PROCEEDINGS

of

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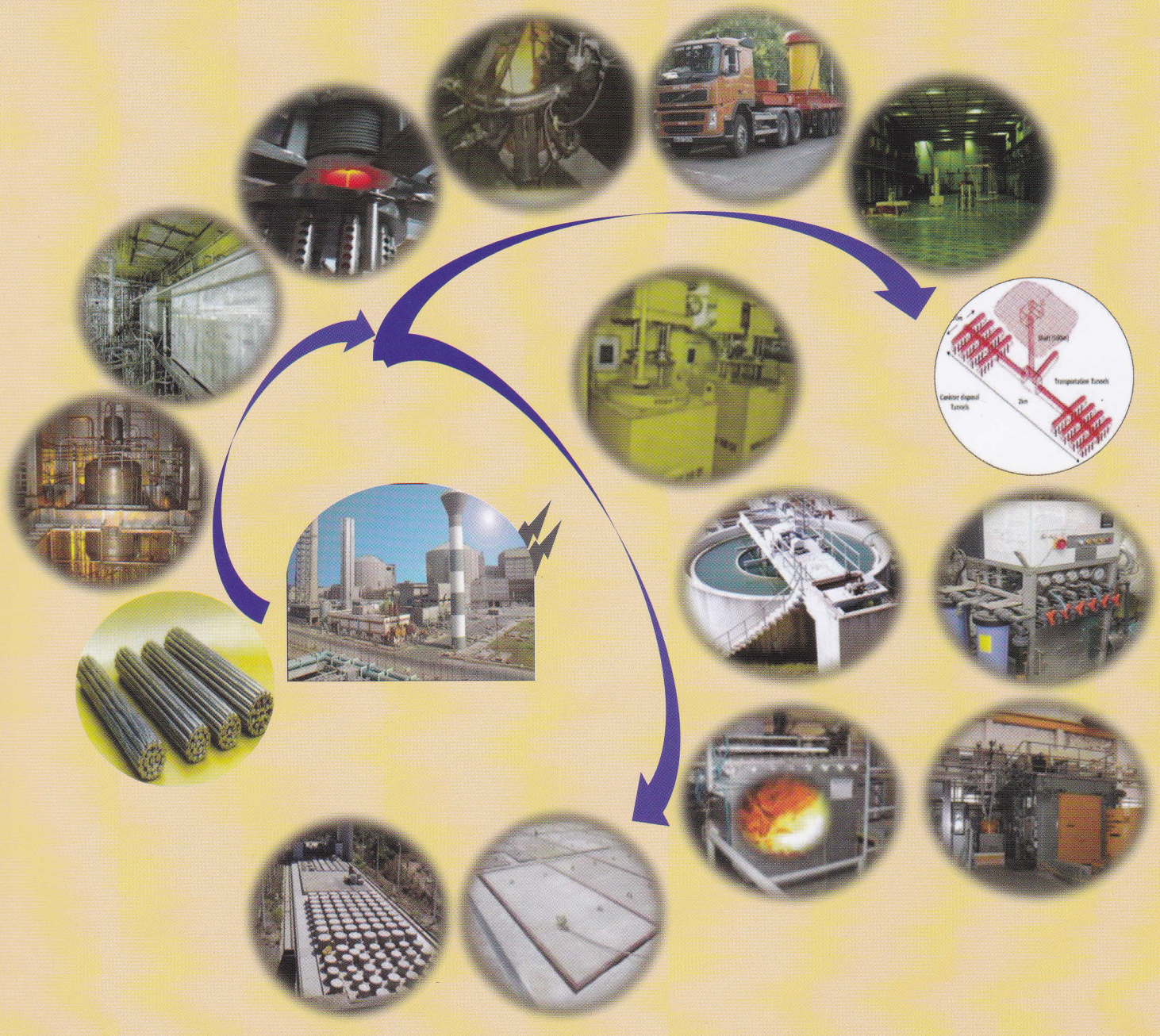
on

Innovations and Challenges in Radioactive Waste Management and Disposal



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Behavior of Engineered Clay Buffer: A modeling Approach and Methodology

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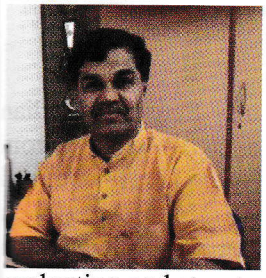
Deep geological disposal of nuclear waste is an issue that is important from public perception of safety and hence is of utmost importance for policy and regulatory framework. The radioactive leakage has to be prevented by any and all means. Towards this, the canister based disposal of HLW nuclear waste has to consider all aspects of safety. A computational modelling approach to study the entire canister for a deep geological disposal is a method that can give the operators good insights into the behaviour of the system. Such an understanding is often used to optimise the system.

To optimize the HLW canister waste disposal system (for space and performance), an integrated system model is needed. Such a system is highly complex, interdisciplinary and calls for multi-disciplinary expertise. Modelling of the system can be used to study the interplay between various components/ systems and the interactions. In the HLW disposal system, different physical phenomena interact, which makes the modelling complex. This includes thermal, mechanical, hydraulic, radiation, creep, void growth and so on in multiple material systems including the engineered clay, vitrified glass, rock, concrete, etc.

Current paper discusses an approach to model the behaviour of engineered clay buffer system in a canister to study and optimize the engineered clay buffer. Need to develop appropriate material models to capture interactive physical phenomena in the clay system is elaborated.

About the Author



Dr S Shamasundar is Managing Director of ProSIM R&D Pvt Ltd. Shamasundar has PhD in Mechanical Engineering from Indian Institute of Science. He has researched in Imperial College London, Drexel University- Philadelphia; Materials Research Lab of US Air Force Base; UES Inc, and Systran Corporation in USA. He has 35 years of experience in modelling and simulation including materials constitutive and damage modelling. Has delivered several R&D projects for the atomic energy entities including BARC, IGCAR, NPCIL. Has developed methodologies for seismic evaluation and structural integrity assessment of several systems, structures and components (SSCs) of nuclear power plants (NPPs). Has been leading and mentoring a team of engineers and scientist at ProSIM to model behaviour of large and complex systems using finite element, computational fluid dynamics, multi-body dynamics, electro-magnetics and such multi-physics simulations. He has applied principles of inter-disciplinary modelling to optimise the complex systems in nuclear energy applications.