THE OHIO STATE UNIVERSITY
PROCESS SAFETY EDUCATION

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Biography

Robert W. (Bob) Johnson (B.S.Ch.E, M.S.Ch.E, Purdue University) is a Fellow of AIChE and past chair of AIChE's Safety & Health Division. In addition to being on the faculty of Ohio State part-time, he is President of Unwin Company, a process safety consultancy. He teaches the AIChE continuing education course on HAZOP Studies, and was primary author of CCPS' *Guidelines for Hazard Evaluation Procedures, Third Edition* as well as two books on chemical reactivity hazards.

Abstract

This presentation describes how process safety has been taught at The Ohio State University as a dedicated elective course, including use of the Safety and Chemical Engineering Education (SAChE) safety certificate program and other available resources.

Introduction

In addition to safety-related topics being included in the core chemical engineering curriculum at Ohio State, most notably in the Unit Ops Lab and in the senior design course, Ohio State offers a 3 credit hour Chemical Process Safety elective to Juniors, Seniors and graduate students. This elective course, originally developed and taught for two years by John E. Corn, instructor at Ohio State (now retired) and past chair of AIChE's Process Development Division, has now been taught for five years, with expanded content each year.

Text

The primary textbook for this course has been Crowl and Louvar, *Chemical Process Safety: Fundamentals with Applications* (Prentice-Hall). The process safety course used the third (2011) edition of the text for the first time last summer. The text is supplemented by a reading assignment related to Ethics and Professionalism, as well as many on-line resources.

Topics

In-class lectures are given on the following topics:

1 - Course Introduction

2 - Regulations and Ethics
3 - Safety in Process Design
4 - Fires and Explosions
5 - Fire & Explosion Prevention
6 - Dust Explosions
7 - Chemical Reactivity Hazards
8 - Introduction to Reliefs
9 - Relief Sizing
10 - Hazard and Risk Analysis
11 - Chemical Plant Security
12 - Inherently Safer Design

The course introduction is fairly extensive, covering the anatomy of process safety incidents as well as the spectrum of process hazards shown by way of videos and calculations the potential severity of consequences.

SAChE Products

Portions of several products of AIChE's Safety and Chemical Engineering Education Committee are worked into the lectures at various points, including the "Introduction to Reactive and Explosive Materials" video in the course introduction. Students are required to complete a minimum of four Safety Certificate Modules, with completion of additional modules being given extra credit. The Piper Alpha video has been shown most years, also.

Grading

Students can earn a base maximum of 100 points by the following:

10	Class attendance and participation
20	Completion of four Safety Certificate Modules
10	In-class quizzes
10	Midterm exam
21	Homework problems
14	Case study reports and presentations
15	Final exam

Extra credit points can be earned by attending more than ten lectures, completing more than four Safety Certificate Modules, and completing extensions to one of the homework problems.

Future

The Chemical Process Safety will be changing in the coming year, as Ohio State transitions from quarters to semesters. The new ABET requirements are likely to also have an impact. However, it is not known at this time what form that change will take.