PROGRAM BOOK

Post SMiRT28 seminar

Innovation in Risk Management for External Events

December 1 - 2, 2025

Abiko Area, Central Research Institute of Electric Power Industry, Japan

Hosted by JASMiRT
(Japan Association of Structural Mechanics in Reactor Technology)

Co-hosted by IASMiRT
(International Association of Structural Mechanics in Reactor Technology)

Supported by AESJ
(Atomic Energy Society of Japan)

Contents

Message from the Chair

On behalf of the Organizing Committee, it is my great pleasure to inform you that the post SMiRT28 Seminar will be held in Tokyo Japan from December 1 to 2, 2025. After the great success of SMiRT28 in Toronto, August 2025, JASMiRT (Japan Association of Structural Mechanics in Reactor Technology) has planned to have the post SMiRT seminar in Japan to focus on the recent innovation in risk management for external events. JASMiRT, founded in 2016, has been making great contributions not only for domestic but also for the past international conferences such as SMiRT27 in Yokohama. It provides an academic as well as professional forum in the field of SMiRT.

We sincerely hope that you do not miss the opportunity to visit Japan in the winter season.

We are looking forward to welcoming you all to Tokyo in December 2025.

Tsuyoshi Takada

Director, Office for Promotion of Risk-Informed Applications (OPRIA), JAEA

Professor Emeritus of the University of Tokyo

JASMiRT representative

Member of IASMiRT Board

Japan Association of Structural Mechanics in Reactor Technology (JASMiRT)

JASMiRT (Japan Association of Structural Mechanics in Reactor Technology, Representative: Tsuyoshi Takada (Professor, The University of Tokyo)) was established in May 2016 to contribute more to future SMiRTs after Fukushima Daiichi NPP accident with support from and close collaboration with Atomic Energy Society of Japan (AESJ). JASMiRT is active to be a core organization responsible for integration of individual technologies and promotion of human capacity building related to structural mechanics in reactor technology as well as for nuclear safety against external hazards like earthquake. JASMiRT is also a liaison association to enhance collaboration among government, industry and academia in Japan. JASMiRT has contributed and will contribute to international activities cooperating with IASMiRT and related organizations worldwide. JASMiRT is also willing to be a regional hub for cooperation among Asian countries.

Conference Overview

Post-SMiRT 28 Seminar - Tokyo, Japan

Date: December 1 - 2, 2025
Venue: Central Research Institute of Electric Power Industry
(1646 Abiko, Abiko-shi, Chiba. The seminar will be held in person.)
Official Language: English
Supported by: Atomic Energy Society of Japan
Correspondence: Post SMiRT28 Seminar committee
Email: postsmirt28-group [at] g.ecc.u-tokyo.ac.jp
Conference Website: http://risk.arch.t.u-tokyo.ac.jp/PostSMiRT28/

Program Overview

Monday - December 1st

	Desk	Hall A+B
9:00	**Desk Open**	
9:30 - 9:50		**Welcome** Chair Tsuyoshi Takada (JAEA, JASMiRT)
9:50 - 10:30		**Plenary Lecture1** Prof. Abhinav Gupta (North Carolina State University)
10:30 - 10:45	Break	
10:45 - 11:25		**Keynote Lecture1 - Application of AI (1)-** Prof. Kazuyuki Demachi (The University of Tokyo)
11:25 - 11:35	Break	
11:35 - 13:15		**Technical Session 1** - Application of AI (1)-
13:15 - 14:05	**Lunch**	
14:05 - 14:45		**Plenary Lecture2** Dr. Emmanuel Viallet (EDF)
14:45-15:00	Break	
15:00 - 17:00		**Technical Session 2** - Special Topics -
17:00 - 17:10	Break	
17:10 - 17:50		**Plenary Lecture3** Dr. Minkyu Kim (Korea Atomic Energy Research Institute)
18:00 - 20:00	**Banquet**	

