

Topics of dissertations for academic year 2023/2024

Supervisor: prof. Dr. Ing. Aleš Bernatík
Topic of dissertation: Safety Recommendations for Cases of Hydrogen Releases

A short annotation of the proposed dissertation:

Nowadays, the hydrogen is connected with the future as an alternative energy source which could improve air quality and minimizing environmental impact. This creates the need of using hydrogen technologies in the future for smart cities or regions, so these technologies find their application in heavy industry, mobility and also in thermal management. Due to the superior possibilities of hydrogen production, storage, distribution and use, sufficient knowledge of all safety aspects across the entire spectrum of hydrogen occurrence is necessary. If the hydrogen is not handled safely, there is a risk of its release and subsequently ignition which could lead in the fire or explosion. Hence, studying the behaviour of hydrogen release is very important to be ready for any leakage by expecting the impact of this release. The dissertation is going to study process of hydrogen release under different pressure condition in connection to safety recommendation. The practical obtained data from laboratories experiments will be used as an input data for simply models and the results will be compared and discussed.

Intended objective of the proposed dissertation:

The main research aim is to prepare safety recommendation in case of hydrogen release to reduce its impact. Partial goals are laboratory experiments focused on the hydrogen release. The hydrogen release will be recorded with the different initial condition with the aim to study its behaviour during and after its release. Obtained data will be used as an input data to relevant software for modelling. The results from the laboratories experiments and from the models will be compared.

Expected contribution to the scientific field and to practice:

Practice will gain the comparison between the practical and theoretical obtained data. The main impact for practice is safety recommendation based on these results. Both laboratory experiments, models and the comparison between them will contribute to the future work in this field. This will help better understanding to hydrogen release and the higher impact in the hydrogen safety.

Supervisor: doc. Dr. Ing. Michal Lesňák
Topic of dissertation: Model proposal for occupational risk reduction in the developing countries

A short annotation of the proposed dissertation:

The simple and obvious idea that safe and healthy conditions are in the interest of workers, employers and governments, as well as the public at large, has not yet gained meaningful recognition and remains neglected in developing countries because of competing social, economic, and political challenges. Hundreds of millions of people throughout the world are employed today in conditions that lead to different diseases and injuries and this has an immediate and direct impact on national and world economies. Many of these accidents lead to partial or complete incapacity to work and generate income. An increasing number of workers in industrial countries complain about psychological stress and overwork. Mechanical factors, unshielded machinery, unsafe structures at the workplace and dangerous unprotected tools are among the most prevalent hazards in both industrial and developing countries.

Intended objective of the proposed dissertation:

The main objective is suggest a practicable model for developing countries, which could give the immediate solution of accident reduction in the developing countries (specifically Pakistan) with respect to regional environment resources.

Partial goals are:

- To study and evaluation of the historical and current status of OSH in 2nnovatio nations OECD, (specifically Czech Republic) UK, USA with developing countries, specifically by Pakistan.
- Comparison of governmental legislation, regulations and commitment in developing and 2nnovatio countries will be carried out by Literature review.
- Comparison of working conditions of OSH practices in General Industry in 2nnovatio and developing countries by inspections and data collection from the big giants i.e. Cement, Textile, Fertilizers, SMEs, Offices, general shops and shopping malls etc. By previous Incident data.
- Good practices in research policy and implementation found in 2nnovatio countries will be collected and analyzed for suggesting the road map of OHS policy making (with regards of capacity building and research activities) for developing countries.

Expected contribution to the scientific field and to practice:

Prevention is the only sustainable 2nnovati for controlling the accident epidemic. Accident prevention programs are shown to have high cost-effectiveness and yield rapid results. The solution to occupational health problems in developing countries therefore requires not only the social change and technological innovation but also significant institutional and legal developments.