

17th International Conference on Structural Mechanics in Reactor Technology 2003 (SMiRT 17)

Prague, Czech Republic
17-22 August 2003

Volume 1 of 4

ISBN: 978-1-5108-1700-5

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2003) by International Association for Structural Mechanics in Reactor Technology (IASMiRT)
All rights reserved.

Printed by Curran Associates, Inc. (2016)

For permission requests, please contact International Association for Structural Mechanics in Reactor Technology (IASMiRT)
at the address below.

International Association for Structural Mechanics in Reactor Technology (IASMiRT)
c/o Dr. Vernon Matzen
North Carolina State University
Campus Box 7908
Raleigh, NC 27695-7908

Phone: (919) 515-5277
Fax: (919) 515-5301

IASMiRTinfo@gmail.com

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
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

VOLUME 1

DIVISION A: PLENARY LECTURE

A01: PLENARY LECTURES AND PANEL

Historical Development of the Seismic Design Requirements for Nuclear Power Plants Worldwide and Their Impact on Cost and Safety.....	1
<i>John D. Stevenson</i>	
Towards and European Draft Code of Practise in Creep Crack Growth Testing.....	36
<i>Kamran Nikbin</i>	
Trends in Large - Scale Testing of Reactor Structures.....	44
<i>Thomas E. Blejwas</i>	
Integrity Operation of NPP-components Skills and Tools to Maintain Competence	49
<i>Helmut Schulz</i>	
Computational Platform for Safety and Life-cycle Assessment of RC/PC Shells	55
<i>Koichi Maekawa, Kyu Yong Choi</i>	
VVER Operational Safety Improvements: Lessons Learnt from European and OECD Co-operation, and Future Research Needs	63
<i>Frantisek Pazdera, Ivo Vasa, Jiri Zdarek</i>	

DIVISION B: COMPUTATIONAL MECHANICS

B01: STRUCTURAL AND THERMAL ANALYSIS

Effect of Modeling of Super-structure on the Behaviour of Reactor Building Raft (B511).....	73
<i>A. Mondal, A. K. Singh, Raghupati Roy, U. S. P. Verma, A. S. Warudkar</i>	
Development of a Finite Element Based Probabilistic Tool (B215)	82
<i>Ronald F. Kulak, Paul V. Marchertas</i>	
Assessment of Local Decreases in Wall Thickness at the Connection Straight-Pipe/Bend Considering 0°-90° -Bends (426).....	89
<i>Wieland Holzer, Robert Kauer, Christian Hüttner</i>	
Numerical FEM Analyses of Primary Coolant System at NPP Temelín (B522)	97
<i>Lubomír Junek, Marek Slováček, Leoš Ružek, Pert Moulis</i>	
Super-Elements...a Remedy for Non-Linear Analyses of Large-Sized Models (B050).....	106
<i>S. M. Palekar, K. V. Subramanian, M. S. Bavare</i>	

B02: HIGH – NON LINEAR ANALYSIS, MATERIAL BEHAVIOUR

Nonlinear Stability Analysis of Doublet Type Thin-walled Shell Structures Considered the Multi Point Constraints Condition (B246).....	112
<i>Kyung-Ho Yoon, Myung-Hwan Choi, Hyung-Kyu Kim, Kee-Nam Song</i>	
Tip-Over Analysis of the HI-STORM Dry Storage Cask System (B237)	120
<i>Mahendra J. Shah, P. A. Cox, A. H. Chowdhury</i>	
A New Method for Determining Longitudinaly Nonuniform Axisymmetric Residual Stresses in Tubes Using Strain Gages (B314)	128
<i>Tadashi Nishimura</i>	
Topology Optimization of the Structure with Material Properties Changing (B399)	136
<i>Ryszard Kutyłowski</i>	
Modeling Elasto-plastic Behavior of Polycrystalline Grain Structure of Steels at Mesoscopic Level (B584).....	144
<i>Marko Kovac, Igor Simonovski, Leon Cizelj</i>	

B03: VIBRATION AND FLUID DYNAMICS ANALYSIS

Free Vibration of Cracked Shallow Elliptic Paraboloid Shells (B376).....	154
<i>Yung-Tze Chen</i>	
Optimization of a Primary Circuit of the Nuclear Power Plant from the Vibration Point of View (B309).....	162
<i>Jan Dupal, Vladimír Žeman</i>	
Generation Possibilities of Lower Frequency Components in Fluid Temperature Fluctuations Related to Thermal Striping Phenomena (B216).....	171
<i>Toshiharu Muramatsu</i>	
Modelling of Temperature Field in a Reactor Vessel Downcomer during Transients (B579).....	179
<i>Martin Prošický, Pavel Zácha</i>	

Numerical Analysis of Flow-induced Vibration using Overset Grid System (B487)	192
<i>Shigeaki Kuroda, Kazuya Ogasawara</i>	

DIVISION C: FUEL AND CORE STRUCTURES

C01: FUEL VIBRATION AND FRETTING

Prediction of Flow Induced Damping of a PWR Fuel Assembly in Case of Seismic and Loca Load Case (C083)	197
<i>E. Viallet, T. Kestens</i>	
Validation of PWR Core Seismic Models with Shaking Table Tests on Interacting Scale 1 Fuel Assemblies (C431)	205
<i>E. Viallet, G. Bolsee, B. Ladouceur, T. Goubin, J. Rigaudieu</i>	
Vibration Analysis of a Dummy Fuel Rod Continuously Supported by Spacer Grids (C089)	213
<i>Myoung-Hwan Choi, Heung-Seok Kang, Kyung-Ho Yoon, Kee-Nam Song, Youn-Ho Jung</i>	
Modal Testing and Identification of a PWR Fuel Assembly (C188)	221
<i>Stéphane Pisapia, Bruno Collard, Sergio Bellizzi, Vincent Mori</i>	
Water Confinement Effects on Fuel Assembly Motion and Damping (C238)	229
<i>B. Brenneman, S. J. Shah, G. T. Williams, J. H. Strumpell</i>	

C02: FUEL DESIGN AND CONSTITUTIVE MODELLING

A Sensitivity Study on the Fuel Rod Hydraulic Instability for the Advanced 16X16 Fuel Development (C501)	236
<i>Sang Youn Jeon, Kyeong Lak Jeon, Jae Won Kim</i>	
Calculational Analysis of WWER-1000 Fuel Assembly Operational Deformation (C179)	244
<i>V. L. Danilov, S. V. Zarubin, V. P. Semishkin, N. V. Shary</i>	
Large Grain Size UO₂ Sintered Pellets Obtaining used for Burn up Extension (C009)	250
<i>Dumitru Ohai</i>	
Optimization of Procedures for Manufacture of Tubular Claddings and Pressure Tubes (C318)	256
<i>Igor Matsgorin, Alexander Semenov, Eugeny Rivkin, Boris Rodchenkov</i>	
Performance of Mexican Fuel at the Laguna Verde Nuclear Power Plant (C257)	264
<i>Carlos A. Nocetti, Raúl Perusquia, Octavio Ovila</i>	
Modeling of the Cold Work Stress Relieved Zircaloy-4 Cladding Tubes Mechanical Behavior under PWR Operating Conditions	270
<i>Fabrice Richard, Patrick Delobelle, Sylvain Leclercq, Pol Bouffoux, Gilles Rousselier</i>	

C03: FUEL FAILURE UNDER OPERATION AND ACCIDENT CONDITIONS

Modelling of Fuel Rod Hydriding Failures in Water Reactors (C194)	283
<i>E. Yu. Afanasieva, I. A. Evdokimov, O. V. Khoruzhii, V. V. Likhanskii, A. A. Sorokin</i>	
Theoretical and Experimental Modeling of the Multiple Pressure Tube Rapture for RBMK Reactor. Part I (C228)	291
<i>Natalya Y. Medvedeva, Igor A. Peshkov, Andrey V. Andreev, Robert V. Goldstein, Yuri V. Zhitnikov, Ilya V. Kadochnikov</i>	
Scenario for the Damage of PWR Fuel Cladding in Situations of Pellet-Cladding Interaction (C288)	297
<i>Gilles Rousselier, Sylvain Leclercq, Olivier Diard</i>	
Prediction of Failure of Highly Irradiated Zircaloy Clad Tubes under Reactivity Initiated Accidents (C037)	303
<i>Lars O. Jernkvist</i>	
Analysis of Power History Effect for Cladding Stress during Power Ramp by FEMAXI-IV (C269)	312
<i>Shuhei Takeda</i>	
Effect of External Hydride Layer on Fuel-Cladding Deformation during EDC-Testing (C374)	318
<i>Y. Ménager, A. G. Varias</i>	

C04: COMPONENTS AND MATERIAL BEHAVIOUR UNDER IRRADIATION

Advanced Spacer Grid Design for the PLUS7 Fuel Assembly (C378)	326
<i>Yong Hwan Kim, Young Ki Jang, Kyu Tae Kim</i>	
Studies on the Stress-strain State of Spacer Grids and Claddings (C317)	334
<i>Igor Matsgorin, Alexander Semenov, Denis Severinov, Eugeny Rivkin, Anatoliy Kupalov-Yaropolik</i>	
Mechanical Characteristics of the HANARO Fuel Capsule (C171)	342
<i>Y. H. Kang, Y. J. Kim, B. G. Kim, Y. S. Lee, H. S. Kim, Y. J. Choi</i>	
Presentation of a New Methodology of Chained Computations using Instationary 3D Approaches for the Determination of Thermal Fatigue in a T Junction of a PWR Nuclear Plant (C492)	349
<i>Sofiane Benhamadouche, Marc Sakiz, Christophe Péniquel, Jean-Michel Stéphan</i>	
The Risk Impact of Aging/Degradation of Barrel-Baffle Bolts on a PWR Plant (C503)	357
<i>Ching-Hui Wu, Tsu-Mu Kao, Tsu-Jen Lin</i>	
Deformation and Fracture of Irradiated Stainless Steel (C389)	361
<i>H. Tsai, T. R. Allen, J. Cole, T. Yoshitake, I. Yamagata</i>	

C05: INTEGRITY OF FUEL SYSTEMS UNDER TRANSIENT CONDITIONS

High Temperature Mechanical Behavior of Zr-2,5 % Nb Alloy (C273)	369
<i>B. S. Rodchenkov, A. N. Semenov</i>	
Fatigue Properties of a Cast Iron for the Reactor Fuel Carrier Candidate Heavy Thickness Tube (C087)	374
<i>Shigetomo Nunomura, Yasuhiro Yamasaki, Wu Shi Pink</i>	
Calculations of Fuel Rod Cladding Deformation for a Reactor Plant Wwer-1000 Under LB Loca (C180)	382
<i>Yu Dragunov, V. Semishkin, Eu. Frizen, N. Shary</i>	
Fuel Dimensional Stability in Czech Wwer Reactors (C472)	388
<i>J. Belac, D. Ernst, M. Lehmann, V. Mecir, A. Miasnikov, R. Svoboda, S. Stech, P. Vesely, M. Valach</i>	
Severe Core Damage Experiments and Analysis for CANDU Applications (C069)	389
<i>P. M. Mathew, A. J. White, V. G. Snell, M. Bonechi</i>	

