2022 4th International Conference on System Reliability and Safety Engineering (SRSE 2022)

Guangzhou, China 15-18 December 2022



IEEE Catalog Number: CFP22BG3-POD ISBN: 978-1-6654-7389-7

Copyright © 2022 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

 IEEE Catalog Number:
 CFP22BG3-POD

 ISBN (Print-On-Demand):
 978-1-6654-7389-7

 ISBN (Online):
 978-1-6654-7388-0

Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400

Fax: (845) 758-2633

E-mail: curran@proceedings.com Web: www.proceedings.com



2022 4th International Conference on System Reliability and Safety Engineering (SRSE 2022)

Table of Contents

REFACEx	
> Resilience and Maintenance Modeling of Complex Systems	
Research on the Classification Method of Reliability Critical Parts and Important Parts	. 1
Condition-Based Maintenance for Two-Component Series Systems Considering Component Reallocation	. 7
Resilience Modeling of Interdependent Supply Chain Networks with Company Collaboration Against Ripple Effective	
Lei Zhang, Jian Zhou, David W. Coit, Yizhong Ma	
Research on the Construction Method of System Off-Nominal States Model Based on Ontology Model	18
> Reliability and Resilience of Complex Systems	
An Improved Approach Based on Linear Programming Model for Assessing Rail Transit System Resilience und Disruptions	
Gong Xuanjing, Luo Chunling	
Put Theory into Practice Knowledge Graph Based Aviation Quality Reliability Knowledge System	30
Uncertainty Analysis Technology of Complex System Based on Evidence Theory	35
Remaining Useful Life Prediction of Aero-Engine Using CNN-LSTM and mRMR Feature Selection	41

Leveraging Ground Test Data for Aero-Engine Thrust Estimation	40
Modeling, Assessing and Optimizing Critical Systems for Reliability and Enhancement	l Safety
Fatigue Process Monitoring of Aluminum Alloy Materials Based on AE Technology	51
Reliability Assessment of Man-Machine Systems Subject to Probabilistic Common Cause Errors	55
Application of Software Reliability in Civil Aircraft Airborne Software Development	61
Reliability Modeling and Analysis for Space Phased-Mission System	67
On Modeling of Repairable Systems with Multi-output Gaussian Convolution Process	75
Reliability Optimization of the Filling and Discharging System for Lead-Based Fast Reactor	81
radini San, Xi Cha, Wing San, Daochaan Ge	
 High-reliability Distributed Control, Estimation and Optimization of Net Systems 	tworked
> High-reliability Distributed Control, Estimation and Optimization of Net	
High-reliability Distributed Control, Estimation and Optimization of Net Systems Large-Scale Weapon Target Assignment Based on Improved MOEA/D Algorithm	86
 High-reliability Distributed Control, Estimation and Optimization of Net Systems Large-Scale Weapon Target Assignment Based on Improved MOEA/D Algorithm	92 overy with
 High-reliability Distributed Control, Estimation and Optimization of Net Systems Large-Scale Weapon Target Assignment Based on Improved MOEA/D Algorithm	92 overy with 97
 High-reliability Distributed Control, Estimation and Optimization of Net Systems Large-Scale Weapon Target Assignment Based on Improved MOEA/D Algorithm	92 overy with97 ment104
 ➢ High-reliability Distributed Control, Estimation and Optimization of Net Systems Large-Scale Weapon Target Assignment Based on Improved MOEA/D Algorithm	92 overy with97 ment104

A Simulation-Based Learning Method for Automatic Dynamic Event Tree Model Generation and Analysis
Research and Application of Intelligent Alarm Management Method for Petrochemical Plants in the Context of Industrial Internet
Xiaomiao Song, Fabo Yin, Dongfeng Zhao, Jiangbo Jiu
Application of PSA Technology in Technical Requirements Optimization of Nuclear Power Plant
> Nuclear Power Plant Reliability Design and Safety Assessment
Design of an Online Operational Task Reliability Analysis System in Nuclear Power Plant
Wei Li, Ming Yang, Zhengxi He, Zhao Gao, Yan Xiong, Zhongyue Zhang, Dehang Jiang, Jipu Wang
Risk-Informed Safety Margin Evaluation Approach of Nuclear Power Plant Integrated with Adaptive Dynamic Event Tree Algorithm145
Anqi Xu, Ming Yang, Xiaomeng Dong, Yuan Yin, Sijuan Chen, Jipu Wang, Lei Li, He Wang
Research on Intelligent Identification Method of Primary Loop Transient in Nuclear Power Plant
Summary of Collecting and Processing Methods for Common Cause Failure Data of PSA Components in Nuclear Power Plant
Hongwei Dai, Weijin Wang
Human Performance Detection Using Historical Operation Data of Nuclear Power Plants
GRU-CNN-Based Prediction of LOCA Accident Condition in Nuclear Power Plants
An Application of Cognitive Workload and Situational Awareness Assessment in Human Safety Demonstration of NPP
Zhihui Xu, Hang Liu, Can Zhou, Yunqing Gao, Jipu Wang, Yuxin Zhang, Jun Yang, Ming Yang
Research and Practice of Prognostics and Health Management Technology in Medium Voltage Cabinets Management of Nuclear Power Plants
Zhijian Wang, Yao Sun
A GO-FLOW Model Updating Method Adapting to the Scenario Change in Nuclear Power Plants
> Fault Analysis and Status Monitoring
Intermittent Fault of Solder Joints: A Review
Gen Liu, Shulin Liu, Yueze Wang, Zijian Zhang, Xiaojian Yi

