LITHUANIAN ENERGY INSTITUTE

DOCTORAL RESEARCH TOPIC:

Energy or metrology infrastructure safety and estimates accuracy dynamics' investigation applying machine learning

RESEARCH FIELD:

Energetics and Power Engineering (T 006)

BRIEF DESCRIPTION OF RESEARCH TOPIC:

The safety justification of so-called critical energy infrastructure (e.g., hazardous facilities, power plants, main networks), unused, still-in-use or new facilities and their sites, and the control of their dismantling or operation are closely related to all initiating risky events (e.g., explosions or fires) frequency and their consequences. However, despite various research, there is still no common methodology for analyzing the safety dynamics of critical infrastructure (e.g., fuel storage, main gas pipelines) and risky events, which includes assessment of both the likelihood of events and the severity of their consequences, when their prediction uncertainty is also addressed. Therefore, new research for the safety assessment of various energy infrastructures (including spent fuel storage, explosive or flammable pipelines) is still relevant, especially with a focus on the combinations of risky events, the impact of operator errors, the dynamics of events or their effects, and the integrated assessment with uncertainty change and sensitivity analysis.

This research objective is to make a research, probabilistic assessment, data analytics and machine learning of the safety dynamics of energy or metrology infrastructure and potential risky events, considering the uncertainty of their prediction, when the reliability characteristics or environmental conditions are changing.

Tasks:
1. Clustering of challenges of energy or metrology infrastructure and its safety dynamics;
2. Methodology for infrastructure and risky events' probabilistic assessment;
3. Modeling and analysis of changes in risk and its prognosis uncertainty;
4. Determining the importance of the equipment and adverse events;
5. Development of safety dynamics modeling methodology.

Expected results are methodology and pilot calculations with research on probabilistic assessment and uncertain data analytics of possibly risky events and critical infrastructure's safety dynamics. The research and expected results are significant in Lithuania and abroad.

SCIENTIFIC SUPERVISOR:

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