16th International Conference on

STRUCTURAL MECHANICS in REACTOR TECHNOLOGY (SMiRT 16)

Washington, DC, USA August 12-17, 2001

IASMiRT

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March 10, 2000

The Honorable Richard A. Meserve
Chairman
US Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Subject: SMiRT 16 Divisions

Dear Chairman Meserve:

I am grateful that you have accepted our invitation to serve on the SMiRT 16 Senior Advisory Board. I expect that this association will be mutually rewarding and result in a conference that will significantly benefit the US nuclear industry.

I am attaching a brief description of the proposed 14 divisions. Each division will have several sessions on related topics. I will appreciate it if you would review the description at your convenience during the next couple of weeks and offer your critique. I value your perspective as a leader and would like the conference to benefit from it. We have other resources to obtain in-depth technical input and assistance in organizing the conference.

I look forward to hearing from you soon. With my best regards,

Yours sincerely,

Ajaya Kumar Gupta
Professor & SMiRT 16 Chairman

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Attachment

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16th International Conference on Structural Mechanics in Reactor Technology SMiRT 16

SMiRT 16 will be held August 12-17, 2001 in the Washington, DC metropolitan area at the Key Bridge Marriott Hotel, Arlington, VA. It will follow 15 successful biennial conferences organized in major cities around the world. SMiRT 1 held in Berlin in 1971 was the first international conference related to the **Role of Structural Mechanics in Nuclear Plant Safety.**

SMiRT 16 features a division for plenary lectures in which distinguished speakers deliver comprehensive coverage of important topics of interest to broad cross section of the audience. It has 13 topical divisions representing specific areas for paper and panel sessions. The panel sessions encourage intense and lively discussion among participants and the audience on current and emerging issues with diverse opinions.

SMiRT 16 covers a range of topics from those related to new plants such as siting criteria and design to those more relevant to operating reactors including operation and maintenance (O&M) and life extension and license renewal. In recognition of their importance, SMiRT 16 has new divisions (D and O) dealing with the latter two issues. Division M is revitalized by introducing sessions with emphasis on risk-informed regulation and probabilistic safety assessment in view of the profound effect these approaches have on plant design and operation. Another new division (W) addresses the structural mechanics issues related to decommissioning and waste management for all nuclear facilities including power plants and those operated by the US Department of Energy and similar organizations around the world.

SMiRT 16 provides a unique forum to bring together academicians, researchers, analysts and designers, vendors, utilities and operators, and regulators who are interested in **structural mechanics** and **safety** of nuclear power plant buildings and components.

SMiRT 16 is the first of the series held in the 21st century.

Division Summaries

A: General

Opening session, plenary sessions, panel discussions and workshops

B: Computational Mechanics

Recent developments in computational methods for non-linear mechanics (material, damage, large deformations), thermal hydromechanics, impact and vibration of structures, and localized modeling and behavior. Fluid dynamics and fluid-structure interaction. Software and error control.

C: Fuel and Core Structures

Reactor fuel design and integrity analysis. Thermo-mechanical modeling. Zr-based tube fracture. Response to fast transients and seismic events. Flow-induced vibrations. High burn-up behavior. Irradiation assisted stress corrosion cracking (IASCC).

D: Aging, Life Extension, and License Renewal

Life cycle management, experience in life extension, license renewal, periodic safety review, repair and replacement. Effects of aging on material properties and structural performance. Evaluation of existing facilities.

F: Design Methods and Rules for Components

Experimental and analytical methods for fundamental understanding and development of constitutive laws for component materials: isotropic and anisotropic; nonlinear inelastic; plasticity and ratcheting; creep damage, fatigue, creep-failure interaction, thermal striping, composite structures, residual stress in welds, tube expansion; degradation, damage and failure; and buckling and instability. Use of material laws in development and application of design rules and codes and standards for components subjected to monotonic, cyclic and dynamic loads.

G: Fracture Mechanics

Experimental and theoretical methods and results on brittle and ductile fracture. Crack propagation by creep and fatigue. Local approach of fracture mechanics. Cracks in welds. Structural integrity assessment of steel components such as reactor vessels and piping systems. Leak before break assessment.

H: Concrete Containment and Other Structures

Concrete constitutive laws. Modeling, analysis, design, testing and construction of structures. Cracking, leakage across walls, and local behavior. Thermal and environmental effects. Creep, fracture and size effects. Concrete hydration. Anchorage systems. Containment liner-structure interaction.

J: Analysis and Design for Dynamic and Extreme Loads

Dynamic analysis of structures for short-duration and impulsive loads. Load and damage induced by vibration and fluid-structure interaction. Vibration-induced fatigue, failure mode and prevention. Flow-induced vibration and response of submerged elements. Dynamic instabilities. Impact loads on metallic and concrete structures, aircraft impacts, missiles impacts, and transport accidents. Fire safety and protection. Computer codes and validation.

K: Seismic Analysis, Design and Qualification

Experimental and analytical methods for seismic response analysis, design and qualification of structures and subsystems including foundation and components. Seismic ground motion. Soil-structure interaction. Liquefaction. Advanced seismic-resistant design concepts such as seismic isolation or energy absorption systems.

M: Structural Reliability and Probabilistic Safety Assessment (PSA)

Reliability and probabilistic safety assessment of buildings, components, systems and subsystems and application of assessments in improving their design and operation. Probabilistic analysis of natural hazards, external events PSA and margin studies. Development and application of risk-informed approaches. Risk-informed codes and standards.

O: Operation, Inspection and Maintenance

Life prediction, aging management, integrity assessment, in-service inspection, risk-informed inspection and maintenance. Operational experience and feedback. Codes and standards. Use of non-destructive evaluation (NDE) for structural integrity evaluation: advanced techniques and systems; modeling, validation and reliability; training and qualification. Risk-based assessment of structural integrity.

P: Severe Accident Management and Structural Evaluation

Evaluation of load-carrying capacity of structures during severe accidents. Mitigation of in-vessel consequences such as hydrogen generation, hot leg creep, steam generator tube and vessel rupture, lower head penetrations thermal attack, and fission product revaporation and revolatilization. Mitigation of consequences outside vessel: reactor coolant system pressure boundary rupture, high pressure melt ejection, direct containment heating, vapor explosion, molten core concrete interaction, hydrogen deflagration and detonation, and debris liner attack.

S: Advanced Reactors

Special analysis, design and construction issues. Unique regulatory concerns. Results of research and testing dealing with applications of new concepts such as seismic isolation and passive safety features. Severe accident evaluation and management philosophy. Risk and margin assessment.

W: Decommissioning of Nuclear Facilities and Waste Management

Unique structural mechanics issues associated with decommissioning of nuclear facilities. Siting, design and construction of fuel cycle facilities. Rules and design criteria. Risk-informed and performance based considerations. Probabilistic safety assessments. Evaluations of existing facilities.