DIVISION D: AGING, LIFE EXTENSION, AND LICENSE RENEWAL

D01: INTERNATIONAL REGULATORY AND ECONOMICS PERSPECTIVES

Assessment and Management of Aging of Nuclear Power Plant Safety-Related Structures (D457)	397
<i>D. J. Naus, H. L. Graves III, B. R. Ellingwood</i>	
The AMES network in the 6th Framework Programme (D267)	405
<i>F. Sevini, L. Debarberis, N. Taylor, R. Gerard, C. English, M. Brumovsky</i>	
Life Cycle Management in the US Nuclear Power Industry (D545)	411
<i>George E. Sliter</i>	
Regulatory Strategy for Operational Safety and Aging Management of NPPs in Korea (D555)	419
<i>H. J. Kim, H. K. Kim, T. E. Jin</i>	
Development of Periodic Safety Review Technology in Korea (D034)	425
<i>Tae-Ryong Kim</i>	

D02: UTILITY PERSPECTIVES, WWER TECHNOLOGY

Safety Aspects of Long-term Operation of Nuclear Power Plants (D524)	431
<i>Paolo Contrì, Tamás Katona</i>	
Lifetime-Management and Operational Lifetime Extension at Paks Nuclear Power Plant (D112)	439
<i>T. Katona, A. Jánosiné Bíró, S. Rátkai, A. Tóth</i>	
Aging Assessment of CANDU Plant Major Components for PLIM Feasibility Review (D535)	447
<i>Kyoung-Soo Lee, Il-Seok Jeong, Tae-Ryong Kim</i>	
Material Properties Degradation Assessment of the First Generation WWER-440 RPV after Prolonged Operation (D182)	455
<i>Igor Gorynin, Boris Timofeev, Tatiana Chernenko</i>	
Surveillance Specimen Programmes for WWER Reactor Vessels in the Czech Republic (D026)	463
<i>Jiri Brynda, Jozef Hogel, Milan Brumovsky</i>	
VVER-1000 Base Metal Reference Steel and its Characterisation (D225)	471
<i>Luigi Debarberis, Beatriz Acosta, Soraia Pirlo, F. Sevini, A. Kryukov, F. Gillemot, A. Chernobaeva, M. Brumovsky</i>	

D03: FATIGUE, CORROSION AND CRACK ISSUES

Study of Crack Propagation in a Multicracked Structure in Thermal Fatigue (D210)	479
<i>M. Seyed, S. Taheri, F. Hild, J-M Stephan</i>	
Fatigue Evaluation of Dissimilar Welds on Nuclear Components (D080)	487
<i>Jong-Sung Kim, Se-Hwan Lee, Tae-Eun Jin</i>	
Crack Growth Behavior of Irradiated Austenitic Stainless Steels in BWR Environments (D444)	495
<i>O. K. Chopra, E. E. Gruber, W. J. Shack, J. Muscara</i>	
Mechanism of Fatigue Crack Initiation in Austenitic Stainless Steels in Light Water Reactor Environments (D445)	503
<i>O. K. Chopra, W. J. Shack, J. Muscara</i>	
Structural Assessment of a Corrosion-Degraded Reactor Pressure Vessel Head (D448)	511
<i>Paul T. Williams, B. Richard Bass</i>	
Condition Monitoring of Flow-Accelerated Corrosion of a Simulated Low Alloy Steel Piping Elbow using Electrochemical and Vibration Sensors (D320)	519
<i>Na Young Lee, Chi Bum Bahn, Si Hyoung Oh, Il Soon Hwang, Jung Taek Kim, Vincent K. Luk</i>	

D04: COMPONENT INTEGRITY

Ageing Management of the Steam Generators of the Nuclear Power Plant GKN (D530)	527
<i>J. Bartonicek, W. Zaiss, F. Schöckle</i>	
Life Cycle Management of PWR Pressurizer (D539)	537
<i>Keshab K. Dwivedy, Nitin J. Shah, Mark A. Gray</i>	

Ageing Evaluation Model of Nuclear Reactors Structural Elements (D313)	543
<i>Antanas Ziliukas, Audrius Jutas, Vitalis Leisis</i>	
Application of the Seebeck Effect for the Monitoring of the Neutron Embrittlement and Low-Cycle Fatigue in Nuclear Reactor Technology (D585)	549
<i>M. Niffenegger, K. Reichlin, D. Kalkhoff</i>	
Wear Behavior of Steam Generator Tubes in Nuclear Power Plant Operating Condition (D045)	557
<i>In-Sup Kim, Jin-Ki Hong, Hyung-Nam Kim, Ki-Sang Jang</i>	
Experience Acquired from the Equipment Qualification Process of the Temelin NPP (D521)	564
<i>Marek Tengler, Rudolf Masopust, Milan Vrana</i>	

D05: AGING ASSESSMENT AND MONITORING

The TVO Pipeline Analysis and Monitoring System (D185)	568
<i>Paul Smeekes, Aarne Lipponen, Heikki Raiko, Heli Talja</i>	
Application and Importance of Ageing Management in Plant Life Extension Programme, Swiss NPP's (D054)	576
<i>Reinhard Fuchs, Jan Stejskal, Daniel Steudler, Kurt Thoma</i>	
Ageing Management Program of Safety Components: A Systematic Procedure (D567)	592
<i>Claude Faidy</i>	
Monitoring of Thermal Stresses in Steam Generators (D515)	598
<i>Bohdan Weglowski, Jan Taler, Piotr Duda</i>	
Application of DIALIFE system for Residual Life Time Assessment on Nuclear Power Plants (D406)	606
<i>Dušan Vincour</i>	
Application of Neural Networks for Finding the Relation between Stress and Operational Parameters of NPP Temelin (D536)	614
<i>Leos Ružek</i>	
COMSY Software Assists Lifetime Management Activities (D187)	619
<i>A. Zander, H. Nopper</i>	
Inverse Method for Stress Monitoring in Pressure Components of Steam Generators (D489)	629
<i>Piotr Duda</i>	
Ageing Management - A New Key Word for Inaction? (D438)	637
<i>Josef Jansky</i>	
Process Data Reconciliation in Nuclear Power Plants (D435)	644
<i>Magnus Langenstein, Josef Jansky</i>	
MAFES, HUMOS and LEMOP Diagnostic Systems-Applications in NPP Temelin (D542)	653
<i>Oldrich Matal, Oldrich Matal, Josef Žaloudek</i>	

D06: CONTAINMENT AND OTHERS STRUCTURES

Risk-Informed Assessment of Degraded Containment Structures (D455)	659
<i>B. W. Spencer, D. M. Kunsman, H. L. Graves</i>	
Structural Analysis Research Needs for Advanced Reactors (D456)	667
<i>Syed A. Ali, Herman L. Graves III</i>	
Development of Integrated Aging Management System for Containment Building (D252)	672
<i>Myung-Sug Cho, Young-Chul Song, Jong-Suk Lee, Sung-Wook Kim</i>	
Risk-based Replacement Strategies for Redundant Deteriorating Reinforced Concrete Pipe Networks (D546)	680
<i>Bryan Adey, Olivier Bernard, Bruno Gerard</i>	

DIVISION F: DESIGN METHODS AND RULES FOR COMPONENTS

F01: INTERNATIONAL CODES AND STANDARDS

RCC-MR Code for Years 2000 : Presentation Emphasising Recent Design Improvements (F033)	689
<i>Bernard Riou, Morello Sperandio, Claude Escaravage, Bernard Drubay, Marie-Thérèse Cabrillat, Yves Mézière, Bernard Salles</i>	
Review and Comparison of WWER and LWR Codes and Standards (F442)	695
<i>D. Buckthorpe, A. Tashkinov, J. Brynda, L. M. Davies, C. Cueto-Felgueroso, P. Detroux, K. Bieniussa, J. Guinovart</i>	
Review of Provisions on Corrosion Fatigue and Stress Corrosion in WWER and Western LWR Codes and Standards (F441)	703
<i>D. Buckthorpe, V. Filatov, A. Tashkinov, S. V. Evropin, K. Matocha, J. Guinovart</i>	
Typical Design/Qualification Acceptance Criteria for Newly Installed Pipelines and Equipment Components of VVER-Type NPPs (F509)	711
<i>Rudolf Masopust</i>	
Automated Safety Assessment Based on Design by Analysis (F085)	719
<i>Yu Zhou, Shiyi Bao</i>	
Correction Factors for ASME ANSI-OM3 Stress/Velocity Relationship With Respect to Static Design (F281)	726
<i>Sébastien Caillaud, Didier Briand, Pierre Moussou, Michaël Gaudin</i>	

F02: TUBE, PIPING CODES AND STANDARDS

The B₂ Stress Index as a Function of Internal Pressure, Bend Angle, Loading Type and Material (F265)	734
<i>Vernon C. Matzen, Xi Yuan</i>	
Limit Analysis of Pipe Tee Connection (F298)	740
<i>Marie-Noël Berton, Bruno Michel</i>	
Adaptation of the Modern Approaches for Protection of Nuclear Power Plants against the Effects of Postulated Pipe Ruptures to the Russian National Guides. Problems and Experience (F278)	748
<i>Alexei Berkovsky, Victor Kostarev, John D. Stevenson</i>	
Chemistry Effect of Heat-Exchange Pipes on Functional Reliability of Steam Generators in PWR and VVER NPPs (F369)	756
<i>V. I. Baranenko, M. B. Bakirov, S. G. Oleinik, V. A. Kumov, V. N. Merkushev, T. E. Schederkina</i>	
Industrial Models for Thermal Fatigue Crack Initiation and Propagation in Mixing Zones of Piping Systems (F157)	761
<i>Frédéric Beaud, Stéphanie Musi, Claude Faidy</i>	
The Turbulent Graetz Problem for Direct-Contact Condensation in the Entrance Region of a Rectangular Channel (F005)	770
<i>Ki Yong Choi, Hee Cheon No</i>	

F03: ANALYSES

Mitigation Method of Thermal Transient Stress by Thermalhydraulic-Structure Total Analysis (F263)	778
<i>Naoto Kasahara, Masakazu Jinbo, Hiromi Hosogai</i>	

VOLUME 2

Critical Heat Fluxi in Narrow Gap in Two-dimensional Slices under Uniform Heating Condition (F451)	786
<i>Yong Hoon Kim, Seong Joong Kim, Sang Woo Noh, Kune Y. Suh</i>	
Issues Involved in Analysis and Design of Liner-System (F052)	793
<i>K. V. Subramanian, S. M. Palekar, M. S. Bavare</i>	
Size and Strain Rate Effects in the Mechanical Properties of Materials (F065)	800
<i>Atilio A. Morquio, Jorge D. Riera</i>	
Stress Analysis of the Pressure Barrier of the MCP for an Integral Reactor (F144)	808
<i>Jin Seok Park, Jong In Kim, Jae Seon Lee, Min Hwan Kim, Sung Kyun Zee</i>	
Structural Mechanics Analysis of Intermediate Heat Exchanger for Prototype Fast Breeder Reactor (D336)	814
<i>R. Srinivasan, Alok Gupta, P. Chellapandi, S. C. Chetal, S. B. Bhoje</i>	

