LITHUANIAN ENERGY INSTITUTE

ADMISSION TO PHD STUDIES FOR THE YEAR 2024

DOCTORAL RESEARCH TOPIC:

Aging energy infrastructure safety dynamics' and possible risky events' probabilistic assessment

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 or still in use facilities or 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 researches, there is still no common methodology for analysing the safety dynamics of critical infrastructure (e.g., fuel storage, main gas pipelines) and risky events, which includes assessment 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 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 probabilistic assessment of the safety dynamics of old energy infrastructure and potential risky events, considering the uncertainty of their prediction, when the reliability characteristics are changing due to aging and the environmental conditions change too.

Tasks:

1. Clustering of challenges of aging energy 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 aging equipment and adverse events;
5. Development of safety dynamics modeling methodology.

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

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