errors contributed to barrier degradation and failure and the consequence of those errors. An essential and fascinating read for professionals, Human Barrier Design and Lifecycle: A Cognitive Ergonomics Approach and Path Forward will appeal to those in the fields of human factors, process and technical safety, functional safety, display and safety system design, risk management, facility engineering, and facility operations and maintenance. Chapters 1 and 8 of this book are freely available as downloadable Open Access PDFs at http://www.taylorfrancis.com under a Creative Commons Attribution-Non Commercial-No Derivatives (CC-BYNC-ND) 4.0 International license.

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267,60 €
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Lieferfrist: bis zu 10 Tage

Artikelnummer: 9781032655949
Medium: Buch
ISBN: 978-1-032-65594-9
Verlag: CRC Press
Erscheinungstermin: 07.05.2024
Sprache(n): Englisch
Auflage: 1. Auflage 2024
Produktform: Gebunden
Gewicht: 1089 g
Seiten: 654
Format (B x H): 161 x 240 mm

Kundenservice Verlag Dr. Otto Schmidt KG
Neumannstraße 10, 40235 Düsseldorf | kundenservice@otto-schmidt.de | 0221-93738-997 (Inland)