F04: FATIGUE AND LIFE ASSESSMENT

The Effect of Material Ductility Variations on Low-cycle Fatigue (F181)	821
<i>V. M. Filatov, A. V. Tashkinov</i>	
Application of a Kinetic Indentation Technique to Estimate Wear and Fatigue Behaviors of Irradiated Specimens (F172)	827
<i>V. P. Alekhin, Y. H. Kang, Y. S. Pyun, C. H. Hahn, Y. Choi</i>	
Study on Fatigue Crack Closure in High Strain Region of Engineering Structure (F414)	832
<i>Gao Zengliang, Fang Zhiming, Zhang Kangda, Li Peining, Jin Weiya</i>	
Study on the Simplified Procedure for Evaluating the Undrained Cyclic Strength for Gravelly Soils (F572)	838
<i>Shizuo Tsurumaki, Kouichi Nishi, Yuichi Kohmura, Akihiko Uchida, Ryoutchi Babasaki</i>	
Prediction of Fatigue Crack Propagation of Double Surface Cracks by "SCAN" (F437)	845
<i>Masaki Shiratori, Naoki Yoshikawa, Nagatoshi Seki, Hiroyuki Matsuda, Hisao Matsushita, Toshiro Miyoshi</i>	
A Simulation for Growth Evaluation of Multiple Small Cracks (F508)	853
<i>Masayuki Kamaya, Takayuki Kitamura</i>	
Multiaxial Low Cycle Fatigue Life Prediction Criteria: Comparisons and Results (F126)	857
<i>Sergiy Shukayev, Oleksandr Zakhovayko, Timophiy Ponomarenko</i>	

F05: CREEP

Effect of Specimen Geometries on the C* vs da/dt Master Curve of Type 316L Steel (F233)	866
<i>R. Kabiri, L. Laiarinandrasana, M. Reytier</i>	
Formulation of a Physically Based Intergranular Creep Damage Model for Austenitic Steels (F304)	874
<i>B. Michel</i>	
Comparison of Crack Initiation Life Estimation Procedures Under Creep-Fatigue Conditions (F416)	882
<i>M P. O'Donnell, Y. Takahashi</i>	
Evaluation of Creep Crack Growth Behavior of Type 316LN Stainless Steel (F319)	890
<i>Woo-Seog Ryu, Woo Gon Kim, Kyung Yong Lee</i>	
Creep Fracture and Creep Crack Growth in Inconel 718 Nickel based Superalloy (F211)	897
<i>Antonietta Lo Conte</i>	

Materials Research Needs for Advanced Reactors (F481).....	903
<i>Nilesh C. Chokshi, Charles A. Greene, Joseph Muscara, Makuteswara Srinivasan</i>	
Elastic-plastic-creep Cyclic Loading of Thick Pressure Vessels based on the Frederick-Armstrong Kinematic Hardening Model (F464).....	912
<i>Hossein Mahbadi, Mohamad R. Eslami</i>	
Effect of Penetrations on the Lower Head Vessel Failure under Coupled Melt Pool Convection and Creep (F342).....	919
<i>B. R. Sehgal, A. Giri, A. Karbojian, A. Theerthan</i>	

F06: BOLTED CONNECTIONS AND GASKETS

"Tightness" of Bolted Flange Connections - What Does That Mean? (F531).....	934
<i>J. Bartonicek, F. Schoeckle, H. Kockelmann</i>	
Calculation of Bolted Flange Connections - State of the Art (F533).....	942
<i>M. Schaaf, J. Bartonicek</i>	
Replacement of VVER-440 Reactor-Coolant-Pump Main-Flange Packing (F177).....	949
<i>Karel Pochman, Lubomir Charvat, Ales Licka</i>	
Effect on Residual Life Time Due to Welding Repairs of NPP Components (F523).....	956
<i>Marek Slovacek, Lubomir Junek</i>	
Gasket Characteristics in Flanged Joints (F532).....	962
<i>M. Schaaf, F. Schöckle, J. Bartonicek</i>	

DIVISION G: FRACTURE MECHANICS

G01: REACTOR PRESSURE VESSEL INTEGRITY I

Nesc Benchmark Tests to Support Improved Structural Integrity Assessment (G055).....	971
<i>R. Rintamaa, N. Taylor</i>	
Latest Results of the United States Nuclear Regulatory Commission Pressurized Thermal Shock Rule Re-evaluation Project (G402).....	979
<i>T. L. Dickson, M. T. Kirk, C. G. Santos</i>	
Evaluation of Pressurised Thermal Shocks for VVER 440/213 Reactor Pressure Vessel in NPP Dukovany (G326).....	987
<i>Vladislav Pištora, Pavel Král</i>	
New Approaches for Evaluation of Brittle Strength of Reactor Pressure V (G291).....	995
<i>Boris Margolin, Eugene Rivkin, George Karzov, Victor Kostylev, Alexander Gulenko</i>	
Updated Embrittlement Trend Curve for Reactor Pressure Vessel Steels (G479).....	1003
<i>Mark Kirk, Cayetano Santos, Ernest Eason, Joyce Wright, G. Robert Odette</i>	
The Evaluation of Ductile-brittle Transition Temperature before and after Neutron Irradiation in RPV Steels Using a Small Punch Test (G006).....	1011
<i>Min-Chul Kim, Yong Jun Oh, Bong Snag Lee</i>	

G02: REACTOR PRESSURE VESSEL INTEGRITY II

Study on Fracture Behaviour in Clad Cruciform Specimens under Biaxial Loading (G075).....	1017
<i>Iradj Sattari-Far</i>	
Problems of Underclad Type Defects in Reactor Pressure Vessel Integrity Evaluation (G327).....	1025
<i>D. Laurová, M. Brumovský, P. Simpanen, J. Kohopaa</i>	
J-integral Solution for High Strain Region of SCT Specimen (G413).....	1033
<i>Gao Zengliang, Cai Guodong, Jin Weiya, Fang Zhiming</i>	
Crack Propagation of Cracked Plates (G427).....	1037
<i>Yung-Tze Chen</i>	
Assessment of Geometry and Size Effects on the J_R-Δ_a Curve with a Continuum Ductile Damage Model (G305).....	1043
<i>B. Michel</i>	
Evaluation of J-R Curve of Throughwall Cracked Elbow Under In-plane Bending Moment (G583).....	1051
<i>J. Chattopadhyay, B. K. Dutta, H. S. Kushwaha</i>	

G03: REACTOR PRESSURE VESSEL INTEGRITY III

The Energy Approach of Elastoplastic Fracture Mechanics Applied to the Problem of the Shallow Crack Effect (G199).....	1059
<i>Wadier Yves, Bonnamy Marc</i>	
The Weibull Stress Parameters Calibration upon the Toughness Scaling Model between Cracks Having Different Constraint (G556).....	1067
<i>Vladislav Kozák, Libor Vlcek</i>	
The Ductile Crack Growth Effect on the Temperature Dependence of Cleavage Fracture Toughness (G052).....	1075
<i>B. Z. Margolin, V. I. Kostylev, A. I. Minkin</i>	
Fracture Toughness Prediction for RPV Steels with Various Degree of Embrittlement (G292).....	1083
<i>Boris Margolin, Alexander Gulenko, Victoria Shvetsova</i>	

Size Effects on Failure Behaviour of Reactor Pressure Vessel Steel and their Dependence on Deformation Inhomogeneity (G439).....	1091
<i>J. Aktaa, M. Klotz, R. Schmitt</i>	
Design Against Brittle or Elastic-Plastic Fracture of Nuclear Waste Container (G031).....	1099
<i>G. Pluvinage, G. B. Lenkey, I. Dlouhy</i>	

G04: DYNAMIC LOADING

Modern Safety Assessment of Cubic Cast Iron Containers Under Mechanical Impact (G223)	N/A
<i>Uwe Zencker, Karsten Müller</i>	
Numerical Fracture Analysis for the Structural Design of CASTOR Casks (G150).....	1107
<i>M. Enderlein, K. Klein, M. Kuna, A. Ricoeur</i>	
Storage Containers Optimized for Recycling (G516).....	1115
<i>D. Bounin, W. Kleinkröger, D. Schreiber</i>	
Dynamic Fracture Toughness Behaviour of Ductile Cast Iron with Respect to Structural Integrity Assessment (G016).....	1123
<i>Wolfram Baer, Karsten Müller, Peter Wossidlo, Dietmar Klingbeil</i>	
Evaluation of Strain Rate Effects on Transition Behaviour Applying the Master Curve Methodology (G250).....	1131
<i>Ivo Dlouhy, Jan Kohout, Vladislav Jurasek, Miloslav Holzmann</i>	
Correlation Length Estimation Issues in Stochastic Material Model (G010).....	1141
<i>Igor Simonovski, Marko Kovac, Leon Cizelj</i>	

G05: FRACTURE CONSIDERATIONS FOR VARIOUS APPLICATIONS

Transverse Cracking of Rotor Shafts Based on Disk Shrunk Technology (G167)	1150
<i>B. Andrier, L. Capponi, E. Garbay, P. Massin</i>	
Shape Sensitivity Analysis in Twisted Cracked Bars (G337)	1158
<i>Edgardo Taroco, Raúl A. Feijóo</i>	

G06: FAILURE ASSESSMENT OF ZR ALLOY

Sensitivity Analysis of Integrity Parameters in CANDU Pressure Tube using Probabilistic Fracture Mechanics (G147).....	1166
<i>Sang-Log Kwak, Joon-Seong Lee, Young-Jin Kim, Youn-Won Park</i>	
On the Failure Assessment Diagrams for CANDU-6 Pressure Tube Structural Integrity Analysis (G066).....	1175
<i>Vasile Radu</i>	
Measurement of DHC Velocity in CANDU Pressure Tubes (G073).....	1183
<i>Maria Roth, Rameshwar Choubey, Christopher Coleman, Iain Ritchie</i>	
Temperature Limit for Delayed Hydride Cracking in Zr 2.5Nb Alloys (G311)	1189
<i>S. Sagat, M. P. Puls</i>	

G07: PIPE INTEGRITY

Safety Review on Recent Steam Generator Tube Failure in Korea and Lessons Learned (G601).....	1197
<i>Youn Won Park, Jin Ho Lee</i>	
Load Bearing Capacity of Degraded Small Diameter Piping - Comparison of Testing with Calculation (G119)	1203
<i>Eberhard Roos, Karl-Heinz Herter, Frank Otremba, Jaroslav Bartonicek</i>	
Optimum Local Failure Model of Steam Generator Tubes with Multiple Axial Through-Wall Cracks (G138).....	1211
<i>Seong In Moon, Young Jin Kim, Jin Ho Lee, Youn Won Park, Myung Ho Song</i>	
Fracture Behavior of Tee Pipe with Local Wall Thinning (G405).....	1222
<i>Kotoji Ando, Koji Takahashi, Akihiko Kato, Yusuke Kimura, Masakazu Hisatsune, Kunio Hasegawa</i>	
Criterion for Failure of Internally Wall Thinned Pipe Under a Combined Pressure and Bending Moment (G407).....	1229
<i>Jin Weon Kim, Chi Yong Park</i>	
Circumferential-Crack-Driving-Force Solutions for CRDM Nozzles (G602).....	1237
<i>D. Rudland, Y.-Y. Wang, W. Norris, G. Wilkowski</i>	

