Chemical Plant Safety Performance Measurements

Nir Keren, W.J. Rogers, and M.S. Mannan
Mary Kay O’Connor Process Safety Center
Chemical Engineering Department
Texas A&M University System
College Station, Texas 77843-3122

Abstract

A model for safety performance measurements in the chemical industry should be characterized by its applicability to all disciplines of chemical industry, by its ability to measure the contributions to safety of regulatory institutes, and to evaluate the quality and suitability of emergency plans. Furthermore, the model indicators should allow values to be normalized, and its indicator divergences should provide information about trends of safety systems. The objective of this presentation, as a first step toward establishing a model, is to discuss ways of measuring the safety performance of a chemical plant as a “stand alone” unit.

Mapping a typical chemical plant will create a basis for definitions of indicators and indexes to every area that affect safety performance. Indicator spectrum values will be selected so that personal judgements are minimized. By defining a set of weights with values of 0-100%, the way each indicator influences the overall safety performance is established.

After specifying the equations to grade the safety performance of a plant according to values of its indicator, a process of rough adjustment of the weights is necessary. Synthesis of data to set input values that features the safety performance of clear and obvious cases will be processed according to this sequence. The value of each weight will be adjusted according to the deviation between the safety performance output and the expected value. As a final step, a study of the safety performance output sensitivity is required to verify the stability of the mathematical model.