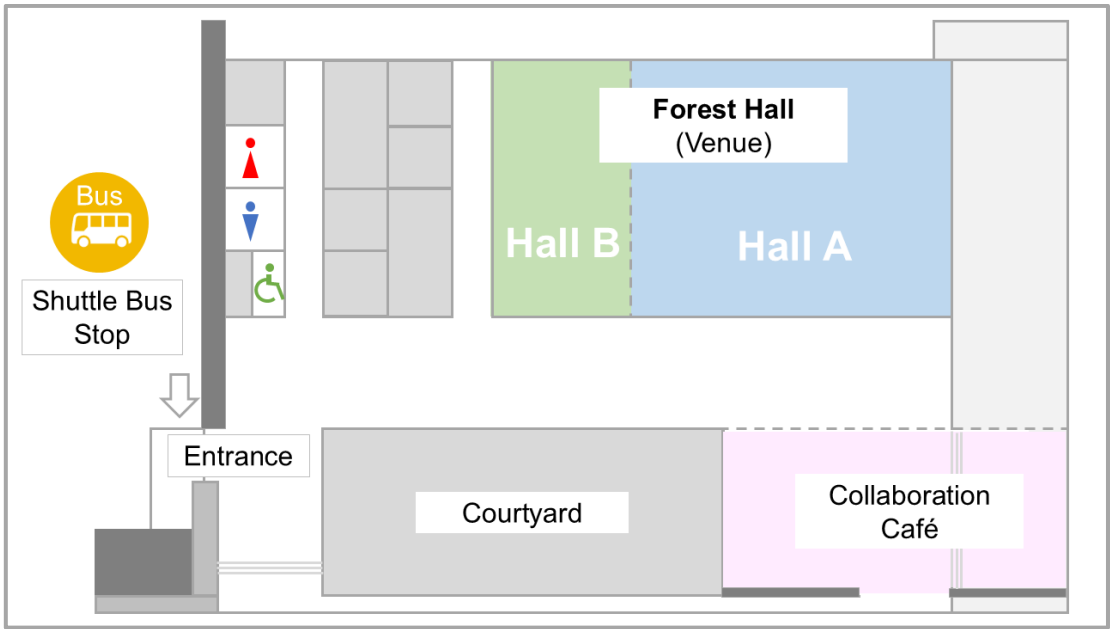
Tuesday - December 2nd

	Desk	Hall A	Hall B	
9:00	**Desk Open**			
9:30 - 10:10		**Keynote Lecture2** **- Application of AI (2) -** Dr. Masanobu Horie (RICOS)		
10:10 - 10:20	Break			
10:20 - 11:20		**Technical Session 3-A** Application of AI (2)-	10:20 - 12:00	**Technical Session 3-B** - Risk Assessment and Management Technologies (Impact) -
11:20 - 11:30	Break			
11:30 - 13:10		**Technical Session 4-A** - New Reactor -		
13:10 - 13:55	**Lunch**			
13:55 - 15:35		**Technical Session 5-A** - Risk Assessment and Management Technologies (Seismic) -	13:55 - 15:35	**Technical Session 5-B** - Seismic Isolation -
15:40 - 16:00		**Closing ceremony**		

Banquet

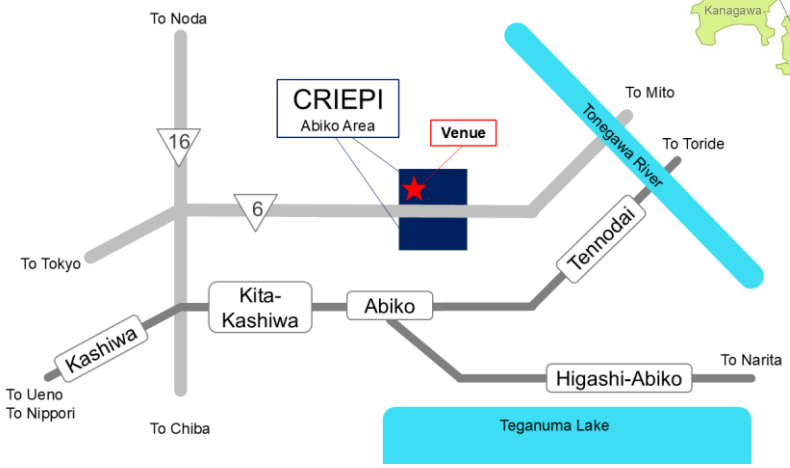
On December 1st, from 18:00 to 20:00, the official conference banquet will be held at the Collaboration Café. This special event offers a valuable opportunity to connect with All participants

Floor Plan



Venue

Central Research Institute of Electric Power Industry (CRIEPI)
Abiko Area
Address:1646 Abiko, Abiko-shi, Chiba 270-1194



Access

From Haneda Airport

You can reach Abiko Station, the nearest station to the conference venue, in approximately 1 hour 20 to 1 hour 30 minutes.