G08: INTEGRITY OF WELDS

Weld Residual Stresses and Crack Growth in Bimetallic Pipe Welds (G410)	1245
<i>F. W. Brust, Y. P. Yang, P. M. Scott</i>	
Potential Interest for the Codification of Defect Assessment Procedures Including Mismatch Effect (G440).....	1253
<i>Patrick Hornet, Gregoire Martin</i>	
Experimental and Numerical Study of Crack Growth in the Heat Affected Zone of a Ferritic Steel Weldment (G550).....	1259
<i>Robert Moskovic, Noel O'Dowd, Peter Flewitt</i>	
On the Significance of Welded Joints in Ferritic Structures (G287).....	1267
<i>T. Šmida, J. Bošanský, V. Magula</i>	

Fatigue Crack Propagation Resistance Assessment on the Heat Affected Zone of for USI-SAC-50 Welded Joints using J Integral (G388)	1278
<i>Geraldo De Paula Martins, Emerson Giovani Rabello, Carlos Alberto Cimini Jr, Leonardo Barbosa Godefroid</i>	

G09: FAILURE ON NON-METALLIC MATERIALS

Self-Crack-Healing Behavior of Silicon Carbide: a Candidate Material for the First Wall of Nuclear Fusion Reactor (G404).....	1284
<i>Kotoji Ando, Sang-Kee Lee, Wataru Ishida, Seung-Yun Lee, Ki-Woo Nam</i>	
A Micro-mechanical Damage and Fracture Model for Concrete under Tension (G166)	1290
<i>Y. P. Li, Y. H. Wang, L. G. Tham, S. X. Xiao</i>	
Mode-Mix Dependency of the Interfacial Crack Propagation Problem (G568)	1296
<i>Byung Sun Choi, Young Suck Chai</i>	
Determination of Interfacial Fracture Toughness by Bimaterial Eccentric Compression Test (G316).....	1302
<i>Il-Hwan Moon, Kyong-Ku Yun, Sung-Chul Yang, Jongsung Sim</i>	
Application of Microstructure Based Brittle Fracture Model to Biaxial Strength of Graphite Materials (G128)	1310
<i>Satoshi Hanawa, Masahiro Ishihara, Taiju Shibata</i>	

G10: LEAK BEFORE BREAK (LBB)

LBB Applicability Review and Basic Implementation Engineering for Primary Coolant Loop & Surge Line of VVER-1000/320 NPP: TACIS Project R2.09/96 (G383)	1316
<i>Piero Zanaboni , Leonid Sokov, Narciso Garate</i>	
Application of a Finite Element Method to Leak Before Break(LBB) of a Heat Exchanger (G587).....	1324
<i>Choon-Yeol Lee, Jae-Do Kwon, Yong-Sun Lee</i>	
Crack Opening Displacement of a Crack in a Plate Subjected to Bending Load (G294)	1332
<i>Hideo Machida, Yeon-Sik Yoo</i>	
Practical Application of Restraint of Pressure-induced Bending Phenomenon in Leak Rate Calculations (G412).....	1340
<i>R. J. Olson, R. A. Morbitzer, P. M. Scott, G. M. Wilkowski</i>	
Development of the Technical Basis for a New Regulatory Guide for Leak-Before-Break (LBB) Applications (G411).....	1348
<i>Paul Scott, Rick Olson, F. W. Brust, Gery Wilkowski, Cayetano Santos, Matthew Mitchell, Keith Wickman</i>	
Leak-Before-Break Assessment of RBMK-1500 Fuel Channel in Case of Delayed Hydride Cracking (G178)	1356
<i>A. Klimasauskas, A. Grybenas, V. Makarevicius, V. Kiselev, L. Nedzinskas, R. Levinskas</i>	
Leak Before Break Investigation on Sodium Piping for Prototype Fast Breeder Reactor (G335)	1364
<i>P. Chellapandi, R. Srinivasan, A. Biswas, S. C. Chetal , S. B. Bhoje</i>	

WG01: CORROSION ASPECTS

Latest SCC Issues of Core Shroud and Recirculation Piping in Japanese BWRs (G600)	1371
<i>Yuichi Okamura, Akihiro Sakashita, Toshihiko Fukuda, Hironobu Yamashita, Tsuneo Futami</i>	
Influence of Silica on Stress Corrosion Cracking of Alloy 600 and Alloy 690 (G139).....	1381
<i>H. P. Kim, S. H. Uhm, Y. M. Nho, D. J. Kim, Y. S. Lim, S. S. Hwang, J. S. Kim</i>	
A Simulation of Corrosion Fatigue Crack Growth (G189).....	1389
<i>Petr Brož</i>	
Long-Term Low-Cycle Corrosion Fatigue of Steel 08Kh18N10T and its Welded Joints in Water of High Parameters (G202).....	1396
<i>Vladimir M. Filatov, Aleksandr V. Zelensky</i>	

DIVISION H: CONCRETE CONTAINMENT AND OTHER STRUCTURES

H01: CONCRETE MATERIALS AND PERFORMANCE

Effect of the Heating Rate on Residual Thermo-hydro-mechanical Properties of a High-strength Concrete in the Context of Nuclear Waste Storage (H381).....	1404
<i>Christophe Gallé, Michel Pin, Guillaume Ranc, Sylvain Rodrigues</i>	
A Study on Pullout Strength of Cast-in-place Anchor Bolt in Concrete under High Temperature (H086)	1412
<i>Jun Hashimoto, Katsuki Takiguchi</i>	
Moisture Migration and Thermo-mechanical behaviour of Concrete at High Temperature up to 310°C (H090)	1418
<i>Albert Noumowé, Guillaume Ranc, Célia Hochet</i>	
Effect of Temperature on Structural Quality of High-strength Concrete with Silica Fume (H420)	1427
<i>Ivan Janotka, Tereza Nürnbergerová</i>	
Creep of Pre-stressed Concrete Containment - Comparing Measurements to Calculations (H076).....	1435
<i>Jan Štepán, Jan Malý, Ivan Holub, Katarína Schererová</i>	
An Investigation on Toughness of Steel Fiber Reinforced Heavy Concrete (H392)	1443
<i>Yu-Cheng Kan, Kuang-Chih Pei, Hsuan-Chih Yang</i>	

Experimental Performances of a Non-cracked Concrete Wall in Air Permeability and in Accidental Conditions (H194).....	1451
<i>Yvan Billard, Gerard Debicki, Laurent Coudert</i>	
Numerical Study on the Behaviour of a Non-cracked Concrete Wall in Accidental Conditions (H195)	1459
<i>Yvan Billard, Gerard Debicki, Laurent Coudert</i>	

H02: TESTS OF 1

Analytical Study on Structural Failure Mode of 1/4 PCCV Test Model (H113).....	1467
<i>Kenji Yonezawa, Katsuyoshi Imoto, Masaaki Ohba, Toshihiro Ikeuchi, Masanori Kozuma, Yasuyuki Murazumi, Kunihiko Sato</i>	
Posttest Analysis of a 1:4-Scale Prestressed Concrete Containment Vessel Model (H371)	1475
<i>R. A. Dameron, Y. R. Rashid, M. F. Hessheimer</i>	
Functional and Structural Failure Mode Overpressurization Tests of 1:4-Scale Prestressed Concrete Containment Vessel Model (H372).....	1483
<i>M. F. Hessheimer, S. Shibata, J. F. Costello</i>	

H03: SHEAR WALL TEST AND ANALYSIS

Shaking Table Test of a RC Box Shear Wall under Uni-directional Input Motion (H120).....	1490
<i>Kazutaka Shirai, Hideo Katsumata, Kazuaki Tsuda, Matsutaro Seki</i>	
Stress-strain Relationship of Reinforced Concrete Subjected to Biaxial Tension (H132).....	1494
<i>Jaeyeol Cho, Namso Cho, Namsik Kim, Youngsun Choun</i>	
New Prestressing Force Measurement System for Prestressed Concrete Containment Vessels (H081).....	1503
<i>Takushi Abe, Ikuro Kawai, Hiromi Ohashi, Yasuyuki Murazumi, Shinichi Takezaki</i>	
The Influence of Vertical Input on the Horizontal Restoring Force Characteristics of Shear Wall (H170).....	1509
<i>Hideo Ono, Koichi Maekawa, Yoshio Kitada, Shiro Mitsugi</i>	
Shaking Table Test of RC Box-type Shear Wall in Multi-axes Loading (H127).....	1517
<i>Yoshio Kitada, Haruhiko Torita, Ryoichiro Matsumoto, Yoshinori Miura, Takao Nishikawa</i>	
Simulation Analysis on Shaking Table Test of RC Box-type Shear Wall in Multi-axis Loading (H192).....	1527
<i>Kazuhiro Kusama, Atsushi Suzuki, Ryusuke Fukuda, Tsutomu Hirotani, Katsuki Takiguchi</i>	

H04: STRUCTURAL ANALYSIS AND CONTAINMENT DESIGN

The Adhesion Characteristics of Protective Coating Materials for the Containment Structure in Nuclear Power Plants (H353).....	1535
<i>Sang-Kook Lee, Jae-Chul Shin</i>	
Ultimate Resistance of a Reinforced Concrete Foundation Under Impulsive Loading (H534).....	1543
<i>Donato Aquaro, Giuseppe Forasassi, Massimo Marconi</i>	
Static Reliability of Concrete Structures under Extreme Temperature, Radiation, Moisture and Force Loading (H552).....	1551
<i>Petr Štepanek, Stanislav Šťastník, Vlastislav Salajka, Petr Hradil, Jaroslav Školar, Vaclav Chlenda</i>	
Concrete Containment Modeling and Management, Conmod (H067).....	1557
<i>Ola Jovall, Jan-Anders Larsson, Peter Shaw, Jean-Pierre Touret, Gösta Karlberg</i>	
Strength Analyses of Containment Steel Liner at the Plasticity Instability (H206).....	1565
<i>Vladimir I. Klyashchitskiy, Vladimir I. Golyakov, Victor I. Kostylev, Boris Z. Margolin</i>	

VOLUME 3

Simulating Structural Collapse of a PWR Containment (H592)	1573
<i>Nawal K Prinja, David Shepherd</i>	
Studies on Influence of Steel Liner and Pre-Stressing Tendons on Ultimate Load Capacity of Pre-stressed Concrete Containment Test Model (H004).....	1581
<i>S. M. Basha, R. K. Singh, R. Patnaik, S. Ramanujam, H. S. Kushwaha, V. Venkat Raj</i>	

WHK01: CONCRETE CONTAINMENT MODEL TEST RESULTS INCLUDING VISUALIZATION OF ULTIMATE BEHAVIOR

Model Seismic Proving Test (1 PCCV)	N/A
<i>Susumu Nakamura</i>	
Model Seismik Proving Test (2 PCCV).....	N/A
<i>Shizuo Tsurumaki</i>	

