

Teaching Process Safety - Development of a HAZOP Study Teaching Module

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Abstract

The education of engineering students goes beyond the transmission of knowledge and involves the development of several professional competencies. As stated in ABET's Engineering Criteria 2000 (ABET,2007), an important program outcome is for graduates to have the "ability to design a system, component, or process to meet the desired needs within realistic constraints, such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability." Although safety is considered as an important area of instruction, particularly for practicing engineers, it is often not addressed adequately in a curriculum. One reason is that safety teaching involves significant amounts of materials covering legislation and a series of guidelines and instructions for students, As such it is generally considered a difficult area in which to stimulate students' interest. Furthermore, many teaching faculty have not had significant exposure to industrial safety.

A HAZOP is one of the key safety analysis techniques used by practicing engineers in the process industries to identify and minimize the hazards of a process and/or improve its effectiveness and efficiency. The term HAZOP derives from HAZards and Operability. The essential feature of the approach is to review process drawings (piping and instrumentation diagrams/process flow diagrams) and/or operating procedures by a multi-disciplinary team using a defined protocol to methodically identify and evaluate the significance of deviations from the normal design intention. This paper discusses the development of an animated teaching module in conjunction with a set of course notes. The teaching module was developed in FLASH software by a team of Process Engineers from HKUST and by members of CELT, the Centre for Enhanced Learning and Teaching at HKUST, in three phases with a testing protocol at each stage of development. The Teaching Module has been tested at HKUST and universities in Australia, France and Ireland and feedback questionnaires were developed, used during the testing phases and analysed prior to final modification of the animated teaching module. All these aspects will be presented in the paper and aspects of the animated teaching module will also be shown.

Biography

Alireza Bazargan is currently a PhD student at the Department of Chemical and Biomolecular Engineering of the Hong Kong University of Science and Technology. After completing his bachelor's degree at Sharif University of Technology in Tehran, Iran, and an internship at the Technical University of Kaiserslautern in Germany, he continued his studies in France by obtaining the prestigious TOTAL fellowship and pursuing a master's degree in Project Management in Environmental and Energy Engineering. After completing his master's with honors he moved to Hong Kong to pursue a doctorate degree, and obtained the PGRS scholarship as well as the SENG fellowship from the Hong Kong University of Science and Technology. His current work is focused on the production of valuable products from waster materials.