The National Decommissioning Centre

Innovation through Partnership

Nuclear Decommissioning

Case Studies

The National Decommissioning Centre's partnership with the Nuclear Decommissioning Authority (NDA) identifies shared opportunities by drawing on the expertise and insights gained in each sector and supports research in several key areas of mutual interest. The partnership is being used to deliver knowledge and solutions to some of these challenges. This includes the development of Artificial Intelligence (AI) based techniques to support risk management, sharing new technology development, analysing impact on the economy and environment and finding environmentally safe alternatives to cement.

Case Study 1
Risk Live Dashboard

Challenge
The Nuclear Decommissioning Authority (NDA) needs to analyse global news from a multitude of sources in order to continuously track potential risk factors to the nuclear industry. These risk factors can be related to international conflicts, economic crises, extreme weather events and other natural disasters that are direct threats to the nuclear infrastructure. The vast range of potential feeds which need scanned and reviewed make this job challenging.

What we did
This project has developed a set of AI/machine learning tools to support risk analysts in their daily tasks. This set of tools are called Risk Live. Risk Live can analyse news from various sources, process this information using state-of-the-art natural language processing techniques, and presents the results through an intuitive, interactive web interface (dashboard), The Risk Live dashboard is now at PILOT stage.

Outcomes and benefits
Risk Live represents a significant advancement in risk management technology for the nuclear industry, offering a comprehensive, real-time solution to enhance safety and decision-making processes. The set of AI tools that Risk Live presents are currently in operation in a sandbox environment and are being used by risk analysts daily. This has allowed for faster completion of tasks.

Case Study 2
Industrial particles in the marine environment

Challenge
Understanding the behaviour of industrial particles as the seabed is mobilised by waves and currents is important for predicting their potential impact on the marine environment. These "alien" particles may be generated as a result of different industrial processes such as dredging or mining activities, oil and gas drilling activities as well as power generation in nuclear plants.

What we did
This project uses the Oscillatory Flow Tunnel located in the Fluid Mechanics Laboratory at the University of Aberdeen to conduct physical experiments. Particles of different sizes, shapes, and densities are being tested at different wave conditions, and their net movement is measured. The probability of a particle being buried or deburied and the speed of travel of these particles with currents is also studied.

Outcomes and benefits
The laboratory experiments will inform theoretical and empirical "Sandtrack" models. Equally, this project will inform the Particle Retrieval Advisory Group at Dounreay and provide unbiased insight to the Scottish Environment Protection Agency (SEPA), responsible for regulating the discharge from sites to ensure that the public are not exposed to doses in excess of the legal limits.

Case Study 3
Socio economic impact studies of nuclear decommissioning in Scotland

Challenge
There are three sites in Scotland in the decommissioning phase: Dounreay, Hunterston A and Chapelcross. Hunterston B is currently being defuelled in preparation for decommissioning. Going forward, two further nuclear sites will enter the decommissioning phase; Torness in East Lothian and Vulcan in Caithness. This poses both a challenge and opportunity for policymakers, but the socio-economic impacts must be well understood and quantified.

What we did
This decommissioning scope is a huge volume of work with the potential to deliver many long term benefits at a national and local levels. The project has provided evidence of the economy-wide gains in key areas such as skills, employment, and household income, which in turn will boost household consumption. The study supports stakeholder engagement helping to inform politicians and policy makers on key opportunities and enabling discussions around investment, support for skills, training, and economic development and planning to support and benefit from decommissioning activities.

Outcomes and benefits
An initial study has been very well received by public policy makers and political parties and was used to provide evidence for the formation of a cross-party committee on nuclear decommissioning in Scotland. The project has now been extended to build clear linkages to the broader debates on the Just Transition and will see the approach widened to include facilities in other parts of the UK.

More information on this work can be found here