Typical route:

- Take the Keikyu Airport Line to Shinagawa Station (KK01)
- Transfer to the JR Ueno-Tokyo Line (JT) (JR Joban Line (JJ)) Local Train bound for Toride, Tsuchiura, Narita, Mito or Katsuta
- Get off at Abiko Station (JJ08)

From Narita Airport

The journey to Abiko Station takes about 45 minutes to 1 hour.

Typical route:

- Take the JR Narita Line bound for Abiko from Narita Airport Station
- Get off at Abiko Station

This route requires one transfer at JR Narita station. Trains run approximately once per hour, so checking the timetable in advance is recommended.

From JR Abiko Station to CRIEPI

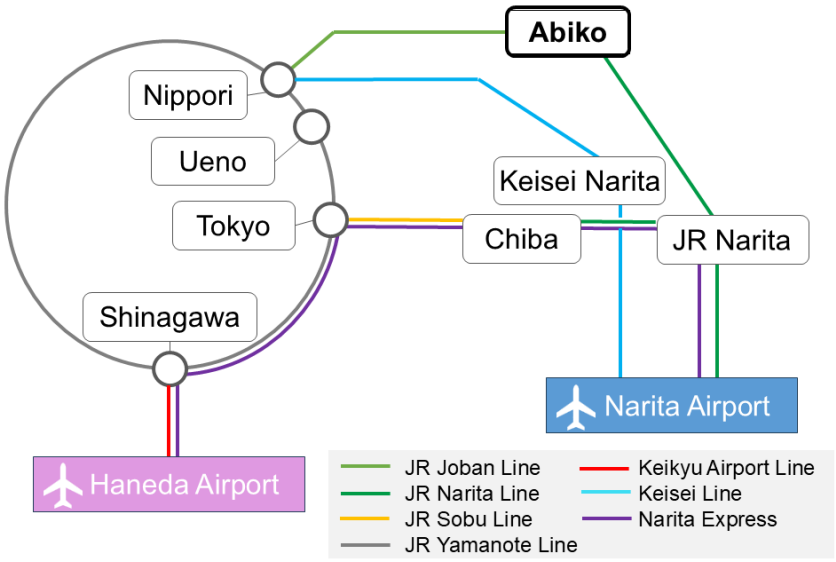
There are 3 ways to get to CRIEPI Abiko Area from "Abiko Station".

Exit from the north entrance.

i. Take a taxi for about 7 minutes.

ii. Take a shuttle bus (complimentary shuttle bus for seminar participants). Bus stop is on the north exit of the station.

iii. Take a walk for about 20 minutes.



Shuttle Bus Timetable

Take a shuttle bus for about 10 minutes.

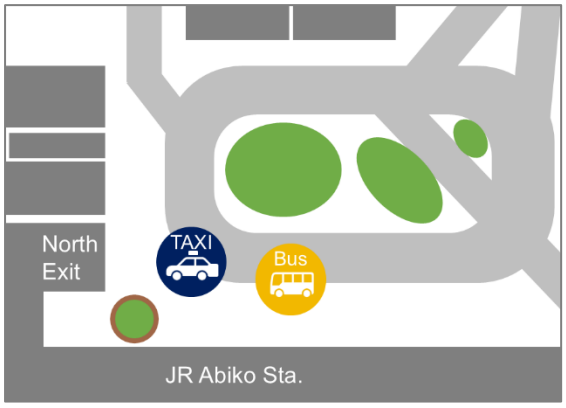
Monday - December 1st	
Bound for CRIEPI※	Bound for JR Abiko Station North Exit
8:30	
8:50	
9:10	
	18:00
	20:20
	20:40