DIVISION J: ANALYSIS AND DESIGN FOR DYNAMIC AND EXTREME LOADS

J01: VIBRATION OF SHELLS AND PLATES I

Vibration of Cylindrical Shells with Oblique Ends (J038)	1589
X. J. Hu, D. Redekop	
Vibration of Compound Shell using the DQM (J039)	1597
D. Redekop	
An Approximate Ultimate-load Analysis for Brittle-matrix Slabs and Pressurized Cylinders (J115)	1605
Marek Janas, Joanna Sokół-Supel, Grzegorz Bielawski	
Rupture Tests with Reactor Pressure Vessel Head Models (J184)	1613
Heli Talty, Heikki Keinänen, Ensio Hosio, Pekka H. Pankakoski, Klaus Rahka	
Static Responses of Elasto - Plastic Nonuniform Plates of Arbitrary Shape (J396)	1621
Subhash Chanda	
Large Amplitude Vibrations of Elasto-plastic Plates and Shells (J397).....	1628
Subhash Chanda	

J02: VIBRATION OF SHELLS AND PLATES II

A Study on the Temperature Distribution of a Cylindrical Structure with Multiple Holes (J094)	1634
Young-Shin Lee, Young-Hwan Kang, Young-Jin Choi, Woong-Joong Lee	
Dynamic (transient) Analysis Of Coupled Piezothermoelastic Composite Plate using First-order Shear Deformation Theory (J131)	1641
F. Heidary, M. R. Eslami	
Analysis of the Bubble Condenser Structure of Wwer-440 Npp Under Loca Loading (J364)	1649
Petr Zeman	
Geometrically and Material Non-linear Analysis of Bubble Condenser Steel Structure (J424)	1656
József Györgyi, Péter Lenkei	
Analysis of the Inertial Interaction in Soil-Pile-Structure System (J315).....	1664
Yun-Suk Chung, Isam Shahrou	
Vibration Analysis of Reactor Assembly Internals for Prototype Fast Breeder Reactor (J334).....	1672
P. Chellapandi, S. Jalaldeen, R. Srinivasan, S. C. Chetal, S. B. Bhoje	

J03: IMPACT ANALYSIS I

Nonlinear Analysis of Reinforced Concrete Shells Subjected to Impact Loads (J236)	1680
Rodolfo L. M. Suanno, Lúcio B. Ferrari, Carlos L. M. Prates	
Damage Evaluation of 500 Mwe Indian Pressurized Heavy Water Reactor Nuclear Containment for Air Craft Impact (J003)	1688
Mukesh Kukreja, R. K. Singh, K. K. Vaze, H. S. Kushwaha	
Calculations of the Floor Concrete Structure Loaded by a Container Drop (J077).....	1697
Jan Malý, Jan Štepán, Katarína Schererová, Ivan Holub	
Structural Analysis of Pressure Surge by Calculation and Measurement for a Rapid Shutdown System (J403)	1705
Helmut Kennerknecht, Fritz-Otto Henkel, Johannes Paulus, Dirk Schümann	
Impact Analysis of Spent Fuel Dry Casks under Accidental Drop Scenarios (J134)	1714
J. I. Braverman, R. J. Morante, J. Xu, C. H. Hofmayer, S. K. Shaukat	
Airplane Impact on Nuclear Power Plants (J595)	1722
Josef Eibl	

J04: IMPACT ANALYSIS II

A Pinball Method by Direct Localization of the Impact Area (J207).....	1730
K. Petkevicius, R. Kulak, A. Marchertas	
Explosive Failuring of Masonry Structure (J432)	1737
Daniel Makovicka, Daniel Makovicka Jr.	
Numerical Predictions of Load-carrying Capacity of Reinforced Concrete Shells Subjected to Impact Loading Obtained by Various Methods (J070)	1745
Lúcio D. B. Ferrari, Rodolfo Suanno, Carlos Prates, Ignacio Iturrioz, Roberto Rios, Jorge D. Riera	
Determination of the Load-carrying Capacity of a Reinforced Concrete Shell Subjected to Impact Loading (J007)	1752
Jorge D. Riera, Roberto Rios, Ignacio Iturrioz	
New Aspects on the Resistance of Nuclear Buildings Against Aircraft Impact (J338).....	1760
Friedhelm Stangenber, Michael Borgerhoff, Rainer Zinn	
Pressure Wave Generated in Vented Confined Gas Explosions: Experiment and Simulation (J484)	1762
Bretislav Janovsky, Tadeas Podstawa, Daniel Makovicka, Jan Horak, Lukas Vejs	
Behavior of Ferrocement Subjected to Missile Impact (J488)	1770
Abdullah, Katsuki Takiguchi, Koshiro Nishimura, Shingo Hori	

J05: PIPING VIBRATION

Dynamic of Piping with Moving Load (J329).....	1776
<i>Ladislav Pecinka, Ivan Krásný</i>	
Application of a Modal Updating Technique to the FEM Schematization of Piping-pump Assembly: Two Case Studies (J147).....	1780
<i>Andrea Collina, Marco Belloli</i>	
Reduction of Operational Vibration of Turbine Steam Inlet Piping at Temelin NPP (J363).....	1789
<i>Petr Zeman</i>	
An Analytical Validation of Simplified Methods for the Assessment of Pipe Whip Characteristics (J358).....	1797
<i>Igli Micheli, Piero Zanaboni</i>	
The Influence of Fluid-Structure Interaction on Pipe System Loads (J174).....	1805
<i>Jarmo Kratz, Wolfgang Münch, Klaus Ungar</i>	
Analytical Study of Piping Flow-Induced Vibration. Example of Implementation (J280).....	1813
<i>Peter Vasilyev, Leonid Fromzel</i>	
Testing for Modal Analysis of a Feed Water Pipeline (J056).....	1821
<i>Arja Saarenheimo, Heikki Haapaniemi, Pekka Luukkanen, Pekka Nurkkala, Jaakko Rostedt</i>	
Model Updating through Measured Data in the Case of a Feed Water Pipeline (J057).....	1829
<i>Arja Saarenheimo, Heikki Haapaniemi, Pekka Luukkanen, Pekka Nurkkala</i>	

J06: STRUCTURAL DYNAMICS

Dynamical Analysis at ŠKODA JS a.s. (J352).....	1837
<i>Petr Markov</i>	
Response of the Steam Generator VVER 1000 to a Steam Line Break (J307).....	1845
<i>Jirí Novotný</i>	
Applicability Limits of Finite Element Models for Simulation of Shock Transfer Processes in Concrete Structures (J594).....	1853
<i>Josef Eibl, Norbert J. Krutzik</i>	
On the Dimensioning of Steel Construction Under Use of Plastic Deformation (J425).....	1861
<i>Lutz Lindhorst</i>	
Structural Dynamics in FBR (J332).....	1869
<i>S. B. Bhobe</i>	

J07: EXPERIMENTAL AND OTHER TOPICS

Interactions between Cask Components and Content of Packaging for the Transport of Radioactive Material During Drop Tests (J153).....	1879
<i>T. Quercetti, V. Ballheimer, P. Zeisler, K. Müller</i>	
Wavelet Time-frequency Analysis of Accelerating and Decelerating Flows in a Tube Bank (J275).....	1887
<i>Maria Luiza S. Indrusiak, Jhon V. Goulart, Cláudio R. Olinto, Sergio V. Möller</i>	
Upgrading of WWER-1000 NPP Safety on Spent Fuel Transportation (J106).....	1895
<i>Victor Kostarev, Juri Petrenya, Alexander Shchukin, Valery Schevchenko, Vadim Nikitin, Andrei Romanovsky-Romanko</i>	
WWER-type NPP Spray Ponds Screen (J036).....	1903
<i>Maria Nikolova, Jordan Denev, Detelin Markov, Marin Jordanov</i>	
Effect of Electrical Conductivity on Emergency Performance of Cables at High Temperatures (J408).....	1910
<i>Olavi Keski-Rahkonen</i>	
Reduction Method for Residual Stress of Welded Joint using Random Vibration (J285).....	1918
<i>Shigeru Aoki, Tadashi Nishimura, Tetsumaro Hiroi</i>	

DIVISION K: SEISMIC ANALYSIS, DESIGN AND QUALIFICATION

K01: GENERAL SEISMIC ISSUES I

Safety Significance of Near Field Earthquakes (K476).....	1922
<i>Pierre Labbé</i>	
Armenian Nuclear Power Plant: USNRC Assistance Programme for Seismic Upgrade and Safety Analysis (K093)	1926
<i>Nicholas Simos, Ken Perkins, Jae Jo, John Carew, John Ramsey</i>	
Seismic Induced Events, Acceptable Risks at Nuclear Facilities, and Proposed ANSI/ANS and ASCE Standards (K246).....	1934
<i>Bhasker P. Tripathi, Joseph D. Price</i>	
Seismic Design Features of the Acr Nuclear Power Plant (K493).....	1941
<i>Medhat Elgohary, Ayman Saudy, Tarek Aziz</i>	
Russian Regulatory Approaches to Seismic Design and Seismic Analysis of NPP Piping (K596)	1950
<i>Y. V. Kaliberda</i>	
Structural Analysis Research Needs for Advanced Reactors (K456).....	1957
<i>Syed A. Ali, Herman L. Graves III</i>	

K02: GENERAL SEISMIC ISSUES II

New Establishment of Seismic Input for NPP, Recent Discussion on Effect of Licencing Criteria in Japan (K356)	1962
<i>Heki Shibata</i>	
Seismic Safety Assessment of Nuclear Facilities other than NPPS (K540)	1969
<i>Ovidiu Coman, Andreea Dragomirescu, Florin Kope, Nicolae Zemtev</i>	
Development of Seismic Damage Assessment System for Nuclear Power Plant Structures in Korea (K546)	1977
<i>Chang-Hun Hyun, Hyun-Moo Koh, Hohyun Cho, Sung-Kyu Lee, Kang-Ryoung Choi</i>	
Coupled Seismic Analysis of Nuclear Safety Systems (K051)	1983
<i>K. V. Subramanian, S. M. Palekar, H. A. Mapari</i>	
New System of Seismic Protection of NPP SSZ -IM Type (K551)	1989
<i>F. O Arakelyan, G. Hakopyan</i>	

K03: GROUND MOTION AND SITTING I

Effect of Irregular Topography on Strong Ground Motion Amplification (K190)	1995
<i>Tetsushi Kurita, Tadashi Annaka, Satoru Takahashi, Masayoshi Shimada, Toshio Suehiro</i>	
Scenario Earthquakes for Korean Nuclear Power Plant Site Considering Active Faults (K301)	2003
<i>In-Kil Choi, Young-Sun Choun, Jeong-Moon Seo</i>	
Analysis of Data from Structural Response Recorders in North and North East Indian Earthquakes (K539)	2011
<i>A. D. Roshan, Sudhir K. Jain, Prabir C. Basu</i>	
Artificial Ground Motion with Non-Stationarity Generated using the Wavelet Analysis (K154)	2019
<i>Fumio Sasaki, Toshiro Maeda, Yoshifumi Yamamoto</i>	
Quantification of the Effects of Low Magnitude near Field Earthquakes (K557)	2027
<i>Christophe Pedron, Pierre Sollogoub, Sylvain Goubet, Emmanuel Viallet</i>	
Analysis of Earthquake Response Data Recorded from the Hualien LSST (K125)	2035
<i>Y.-L. Paek, C.-H. Hyun, J.-C. Shin</i>	