Overview of the Application of Knowledge Graph in Anomaly Detection and Fault Diagnosis	207		
A Multilevel Flow Models Based Diagnosis Method for Multiple Faults in Nuclear Power Plant	214		
Fault Diagnosis Analysis of Complex Controlled Process Based on Multilayer Flow Model	220		
Research on the Integrated Design Technology of Performance Verification and Qualification Test	226		
An LSTM Autoencoder-Based Framework for Satellite Telemetry Anomaly Detection			
Medium-Weight Impact Test Response Data Analysis	235		
Ensemble of DAEs for Fault Detection of Gas Turbine Engines	240		
Failure Mode Analysis of High-Pressure Duct Bleed Air Leakage	245		
Some Extended Geometric Processes and Their Estimation Methods	249		
> Reliability Analysis and Testing of Electronic Equipment			
Concepts and Framework of Automatic Identification Technology for Secondary Device in Substations			
The Study of Activation Energy of Electromigration at Different Temperature	260		
Research on Reliability Quantitative Evaluation Method of Stepping Stress Strengthening Test for Electronic Equ			
Hong Wang, Yuxin Wang			
A Dynamic Fire Risk Assessment Framework of Critical UHV Converter Transformer	271		
Reliability Analysis and Health Management of the Radar Range Based on Belief Reliability Theory	278		
Abnormal Discharge Detection Method of Satellite Battery System Based on FPgrowth-RF	284		
Loose Particle Localization Method for Sealed Electronic Equipment Based on Improved Random Forest	289		

Reliability Risks from Counterfeit Electronics	297
Giovanna Mura, Giovanni Martines	
Fault Excitation Test Method and Application Based on Switching Transistor	302
Indexes and Methods of Multi-dimensional Comprehensive Evaluation of Relay Protection	307
Research on Performance Model of Radial Foil Air Bearings for Aeronautical Cooling Turbine Unit	312
> Risk Classification and Assessment of Complex Systems	
Research of Risk-Informed Human Factors Engineering Implementation Methodology Deng Shiguang, Xu Yunlong, Li Wanting	322
Study on Construction Safety Risk Classification Methods of Bridge Engineering	327
Safety Risk Research during Military Aircraft Crossing Civil Airway Based on EVENT Model	333
Causes of Chinese Mainland's Major Chemicals-Related Accidents from 2015 to 2020: A Review Based on Network Theory	
Jianfeng Yang, Pengchao Wang, Liangchao Chen, Jianwen Zhang, Zhan Dou	
Research on Risk Situation Awareness and Prediction Method of Industrial Control Systems	344
A Theoretical Framework of COTS Components Space Application Based on "Risk Information Entropy" Zhang Wen, Dang Wei, Ao Liang, Feng Yewei	353
A Data Model for Quantitative Analysis of Fire Risk in Social Units	358
> System Model Design and Stability Evaluation	
Optimal Periodic Inspection for Multi-auxiliary Component Systems Subject to Load-Sharing Dependence Xiayu Cai, Jingyuan Shen, Yao Duan, Nan Zhang	363
Research and Implementation of Reinforcement Technology of Integrated Monitoring Platform Based on C	
Li Yi, He Ming, He Rui, Zhou Wan, Feng Shilin	
Mental Workload Modeling of Time-Critical Tasks in Autonomous Driving Based on a Multi-source Information	
Yaonan Ding, Shengkui Zeng, Haiyang Che, Jianbin Guo	