Tuesday - December 2nd	
Bound for CRIEPI※	Bound for JR Abiko Station North Exit
8:30	
8:50	
9:10	
	15:10
	16:20
	17:10

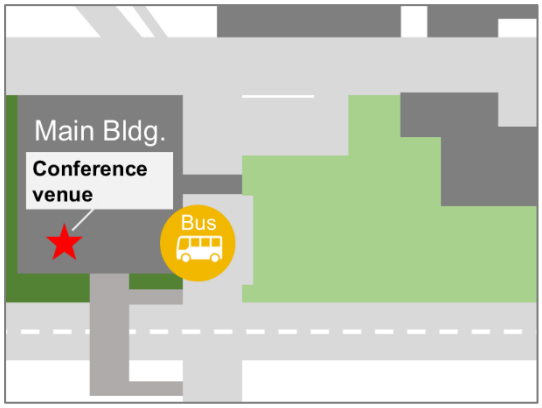
※CRIEPI : Central Research Institute of Electric Power Industry

Shuttle Bus Stop

Bound for Central Research Institute of Electric Power Industry



Bound for JR Abiko Station North Exit



Post SMiRT28 seminar Organization

Chair

Dr. Tsuyoshi Takada

Professor Emeritus, The University of Tokyo
Director, Office for Promotion of Risk-Informed Applications (OPRIA), JAEA
The representative of JASMiRT

Vice chair

Dr. Tatsuya Itoi

Associate Professor, The University of Tokyo
Group leader, Seismic safety and structural integrity research group, JAEA

Seminar Secretary

Dr. Naoto Kihara

Central Research Institute of Electric Power Industry

Organizing committee members

Mr. Masaru Fukuie

Toshiba Energy Systems & Solutions Corporation

Mr. Kensuke Arai

Shimizu Cooperation

Mr. Hiroshi Abe

JASMiRT Secretary General

Plenary Lecture 1

Monday, December 1　9:50-10:30
Chair: Dr. Tsuyoshi Takada (Japan Atomic Energy Agency)

“Laboratory Based Demonstration of an AI-Enabled Digital Twin for Piping Systems”

Dr. Abhinav Gupta
Director, Center for Nuclear Energy Facilities and Structures (CNEFS)
Professor of Civil, Construction, and Environmental Engineering
NC State University

Plenary Lecture 2

Monday, December 1　14:05-14:45
Chair: Dr. Masato Nakajima (Central Research Institute of Electric Power Industry)

“Recent Advances and Future Developments in Seismic Risk Assessments”

Dr. Emmanuel Viallet
Seismic Risk & Earthquake Engineering Fellow Expert
Honorary Chairman of the French Association for Earthquake Eng.
OECD/NEA IAGE Seismic Engineering Subgroup Chair
EDF - Nuclear Engineering and Supply Chain Division

Plenary Lecture 3

Monday, December 1　17:10-17:50
Chair: Dr. Tatsuya Itoi (The University of Tokyo)

“Recent Research on Combined External Hazard Safety Assessment of Nuclear Facilities in Korea”

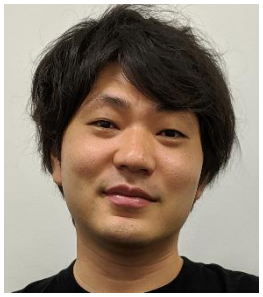
Dr. Minkyu Kim
Director, Structural and Seismic Safety Research Division
Korea Atomic Energy Research Institute

Keynote lecture 1 - Application of AI (1) -

Monday, December 1　10:45-11:25
Chair: Dr. Tatsuya Itoi (The University of Tokyo)

“Development of AI Models that Contribute to the Implementation of Online Maintenance”
Dr. Kazuyuki Demachi
Project Professor, Nuclear Professional School, School of Engineering, The University of Tokyo

Keynote Lecture 2 - Application of AI (2) -



Tuesday, December 2　9:30-10:10
Chair: Dr. Naoto Kihara (Central Research Institute of Electric Power Industry)

“Integrating Physical Laws into Machine Learning for Reliable Predictions”
Dr. Masanobu Horie
Department Head, Fundamental Research Division, RICOS Co., Ltd.