K04: SOIL – STRUCTURE INTERACTION

Statistical Soil-Structure Interaction Response of a Containment Building Considering Soil Property Variability (K362)	2043
<i>Peter J. Rieck, Thomas W. Houstons</i>	
One-Side Seismic Structure-Soil-Structure Interaction Analysis Using SASSI Approach (K525)	2051
<i>Alexander G. Tyapin</i>	
BNL Prediction of NUPEC's Field Model Tests of NPP Structures Subject to Small-to-Moderate Magnitude Earthquakes (K384)	2057
<i>J. Xu, C. Costantino, C. Hofnayer, A. Murphy, Y. Kitada</i>	
Study on Estimation of Basemat Uplift of PWR Reactor Building (K082)	2065
<i>Naohiro Nakamura, Yasuhiro Kasuga, Naoto Yabushita, Sadatomo Onimaru, Akio Nakayama, Yousuke Murakami, Masahiko Ozaki, Tomio Nakano</i>	
Study on the Soil-Structure Interaction Model under Vertical Earthquake Motions (K173)	2073
<i>Noriyoshi Ogawa, Atsushi Tachibana, Yasuaki Fukushima, Yoshinori Miura</i>	
Seismic Analysis of Buried Structures in Frequency Domain: Comparison between Analytical and Finite Element Methods (K345)	2081
<i>Tarcisio Cardoso, Tereza Araujo, Lucio D. B. Ferrari</i>	

K05: SEISMIC RESPONSE OF STRUCTURES I

Seismic Response Analyses of Turbine Hall and Electrical Building of RBMK-1000 MW Type NPP (K018)	2089
<i>Marin J. Jordanov, Krasimir T. Karparov</i>	
Seismic Evaluation and Upgrading Design of Steel Ventilation Stacks at WWER type NPP (K062)	2098
<i>I. H. Geshanov, G. St. Stoyanov, M. J. Jordanov, W. Schuetz</i>	
Seismic Evaluation and Upgrading Design of Overhead Roads between Reactor Buildings of WWER-1000MW type NPP (K064)	2106
<i>M. J. Jordanov, G. St. Stoyanov, I. H. Geshanov, K. P. Kirilov, W. Schuetz</i>	
Seismic Fragility of Ventilation Stack of Nuclear Power Plant (K271)	2113
<i>S. S. Nefedov, T. Z. Yugai, I. V. Kalinkin, P. L. Vizir</i>	
An Experimental Study of Mock-Up Pile Foundations: Part 1 Aging Effects on Dynamic Soil Springs (K152)	2121
<i>Yukio Shimomura, Yoshio Ikeda, Hiromi Adachi, Mitsuakazu Nakanishi, Yoshiya Ogushi, Masatoshi Nakamura, Toshiaki Arai</i>	
An Experimental Study Of Mock-Up Pile Foundations: Part 2 Dynamic Cross Interaction Of Foundations (K151)	2129
<i>Yoshio Ikeda, Yukio Shimomura, Hiromi Adachi, Yoshiya Ogushi, Masataka Nakamura</i>	
Nonlinear Dynamic Responses of Nuclear Reactor Building Under Earthquake Excitations (K418)	2137
<i>Zheng-Ming Zhang, Hong-Lin Wu</i>	

K06: SEISMIC RESPONSE OF STRUCTURES II

Model Test on Dynamic Cross Interaction of Adjacent Building in Nuclear Power Plants - Overview and Outcomes of the Project (K197).....	2144
<i>Kusama Kazuhiro, Kitada Yoshio, Iguchi Michio, Fukawa Nobuo, Nishikawa Takao</i>	
Model Test on Dynamic Cross Interaction of Adjacent Building in Nuclear Power Plants - Overall Evaluation on Field Test (K274)	2152
<i>Tatsuo Yano, Yukio Naito, Kenji Iwamoto, Yoshio Kitada, Michio Iguchi</i>	
Seismic Response Analysis of Nuclear Island Buildings in LNNP Unit 1 (K339)	2160
<i>Pentti Varpasuo</i>	
River Protection Project - Seismic Analysis of Vitrification Buildings (K334)	2167
<i>Farhang Ostadan, Nan Deng, Carl Costantino</i>	
Seismic Damage Assessment of Reinforced Concrete Containment Structures (K565).....	2175
<i>Hohyun Cho, Hyun-Moo Koh, Chang-Hun Hyun, Hyun Mock Shin, Moon-Soo Kim</i>	
Concept of Performance Based Seismic Design Guideline Underground Reinforced Concrete Structures in Nuclear Power Plants in Japan (K574).....	2181
<i>Yukio Aoyagi, Tsutomu Kanazu</i>	

K07: SEISMIC RE - EVALUATION

Assessing Seismic Adequacy of Existing Nuclear Power Plant Structures (K121).....	2189
<i>Viatcheslav Beliaev, Victor Vinogradov, Sergey Privalov, Valentin Shishenin</i>	
Seismic Analysis of the Armenian Nuclear Power Plant (K242).....	2197
<i>Paruyr Zadayan, Nicholas Simos</i>	
Seismic Verification Methods for Structures and Equipment of VVER-Type and RBMK-Type NPPs (Summary of Experiences) (K510)	2206
<i>Rudolf Masopust</i>	
The Reevaluation of Seismic Safety of Existing Nuclear Power Plant (K598)	2214
<i>Hiroshi Kitagawa, Shohei Tominaga, Chiyoji Kumagai, Korematsu Koshiba, Tomonori Kono, Kazuyoshi Agawa, Kenichiro Kuwata</i>	
Seismic Safety Evaluation and Enhancement at the Paks Nuclear Power Plant (K578).....	2222
<i>Gabor Kovacs, Eleonora Pek, Zoltan Zsidi</i>	
Preliminary Seismic Fragility Analysis of Selected Heavy Components in LNNP Unit 1 Reactor Building (K340).....	2231
<i>Pentti Varpasuo</i>	

K08: SEISMIC RESPONSE AND QUALIFICATION OF EQUIPMENT

Seismic Qualification of Spent Fuel Storage Stacks (K011)	2239
<i>Lester S. S. Lee, Wei Liu</i>	
Experimental Studies Of Free-Standing Spent Fuel Storage Cask Subjected To Strong Earthquakes (K470).....	2247
<i>Koji Shirai, Kazuta Hirata, Toshiari Saegusa</i>	
Sensitivity Analyses of Seismic Behavior of Spent Fuel Dry Cask Storage Systems (K299).....	2255
<i>V. K. Luk, B. W. Spencer, S. K. Shaukat, I. P. Lam, R. A. Dameron</i>	
Seismic Calculation of Stud Tensioner Lungmen (K024)	2263
<i>Petr Markov, Petr Friedl, Miloslav Ruchar</i>	
Seismic Analysis & Verification Test ON a Neutron Reflector for APWR Reactor Internals (K158)	2269
<i>Toshio Ichikawa, Satoshi Yonemoto, Hiroyuki Murakoso, Tomomichi Nakamura, Hideyuki Morita, Minoru Murota, Toshihiko Tanaka, Masao Kimura</i>	
Earthquake Resistant Test of New Type Glove Box (K357).....	2277
<i>Susumu Miura, Syuuichi Ousaka, Yoshihisa Kawada, Hiroshi Ito</i>	

K09: SEISMIC BASE ISOLATION I

A Development Program of Three-Dimensional Seismic Isolation for Advanced Reactor Systems in Japan (K142).....	2286
<i>Asao Kato, Satoshi Moro, Masaki Morishita, Takaumi Fujita, Saburoh Midorikawa</i>	
Study On 3-Dimensional Base Isolation System Applying to New Type Power Plant Reactor (Hydraulic 3-Dimensional Base Isolation System: No.1) (K148).....	2295
<i>Akihiro Kashiwazaki, Takahiro Shimada, Tatsuya Fujiwaka, Satoshi Moro</i>	
Development of 3D Seismic Isolator using Metallic Bellows (K084)	2303
<i>Seitaro Ogiso, Kyotada Nakamura, Michiaki Suzuki, Satoshi Moro</i>	
Research on 3-D Base Isolation System Applied to New Power Reactor 3-D Seismic Isolation Device with Rolling Seal Type Air Spring: Part 1 (K141)	2311
<i>Junji Suhara, Tadashi Tamura, Kazuya Ohta, Yasuo Okada, Satoshi Moro</i>	
Development of Three -Dimensional Base Isolation System with Cable Reinforcing Air Spring (K145)	2317
<i>Mitsuru Kageyama, Tsutomu Iba, Katsuhiko Umeki, Takahiro Somaki, Satoshi Moro</i>	
Excitation Test Response Characteristics and Simulations of a Seismically Isolated Test Structure (K092).....	2325
<i>Jae-Han Lee, Gyeong-Hoi Koo, Bong Yoo</i>	

K10: SEISMIC BASE ISOLATION II

Structure of 3-Dimensional Seismic Isolated FBR Plant with Vertical Component Isolation System (K258)	2332
<i>Masaki Morishita, Seiji Kitamura, Yoshio Kamishima, Tetsundo Nakatogawa, Akinori Miyamoto, Takahiro Somaki</i>	
Experimental Study on Coned Disk Springs for Vertical Seismic Isolation System (K143)	2340
<i>Seiji Kitamura, Tetsundo Nakatogawa, Akinori Miyamoto, Takahiro Somaki</i>	
Sensitivity Analyses on Seismic Isolation System Using Elastic Sliding Bearings and Multi-Laminated Rubber Bearings (K175)	2348
<i>Takeshi Ugata, Masahiko Ozaki, Yousuke Murakami, Akio Nakayama, Tomio Nakano, Ryota Maseki</i>	

VOLUME 4

K11: GROUND MOTION AND SITTING II

A Developing Risk-informed Design Basis Earthquake Ground Motion Methodology (K169)	2356
<i>Takaaki Konno</i>	
Real-time Forecasting of Strong Motion Acceleration for Seismic Control of Nuclear Power Plant (K048)	2364
<i>Svetla Ts. Radeva, Reimar J. Scherer, Dimitar I. Radev</i>	
Development of Uniform Hazard Response Spectra for a Site (K217)	2372
<i>A. K. Ghosh, H. S. Kushwaha</i>	

