

Application Note

Performance Based Fire Protection

The information below is a summary of an article that originally appeared in “Workplace Protection,” a supplement to “Consulting-Specifying Engineer” and “Security” magazines.

Risk-Informed Fire Protection

Corporate restructuring and tight maintenance budgets have fire safety specialists taking a fresh look at ways to control fire and explosion hazards. One result has been a wider interest in fire protection methods developed in highly hazardous industries such as chemical processing and nuclear power generation. This risk-informed, performance-based approach presents a more realistic prediction of potential fire and explosion hazards for a given system or process, or for an entire operation.

Performance-Based

The methodology is performance-based because it provides solutions based on established goals, rather than on prescriptive requirements with implied goals. Solutions are supported by data from operators and management about processes, equipment and components, the buildings or structures housing them, operating and maintenance personnel, and the fire protection systems in place. Published performance data also is incorporated into the analysis.

Risk-Informed

The approach is risk-informed because the analysis factors in not only the severity of a fire or explosion — usually measured in dollars — but also the likelihood that a fire or explosion will occur. Because the risk-informed, performance-based method quantifies the likelihood of a fire hazard, and the likelihood that the fire protection system will contain or extinguish the fire, it provides a more realistic prediction of the actual risk.

Seven Steps

The basic methodology can be applied to a wide variety of risks and usually follows this sequence of events:

- Step 1: Project Definition of Risk Tolerance
- Step 2: Loss Event Scenario Development
- Step 3: Consequence Analysis
- Step 4: Probability Assessment
- Step 5: Risk Estimation and Comparison
- Step 6: Risk Reduction Analysis
- Step 7: Risk management, Cost/Benefit Analysis

Limits and Benefits

With results of improved plant safety and cost savings, the growing interest in this risk-graded methodology is not surprising. The approach offers an increasingly acceptable alternative to strict adherence to code requirements alone. The most significant limitation, however, is a relative lack of available industry and equipment data. This type of assessment should be used as one of many decision-making tools, as a supplement to the tool used most often — good engineering judgment.

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