Technical sessions

Technical session 1 - Application of AI (1) -

Monday, December 1　11:35-13:15
Chair: Dr. Kazuyuki Demachi（The University of Tokyo)
This session highlights notable applications of AI to risk assessment, hazard analysis, and fragility assessment for external events.

A007 **Automatic Tools to assist Probabilistic Risk Assessment Engineers - Fault Tree Creation Using Artificial Intelligence Technology -**
Yuki Kondo (Japan Atomic Energy Agency)
Satoshi Futagami; Kenichi Kurisaka; Hidemasa Yamano (Japan Atomic Energy Agency)

A022 **Efficient Creation of Fragility Curves Using AI**
Yu Takano (Tokyo City University)
Wiles Auron Ryu; Ryoto Kobayashi; Yasuki Ohtori; Hitoshi Muta (Tokyo City University)

A016 **Generation of Synthetic Seismograms Using Conditional Generative Adversarial Networks and Generalized Inversion Technique**
Yusuke Tomozawa (Kajima corporation)
Junki Yamaguchi; Tomoki Hikita; Toshihide Saka (Kajima corporation)

A019 **Machine Learning–Aided Bayesian Finite Element Model Updating for Seismic Safety Evaluation of Reinforced Concrete Nuclear Facility Buildings**
Sangwon Lee (The University of Tokyo)
Taro Yaoyama (The University of Tokyo); Kenzo Kodera (Taisei Corporation); Minoru Matsubara (Taisei Corporation); Takeshi Ugata (Taisei Corporation); Tatsuya Itoi (The University of Tokyo)

A018 **Machine Learning Framework for Estimating Un-instrumented Floor Seismic Responses in NPP Structures**
Yongmoon Hwang (Korea Atomic Energy Research Institute)
Tae-Hyun Kwon; Minkyu Kim (Korea Atomic Energy Research Institute)

Technical session 2 - Special Topics -

Monday, December 1　15:00-17:00
Chair: Dr. Naoto Kasahara (Tokyo City University)
This session covers several emerging topics that the SMiRT community should address going forward, including the METIS project, beyond-design-basis events, fault displacement safety, combined hazards, and climate change impacts.

"Integrated Approach for Seismic Fragility Assessment Including Site Response - Application to METIS case study"
Irmela Zentner (Électricité de France)

A004 **New Project on Structure and Safety Coordinate Measures for Beyond Design Basis Events**

Naoto Kasahara (Tokyo City University)

Izumi Nakamura (Tokyo City University); Tohru Suzuki (Tokyo City University); Takashi Takata (The University of Tokyo); Shunichi Suzuki (The University of Tokyo); Takafumi Narukawa (The University of Tokyo); Tomoyoshi Watakabe (Japan Atomic Energy Agency); Tai Asayama (Japan Atomic Energy Agency); Takashi Onizawa (Japan Atomic Energy Agency)

A005 **Engineering Aspects of Fault Displacement Safety**

Tatsuya Itoi (The University of Tokyo)

A025 **Estimation of Probabilistic Precipitation Impacts due to Climate Change at Nuclear Power**

Beom-Jin Kim (Korea Atomic Energy Research Institute)

Daegi HAHM (Korea Atomic Energy Research Institute)

A035 **Development of a Probabilistic Risk Assessment Method for Combined Hazards and Application Examples**

Byunghyun Choi (Japan Atomic Energy Agency)

Akemi Nishida; Tatsuya Itoi; Tsuyoshi Takada (Japan Atomic Energy Agency)

A024 **Optimal Capacity Evaluation of MACST Facilities for NPPs under Combined Hazards**

Daegi Hahm (Korea Atomic Energy Research Institute)

Technical session 3-A - Application of AI (2) -

Session Venue: Forest Hall A

Tuesday, December 2 10:20-11:20

Chair: Dr. Taro Yaoyama (The University of Tokyo)

This session features advanced AI applications to risk assessment and surrogate modeling for seismic and tsunami hazards and fragilities.