K12: SEISMIC TESTING

World's Largest Shaking Table Takes Shapes in Japan (The Third Report) (K284)	2380
<i>Keiichi Ohtani, Nobuyuki Ogawa, Tsunehiro Katayama, Heki Shibata</i>	
Vibration Tests on Pile-group Foundations using Large-scale Blast Excitation (K114)	2386
<i>Osamu Kontani, Hideaki Saito, Hideo Tanaka, Yasushi Kobayashi, Atsushi Suzuki, Kazushige Fujiwara, Yuji Miyamoto</i>	
Large Explosion-driven Seismic Platforms (Theory, Practice and Prospects) (K122)	2394
<i>Viatcheslav Beliaev, Victor Vinogradov, Vladimir Sirro</i>	
Experimental Study on Fracture Behavior of Piping Support under Seismic Loading (Verification Test using Shaking Table) (K110)	2402
<i>Tomomichi Nakamura, Minoru Tomimatsu, Yoshihiro Takayama, Eiji Shirai, Hideyasu Ogo</i>	
Experimental Study on Fracture Behavior of Piping Support under Seismic Loading (Material Properties of Mild Steels) (K111)	2409
<i>Minoru Tomimatsu, Tomomichi Nakamura, Yoshihiro Takayama, Eiji Shirai, Hideyasu Ogo</i>	
An Evaluation of Tensile Capacity of Cast-in-Place Anchor with Crack by Actual Model Test (K321)	2417
<i>Jung-Bum Jang, Yong-Pyo Suh, Jong-Rim Lee</i>	

K13: SEISMIC VIBRATION CONTROL

A New Method for Essential Reduction of Seismic and External Loads on NPP's Structures, Systems and Components (K279)	2424
<i>Victor Kostarev, Andrei Petrenko, Peter Vasilyev</i>	
A Numerical Evaluation Of Anti-Vibration Mechanisms Applied To Frame Structures Under Earthquakes (K544)	2429
<i>Luciano M. Bezerra, Rodolfo C. Carneiro</i>	
Seismic Response of Primary Circuit with Viscous Dampers (K328)	2437
<i>Ladislav Pečinka, Vladimír Zeman, Zdenek Hlaváč</i>	
State-of-the-Art on the Development and Application of Seismic Vibration Control Techniques and Some Innovative Strengthening Methods for Civil and Industrial Structures (K460)	2445
<i>Alessandro Martelli</i>	
"Advanced Tested Technology for Earthquakes" and "The Shapes of Memory": A Short Film and a Motion-Picture Developed in the Framework of the MUSICa Project (K461)	2453
<i>Alessandro Martelli, Giordano-Bruno Arato, Enrico Bellani</i>	

K14: SEISMIC FLUID – STRUCTURE INTERACTION AND TANKS

Dynamic Analysis of Large Steel Tanks (K282)	2461
<i>Alejandro P. Asfura, Basilio N. Sumodobila, Farzin R. Beigi</i>	
Seismic Behaviour of a PWR Reactor Core: Fluid Structure Interaction Effects (K558)	2467
<i>Daniel Broc, Jean Claude Queval, Emmanuel Viallet</i>	
Assessment Procedure for Buckling of Thin Walled Cylindrical Liquid Storage Tanks in Nuclear Power Plants Under Seismic Loading (K549) (1st Report; Investigation on Elephant Foot Bulge)	2475
<i>Hideyuki Morita, Tomohiro Ito, Koji Hamada, Akihisa Sugiyama, Yoji Kawamoto, Hideyasu Ogo, Eiji Shirai</i>	

Assessment Procedure for Buckling of Thin Walled Cylindrical Liquid Storage Tanks in Nuclear Power Plants under Seismic Loading (K548) (2nd Report; Proposal for Reasonable Seismic Design Guideline Taking Dynamic Response Reduction Factor Into Account)	2483
Akihisa Sugiyama, Koji Setta, Yoji Kawamoto, Koji Hamada, Hideyuki Morita, Tomohiro Ito, Hideyasu Ogo, Eiji Shirai	

K15: SEISMIC RESPONSE OF PIPING AND PIPE SUPPORTS

BNL Nonlinear Pre-Test Seismic Analysis for the NUPPEC Ultimate Strength Piping Test Program (K255)	2491
G. Degraissi, C. Hofmayer, A. Murphy, K. Suzuki, Y. Namita	
Seismic Proving Test of Ultimate Piping Strength (Status of Design Method Confirmation Test) (K368)	2499
Kenichi Suzuki, Y. Namita, H. Abe, I. Ichihashi, Kohei Suzuki, T. Sakakida, T. Sato, H. Yokota	
Seismic Proving Test of Eroded Piping (K308) (Status of Eroded Piping Component and System Test)	2507
Y. Namita, K. Suzuki, H. Abe, I. Ichihashi, M. Shiratori, K. Tai, K. Iwata, A. Nebu	
Stress and Seismic Calculation of HTR-10 Primary Loop Pressure Relief System (K417)	2515
Jianling Dong, Jiyang Fu, Shuyuan Yu	
A Review of OBE Elimination on the Evaluation of the Code Pipe Stress and Postulation of Pipe Break Locations (K478)	2521
Soon-Chul Yun, In-Yeung Kim, Ik-Kyu Hwang	

K16: SPECIFIC ISSUES OF SEISMIC ANALYSIS

Seismic Analysis of Coupled Primary - Secondary Systems: Effect of Uncertainties in Modal Properties (K220)	2527
Abhinav Gupta, Byoungchoo Choi	
Calculating Latent Frequencies of Systems with Local Damping (K373)	2535
Ferenc Kolonits	
Nonlinear Dynamical Systems with Data and Model Uncertainties Subjected to Seismic Loads (K032)	2539
Christophe Descliers, Christian Soize, Simon Cambier	
Non-linear Seismic Sliding Analysis of an ISFSI Mat Subject to High Ground Motions (K218)	2546
Sohrab Esfandiari, Robert P. Kennedy, Jearl Strickland, Nozar Jahangir, Patrick Huang	
Uniformly Probable Coupled Response Spectra for Secondary Systems (K224)	2554
Andréia Diniz Almeida, João Luis Roehl	
Practical Response Analysis of a Mass-spring Impact System with Hysteresis Damping (K349)	2560
Shigeru Aoki, Takeshi Watanabe	

DIVISION M: STRUCTURAL RELIABILITY AND PROBABILISTIC SAFETY ASSESSMENT (PSA)

M04: PROBABILISTIC ANALYSIS IN DYNAMIC AND IMPACT MECHANICS

Reliability-based Approaches for Safety Margin Assessment in the French Nuclear Industry (M483)	2569
E. Ardillon, B. Barthelet, E. Meister, P. Cambefort, P. Hornet, P. Le Delliou	
Simplified Estimation Method for First Excursion Probabilities of Secondary System with Friction (M354)	2577
Shigeru Aoki	
Reliability Assessment of Structural Impact/Contact Mechanics (M208)	2584
K. Petkevicius, R. Kulak, P. Marchertas	
Reliability Analyses of Pipe Whip Impacts (M268)	2592
Robertas Alzbutas, Gintautas Dundulis, Ronald F. Kulak, Paul V. Marchertas	
Statistical Analysis of Real Flight Tracks for the Risk Assessment of a New Takeoff-Route (M293)	2600
Birgitt Felbermeier, Gerhard Klein, Jens Döring	
Risk-based Safety Performance Indicators for Nuclear Power Plants (M212)	2606
S. Chakraborty, Y. Flodin, G. Grint, H. Habermacher, A. Hallman, R. Isasia, Z. Karsa, M. Khatib-Rahbar, K. Koeberlein, N. Matahari, E. Melendez, I. Moravcik, J. Preston, G. Prohaska, C. Schwaege, M. Tkac, E. Verduras	

M02: PSA FOR SEISMIC AND OTHER EXTERNAL EVENTS

Probabilistic Liquefaction Hazard Evaluation: Method and Application (M164)	2614
James Marrone, Farhang Ostadan, Robert Youngs, Joe Litehiser	
Development of Seismic Hazard Curves for the Portfolio of Facilities (M047)	2622
Sei'Ichiro Fukushima, Harumi Yashiro	
Seismic Fragility Analyses of Nuclear Power Plant Structures Based on the Recorded Earthquake Data in Korea (M040)	2630
Yang Hee Joe, Sung Gook Cho	
Assessment of Structural Safety Under Seismic Hazard by Vulnerability Functionals (M035)	2638
Adrian Vulpe, Alexandru Carausu, George Emanuel Vulpe	
Seismic PSA for NPP Paks of Hungary (M513)	2647
Attila Bareith, Zoltán Karsa, John W. Stetkar	

Maximum Fragility Analysis of Loviisa Nuclear Power Plant Ventilation Stack for Wind Loads (M341).....	2655
<i>Pentti Varpasuo</i>	

M03: RELIABILITY ANALYSIS OF PRESSURE VESSELS AND PIPING

Probabilistic and Deterministic Treatments for Multiple Flaws in Reactor Pressure Vessel Safety Analysis (M222).....	2663
<i>Tong Fang, Mohammad Modarres</i>	
Probabilistic Procedure to Evaluate Integrity of Degraded Pipes under Internal Pressure and Bending Moment (M118).....	2668
<i>Eberhard Roos, Karl-Heinz Herter, Peter Julisch, Frank Otremba, Xaver Schuler</i>	
Development on Methods for Evaluating Structure Reliability of Piping Components (M401).....	2676
<i>Thomas Schimpfke, Hans Grebner, Jörg Peschke, Jürgen Sievers</i>	
Probabilistic Assessment of Fatigue Damage Including Statistical Uncertainties in S-N Curves (M232)	2684
<i>Bruno Sudret, Zakoua Guédé, Patrick Hornet, Jean-Michel Stéphan, Maurice Lemaire</i>	
Risk Based Lifetime Assessment of Piping under Creep-Fatigue Conditions (M495).....	2693
<i>Ondrej Bielak, Vladimír Bína, Jan Korouš</i>	
A Pilot Study of RI-IST Applications to IST Check Valves for Ulchin Unit 3 (M140).....	2701
<i>Daeil Kang, Kilyoo Kim, Jooneon Yang</i>	

M04: RELIABILITY ANALYSIS OF CONCRETE STRUCTURES AND OTHER COMPONENTS

Containment Reliability and Risk-Informed Decision Making-A Perspective (M456).....	2708
<i>Hansraj Ashar, Eugene Imbro, David Terao</i>	
Reliability of the Repairing of Double Wall Containment Vessels in the Context of Leak Tightness Assessment (M264).....	2715
<i>Bruno Sudret, Marc Berveiller, Grégory Heinfling</i>	
Reliability Assessment of a Reinforced Concrete Beam Subjected to Corrosion (M529).....	2723
<i>Bruno Capra, Olivier Bernard, Bruno Gérard, Brian Adey</i>	
Probabilistic Safety Assessment of the Steam Generator Cover (M449)	2731
<i>Stanislav Vejvoda, Zbyněk Kersner, Drahomír Novák, Bretislav Teply</i>	
Probability Finite Element Assessment Method for Nuclear Graphite Components (M096)	2741
<i>Siyuan Yu, Haiyan Li, Chaoyang Wang, Zhensheng Zhang</i>	
A Probabilistic Failure Assessment of a Dry Cask Storage System (M480)	2747
<i>Cayetano Santos, Douglas Kalinousky, Christopher Ryder, Lee Abramson, Syed Shaukat, Jason Schaperow, Alan Rubin</i>	

