44th International Conference of the Slovak Society of Chemical Engineering

SLOVAK SOCIETY OF CHEMICAL ENGINEERING
INSTITUTE OF CHEMICAL AND ENVIRONMENTAL ENGINEERING
SLOVAK UNIVERSITY OF TECHNOLOGY IN BRATISLAVA

MAY 22-26, 2017 | HOTEL SNP | DEMĂNOVSKÁ DOLINA | SLOVAKIA
Slovak Society of Chemical Engineering
Institute of Chemical and Environmental Engineering
Slovak University of Technology in Bratislava

PROCEEDINGS
44th International Conference of the Slovak Society of Chemical Engineering

Hotel SNP
Demänovská dolina, Low Tatras, Slovakia, May 22–26, 2017
Large-scale data processing techniques in simulation-based safety analysis

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Keywords: HAZOP, process simulation, model-based hazard identification

Conventional process hazard analysis (PHA) methods are constantly being improved by implementation of simulation-based approach. Hazard and operability (HAZOP) study is one of the most popular conventional PHA techniques for hazard and operability problems identification in chemical industry. In this work, software solution employing HAZOP study principles and computer simulations is presented. Mathematical models of process units required for computer simulations are currently provided by commercial process simulators. Simulation output is usually dataset containing relevant information about individual HAZOP nodes. Principal objective of this paper is to review semiautomatic large-scale simulation data processing methods suitable for computer aided HAZOP study. Proposed methods utilize complex numerical procedures (such as parametric sensitivity analysis, runaway conditions identification, etc.) for robust hazard identification. Presented software tool applications demonstrate that the proposed approach can reduce time and cost requirements of conventional HAZOP study.

Acknowledgements
This work was supported by the Slovak Scientific Agency, Grant No. VEGA 1/0749/15 and Slovak Research and Development Agency APP-14-0317.