A029 **Surrogate modeling using Gaussian process regression for analyzing uncertainty associated with various tsunami scenarios of a coastal power infrastructure**

Ayumi Nishi (Tokyo Electric Power Company Holdings, Inc.)

Gaku Shoji (University of Tsukuba)

A023 **Development of AI surrogate models for seismic risk assessment**

Ryoto Kobayashi (Tokyo City University)

Yu Takano; Yasuki Ohtori; Hitoshi Muta (Tokyo City University)

A020 **Uncertainty-aware and adaptive metamodeling of seismic response analyses using deep generative models**

Taro Yaoyama (The University of Tokyo)

Sangwon Lee (The University of Tokyo); Masaru Kitahara (Hokkaido University); Tatsuya Itoi (The University of Tokyo)

Technical session 4-A - New Reactor -

Session Venue: Forest Hall A
Tuesday, December 2　11:30-13:10
Chair: Dr. Masataka Sawada (Central Research Institute of Electric Power Industry)
This session presents the latest developments in new reactor designs, including HTGRs, advanced light-water reactors, and SMRs.

A001 **Overview of HTGR Project in JAEA**
Hiroyuki Sato (Japan Atomic Energy Agency)
Hiroaki Takegami; Nariaki Sakaba (Japan Atomic Energy Agency)

A003 **Experimental Study on Steel Plate Reinforced Concrete against Aircraft Impact, and Application to Innovative Light Water Reactor iBR**
Shingo Terada (Toshiba Energy Systems & Solutions Corporation)

A038 **Development of Advanced Light Water Reactor "SRZ-1200"**
Toshitake Kurashige (Mitsubishi Heavy Industries, Ltd.)
Kazuki Azekawa; Yuji Momose (Mitsubishi Heavy Industries, Ltd.)

A037 **Safety-Enhanced HI-ABWR and Global Deployment of the BWRX-300**
Yuriko Onishi (Hitachi GE Vernova Nuclear Energy, Ltd.)
Takao Kondo; Kazuaki Kito (Hitachi GE Vernova Nuclear Energy, Ltd.)

A012 **NuScale SMR - Technologies and Safety Features**
Yuki Sato (JGC Corporation)
Hiromasa Yanagisawa (JGC Corporation); Daisuke Koike (IHI Corporation), Kent Welter (NuScale Power, LLC); Paul Boyadjian (NuScale Power, LLC)

Technical session 5-A
- Risk Assessment and Management Technologies (Seismic) -

Session Venue: Forest Hall A
Tuesday, December 2　13:55-15:35
Chair: Seiichiro Fukushima (RKK Consulting)
This session discusses seismic risk assessment technologies, including evaluations of soil–structure interaction and performance assessment of reinforced concrete structures.

A014 **Introduction of a Seismic Scenario-Based Risk Analysis Software for Nuclear Power Plant Safety Evaluation**
Junhee Park (Korea Atomic Energy Research Institute)
Sanghoon Han, Min-Kyu Kim, In-Kil Choi (Korea Atomic Energy Research Institute)

A031 **Modeling of the Seismic Capacity of Reinforced Concrete Structures Considering Deterioration Effects**

Yohei Ninomiya (Central Research Institute of Electric Power Industry)
Ayumi Yuyama; Masato Nakajima (Central Research Institute of Electric Power Industry)

A039 **Probabilistic Soil–Structure Interaction Effects on Seismic Demand and Fragility of NPP Equipment**
Jae-Wook Jung (Korea Atomic Energy Research Institute)
Jeong-Gon Ha (Korea Atomic Energy Research Institute); In-Kil Choi (Korea Atomic Energy Research Institute); Hong-Pyo Lee (Korea Hydro Nuclear Power)

A032 **Damage-State-Based Parameter Identification of the Bouc-Wen Class Model for Seismic Performance Assessment of RC Structures**
Sanghyung Kim (Seoul National University)
Wonhui Goh; Yunbyeong Chae (Seoul National University)

A036 **Accuracy Comparison of Model Updating Using Responses vs. Modal Data**
Wonhui Goh (Seoul National University)
Yunbyeong Chae (Seoul National University)

Technical session 3-B

- Risk Assessment and Management Technologies (Impact) -

Session Venue: Forest Hall B
Tuesday, December 2 10:20-12:00
Chair: Dr. Zuoyi Kang (Japan Atomic Energy Agency)
This session presents evaluation methods for both tornado-missile impacts and tsunami-debris impacts.