DIVISION O: OPERATION, INSPECTION AND MAINTENANCE

O01: MATERIAL MONITORING, MAINTENANCE AND REPAIR

Defects Investigation in Neutron Irradiated Reactor Steels by Positron Annihilation (O361).....	2755
<i>Vladimir Slugen</i>	
Qualification of UT Methods and Systems Used for In-service Inspections of VVER 440 Vessels (O030).....	2761
<i>Zdenek Skala, Jan Vit</i>	
Improved Criteria for the Repair of Fabrication Flaws (O555)	2769
<i>S. R. Doctor, G. J. Schuster, F. A. Simonen</i>	
Qualified Maintenance - An Approach for Cutting Costs in Power Plants (O434).....	2777
<i>Josef Jansky, Leander Vogel</i>	
4+D Virtual Reality Technology for Structural Analysis and Integrated Maintenance of Nuclear Plants (O450).....	2785
<i>Il S. Lee, Sang H. Yoon, Kune Y. Suh</i>	
The Use of Acoustic Monitoring to Manage Concrete Structures in the Nuclear Industry (O380).....	2791
<i>Peter O. Paulson, Oliver Tozser, Marcel De Wit</i>	

O02: STEAM GENERATORS AND PIPING

Corrosion Degradation of Steam Generators in Korea (O283).....	2806
<i>Seong Sik Hwang, Hong Pyo Kim, Joung Soo Kim</i>	
Corrosion of Steam Generator Pipelines Analysed Using Mössbauer Spectroscopy (O360).....	2812
<i>V. Slugen, J. Lipka, I. Tóth, J. Hascik, Hinca, M. Lehota</i>	
Prediction of Wear Depth at Near-distant Future from the Present Depth in the SG Tubes of the Nuclear Power Plants (O149).....	2820
<i>C. Y. Park, Y. S. Lee, T. S. Kim, C. S. Lee</i>	
ECT Evaluation on Fretting Wear of Steam Generator in NPPs (O099)	2828
<i>Jung Ho Han, Myung Sik Choi, Deok Hyun Lee, Do Haeng Hur, Un Chul Lee</i>	
Wall Thinning Trend Analyses for Secondary Side Piping of Korean NPPs (O022)	2834
<i>K. M. Hwang, T. E. Jin, S. H. Lee, S. C. Jeon</i>	
High-level Vibration and Noise Analysis of Nuclear Pipes with Orifice (O012)	2841
<i>Qing Mao, Yixiong Zhang, Wenyuan Xiang, Qincheng Bi, Huixiong Li, Fenggang Zang, Quan Duan</i>	

Role of NDE in Integrity Assessment of Steam Generator Tubes (O519).....	2846
<i>Mohamad M. Behravesh</i>	

O03: MONITORING AND OPERATING EXPERIENCE

Nondestructive Evaluation Method on Mechanical Property Change of Graphite Components in the HTGR by Ultrasonic Wave Propagation with Grain/Pore Microstructure (O103).....	2854
<i>Taiju Shibata, Masahiro Ishihara</i>	
Monitoring of Concrete Permeability, Carbonation and Corrosion Rates in the Concrete of the Containers of El Cabril (Spain) Disposal (O393).....	2862
<i>C. Andrade, J. L. Sagrera, I. Martínez, M. García, P. Zuloaga</i>	
Condition Monitoring of a Check Valve for Nuclear Power Plants by Means of Acoustic Emission Technique (O260).....	2870
<i>J. H. Lee, M. R. Lee, J. T. Kim, J. S. Kim, V. K. Luk</i>	
The TVO/VTT Material Database (O186).....	2878
<i>Paul Smeeches, Jouni Alhainen, Aarne Lipponen, Heli Talja</i>	
Recent Operating Experience Related to Degradation of Passive Components at United States Nuclear Power Plants (O135).....	2886
<i>Jerry Dozier, Bill Bateman, Terry Reis</i>	
Evaluation of the NPP Operator Cognitive Workload during an Emergency (O312).....	2893
<i>Nilo Garcia Da Silva, Marco Antonio Bayout Alvarenga, Maysa Joppert Coelho</i>	
Electromagnetic Analysis of the Magnetic Jack Type Control Element Drive Mechanism (O168).....	2901
<i>Hyun Min Kim, In Yong Kim, Il Kon Kim</i>	

O04: MANAGEMENT AND SAFETY ASSESSMENT

Connecting Processes Online: Planning, Building, Maintaining (O306).....	2909
<i>Horst Schillberg, Kirsi Hautala, Holger Drotzella</i>	
Thinned Pipe Management Program of Korean NPPs (O101).....	2915
<i>S. H. Lee, T. R. Kim, S. C. Jeon, K. M. Hwang</i>	
Efficient Management of Inspection and Monitoring Data for a Better Maintenance of Infrastructure (O379).....	2923
<i>Marcel De Wit, Gilles Hovhanessian</i>	
Failure Distribution in Instrumental Cables in Fire (O367).....	2931
<i>Johan Mangs, Olavi Keski-Rahkonen</i>	
Structural Integrity Assessment of the HANARO Reactor Pool Cover (O512).....	2939
<i>Jeong-Soo Ryu, Yeong-Garp Cho, Doo-Byung Yoon, Jong-Sup Wu, Cheol Park, Byung-Jin Jun</i>	
Smart Fibre 'Bragg Grating' Feasibility Retrofitting Assessment in Nuclear Power Plant Structures (O577).....	2948
<i>Aleksandar M. Zikic, Leslie M. Smith, Gary L. Brodt</i>	

DIVISION P: SEVERE ACCIDENT MANAGEMENT AND STRUCTURAL EVALUATION

P01: REACTOR PRESSURE VESSEL AND CONTAINMENT INTEGRITY

Analysis for Mechanical Consequences of a Core Disruptive Accident in Prototype Fast Breeder Reactor (P333).....	2956
<i>P. Chellapandi, K. Velusamy, S. C. Chetal, S. B. Bhoje, Harbans Lal, V. S. Sethi</i>	
FEM-Calculation of Different Creep-Tests with French and German RPV-Steels (P201).....	2964
<i>H.-G. Willschuetz, E. Altstadt, B. R. Sehgal, F.-P. Weiss</i>	
A Study on the Mitigating Capability of an Auxiliary Feedwater System During SBO for APR1400 (P346).....	2972
<i>Young Choi, K R Kim</i>	
Evaluation of Ultimate Load Bearing Capacity of the Primary Containment of A Typical 540MWe Indian PHWR (P348).....	2978
<i>Indrajit Ray, Raghupati Roy, U. S. P. Verma, A. S. Warudkar</i>	
Modelling of Aquitaine II Pipe Whipping Test with EUROPLEXUS Fast Dynamics Code (P430).....	2986
<i>Serguei Potapov</i>	
Reconstruction of Accident Localization System of Units 3 and 4, NPP "Kozloduy" (P365).....	2995
<i>Marin Kostov, Valeri Georgiev, Tsena Todorova, Velina Todorova</i>	

WP01: SEVERE ACCIDENT MANAGEMENT STRATEGIES

Definition of VVER-440 Research Needs in Plant Life Management and Severe Accident Management (P433).....	3001
<i>Harri Tuomisto, Petra Lundström, Ritva Korhonen, Yrjö Hytönen, József Elter, Milan Hladky, Jozef Tomek, Ludovit Fagula, Ludovit Kupca, František Kalmančai</i>	
A Determination of Severe Accident Environmental Conditions utilizing Accident Management Strategy for Equipment Survivability Assessment (P325).....	3009
<i>Byung Chul Lee, Ji Hwan Jeong, Man Gyun Na, Soong Pyung Kim, Hyeong Taek Kim</i>	
Cognitive Approach to Severe Accident in Nuclear Power Plant Using MAAP4 (P452).....	3016
<i>Seung Dong Lee, Kune Y. Suh, Goon Cherl Park, Un Chul Lee</i>	

EU Research in Reactor Safety, with Emphasis on Severe Accident Management - Results of the 5th EURATOM Framework Programme 1998-2002 and Prospects for the Future (P068)	3021
<i>G. Van Goethem, A. Zurita, P. Manolatos, S. Casalta</i>	
Unresolved Issues in Severe Accidents for Advanced Light Water Reactors (P014)	3028
<i>J. H. Song, S. B. Kim, H. D. Kim</i>	

DIVISION S: ADVANCED REACTORS

Safety Philosophy of the GTHTR300 (S591)	3034
<i>Kazuhiko Kunitomi, Shoji Katanishi</i>	
Passive Safe Small Reactor for Distributed Energy Supply System Sited in Water Filled Pit at Seaside (S554)	3040
<i>Toshihisa Ishida, Shou Imai Yoshi</i>	
The ACR®: Advanced Design Features for a Short Construction Schedule (S494)	3047
<i>Mehdat Elgohary, Neville Fairclough</i>	
Helium Gas Turbine Conceptual Design by Genetic/Gradient Optimization (S097)	3057
<i>Long Yang, Siyuan Yu</i>	
Progress of HTR-M Projects for the HTR (S443)	3062
<i>D. Buckthorpe, R. Couturier, J. Van Der Laan, H. Hegeman, A. Vreeling, B. Riou, H. Rantala, P. Ennis, G. Haag, K. Kühn, A. Buenaventura, B-C. Friedrich</i>	
Studies on Components for a Molten Salt Reactor (S537)	3070
<i>Milan Nejedly, Oldrich Matal</i>	
Geoelectric Energy (S382)	3079
<i>Hassan Kianoosh, Hassan Faghish Mortagh, Hafez Keypour, Mahmoud Haydari, Mohsen Karimzadeh, Kamran Hajibagheri, Sharareh Taghipour, Shadi Kianoosh, Vernon C. Matzen</i>	

DIVISION W: DECOMMISSIONING OF NUCLEAR FACILITIES AND WASTE MANAGEMENT

W01: DECOMMISSIONING

Qualification Tests of Surface Decontamination on Low Activity Structural Material of the Caorso Nuclear Power Plant (W060)	3083
<i>Franco Giuseppe Cesari, Luigi Andrea Terzi, Paolo Battistella, Claudia Foletti, Renzo Guerzoni, Franco Bozzini</i>	
Application of a Modified Electrochemical System for Surface Decontamination of Radioactive Metal Waste (W072)	3091
<i>J. H. Lee, Y. K. Lim, H. Y. Yang, S. W. Shin, M. J. Song</i>	
Decontamination and Decommissioning Activities in the Nuclear Research Institute Rez (W528)	3098
<i>Josef Podlaha</i>	

WHJKP01: EXTERNAL EVENTS AND MALEVOLENT ACTION IN RELATION TO NUCLEAR POWER PLANTS AND OTHER NUCLEAR FACILITIES

Engineering Safety Aspects of the Physical Protection of Nuclear Installations against Sabotage (K695)	3106
<i>Aybars Gürpınar</i>	
Protection of Nuclear Power Plants Against External Events of Malevolent Origin (K514)	3112
<i>Paolo Contri, Aybars Gürpınar</i>	
Effects of Aircraft Impact on a Seismically Isolated Reactor Building (K214)	3121
<i>Ronald F. Kulak, Bong Yoo</i>	
Accident Pressure Analysis for a Reinforced Concrete Containment with Steel Liner (K541)	3127
<i>Ovidiu Coman, Daniela Coman, Florin Kope</i>	
Author Index	