Joint Optimization for the Spare Part Support System Location-Inventory-Allocation Problem under (T, S) Policy 38 Wenshu Xie, Li Jia, Peixuan Li, Meilin Wen
Comparative Analysis of Adaptive Sampling Method Optimization
Visualization Simulation of Mission Planning Schemes for Remote Sensing Satellites
The Characterization Research on Atmospheric Environmental Corrosion of Aluminum Alloy
Zhu Yu-qin, Li Jia-meng, Zhao Fang-chao, Dai Lu, Su Yan
> Reliability Estimation from Degradation Data Analysis
A Novel Hybrid Neural Network with Attentive Feature Selection for Degradation Status Identification of Aircraft Self-Locking Nuts
Zhang Wenjing, Ma Yulin, Xu Yanwei, Liang Xinfu, Qi Le, Yang Jun, Li Lei
A Movable Component Signal Identification Technology for Loose Particles Detection Based on Pulse Trajector Tracking Algorithm
Pengfei Li, Guofu Zhai, Guotao Wang, Zhigang Sun, Xiao Han, Qiang Wang
Failure Analysis of Dielectric Material Defects inside IGBT Chips
Research on State Safety Programme Maturity Assessment Model of Civil Aviation
Remaining Useful Life Prediction for Heterogeneous-Wearing Cutting Tools Based on Gamma Process and Bayesia Inference
Yihang Wang, Ke Zou, Nan Sun, Biao Lu
Weighted Clustering Method for Retired Lithium-ion Batteries Screen under Different Operating Scenarios43 Yuhang Du, Yuchen Song, Datong Liu
> Reliability Estimation from Degradation Data Analysis
Degradation Modeling under Dual Time Scales Based on an Autoregressive Model
Protection Current Degradation Modeling and Life Evaluation Method of Sacrificial Anodes for Marine Structure
Haodi Ji, Yikun Cai, Xiaobing Ma, Yanyan Wang
A Study on Accelerated Life Evaluation of Prefabricated Target of Deuterium-Tritium Neutron Tubes45
Bai-Mao LEI, Qiang CHEN, Qian LI, Pei-Bo LIANG
A Novel Framework for Comprehensive PPS Effectiveness Evaluation in 3D Modeled Environment

Health Indicator Construction Method of Gun Anti-recoil Device Based on Dynamic Degradation Distance Jianfeng Wei, Faping Zhang, Weijie Shi, Jiping Lu, Xiangfei Yang	te463
> Novel Operation and Maintenance Solutions for Complicated Systems	
Research on the Safety of New Energy Vehicle Charging Operation Based on Dissipative Structure Theory Yang Menghua, Yue Lihong, Wang Lu, Zhu Mingyang, Wang Yuxiang, Zhang Haijing	′y471
Human-Machine Trust and Calibration Based on Human-in-the-Loop Experiment	476
Yifan Wang, Jianbin Guo, Shengkui Zeng, Qirui Mao, Zhenping Lu, Zengkai Wang	
A (τ, T) Replacement Policy for Series Systems Consisting of Different-Type Units with Consideration of Time	
Kentaro Fujioka, Lu Jin	
Joint Optimization of Maintenance and Spare Parts Ordered from Multiple Suppliers for Multiple Compo Zhiyun Su, Huade Su, Meimei Zheng	onents 488
A Reliability Evaluation and Inspection-Based Replacement Optimization Policy Considering Measurem and State Variations	•
Fanping Wei, Li Yang, Longyan Tan, Xiaobing Ma	
Analysis Analysis of Failure Data with Missing Labels	500
Analysis of Failure Data with Missing Labels	500
Jiaxiang Cai, Xin Ye, Loon Ching Tang	
Prediction of Cognitive Errors Based on EEG Data Mining	505
An Evaluation Model for Continuous Operating Time Based on Minimum Order Statistic	
Evaluation of the Performance of Autonomous Visual Perception Units in Challenging Environments	511
Xingge Li, Xun Chen, Shufeng Zhang, Jingwen Hu, Xiaofei Pang, Kaihong Hou	
Early Prediction Method for Remaining Useful Life of Retired Batteries in Second-life Applications Yuyi Tan, Tianpei Liu, Xingbin Ye, Yanhua Chen, Qingcheng Yang, Weiwen Peng	516
Early Prediction Method for Remaining Useful Life of Retired Batteries in Second-life Applications	516
Early Prediction Method for Remaining Useful Life of Retired Batteries in Second-life Applications Yuyi Tan, Tianpei Liu, Xingbin Ye, Yanhua Chen, Qingcheng Yang, Weiwen Peng Capacity and RUL Prediction of Retired Batteries Using Machine Learning Features	516 522 531

Reliability Assessment of Performance-Based Balanced Syst	ems with Common Bus Performance Sharing Subjected to
Epistemic Uncertainty	549
Tianzi Tian, Jun Yang	

Author Index