A002 **Assessment methods of wind-borne missile strike probability in typhoon and tornado events**
Yuzuru Eguchi (Central Research Institute of Electric Power Industry)
Yasuo Hattori; Daisuke Nohara; Takahiro Murakami; Kosuke Namba; Mitsuharu Nomura (Central Research Institute of Electric Power Industry)

A006 **Collision probability of a small ship drifted by tsunami on seawalls with plunging breaker**
Takuya Toriyama (Secretariat of Nuclear Regulation Authority)
Nobuo Ishida; Kei Yamashita (Secretariat of Nuclear Regulation Authority)

A013 **Probabilistic Evaluation of Tsunami-borne Debris Collisions**
Hideki Kaida (Central Research Institute of Electric Power Industry)
Naoto Kihara (Central Research Institute of Electric Power Industry)

A027 **Overview and Results of a Research Project on Advanced Evaluation Methods for Collisions Involving Tsunami-Borne FRP Boats**
Kohei Kawano (Kansai Electronic Power Company)
Taro Ito, Koki Murakami, Toru Kuriyama (Kansai Electronic Power Company)

A028 **Applicability of Numerical Analysis Models to the Perforation Phenomena of Steel Plates Subjected to Medium- to High-Velocity Missile Impacts**

Koji Shirai (Central Research Institute of Electric Power Industry)

Toshiko Udagawa (WDB corporation); Daichi Nagai (Central Research Institute of Electric Power Industry)

Technical session 5-B - Seismic Isolation -

Session Venue: Forest Hall B

Tuesday, December 2 13:55-15:35

Chair: Dr. Dan M. Ghiocel (Ghiocel Predictive Technologies)

This session highlights state-of-the-art technologies for seismically isolated structures, with a focus on high-seismic-load capacity and applications to SMRs.

A026 **Challenge of development on Seismic Isolation Design to Earthquake-prone NPPs' sites in Japan, Part 1: Some unique earthquake situation and ultimate seismic response analysis**

Kenji Kanazawa (Central Research Institute of Electric Power Industry)

Ryo Umemura (Central Research Institute of Electric Power Industry)

A017 **Challenge of development on Seismic Isolation Design to Earthquake-prone NPPs' sites in Japan, Part 2: The residual performance of completely ruptured rubber bearings.**

Ryo Umemura (Central Research Institute of Electric Power Industry)

Kenji Kanazawa (Central Research Institute of Electric Power Industry)

A030 **SEISMIC SSI EFFECTS FOR BASE-ISOLATED STRUCTURES USING DIFFERENT ISOLATION SYSTEM TYPES UNDER COHERENT AND INCOHERENT WAVES**

Dan M. Ghiocel (Ghiocel Predictive Technologies)

Daniel Lemley (United Engineers & Constructors Inc.); Jeff Pieper (Hopper Engineering Associates); Enver Odar (ARC - Clean Technology)

A015 **EFFICIENT BASE-ISOLATION SYSTEMS FOR DEEPLY EMBEDDED SMR STRUCTURE UNDER SEVERE EARHQUAKES**

Dan M. Ghiocel (Ghiocel Predictive Technologies)

Daniel Lemley (United Engineers & Constructors Inc.); Jeff Pieper (Hopper Engineering Associates); Enver Odar (ARC - Clean Technology)

A033 **Numerical analysis and Trial Design of Seismic Isolation systems applied to an SMR - Simplified Analysis Results -**

Yukihiko Okuda (Japan Atomic Energy Agency)

Ryota Morobishi (Obayashi Corporation); Kenji Kanazawa (Central Research Institute of Electric Power Industry); Nobuo Murota (Bridgestone Corporation)