The Best of Both Worlds
Leveraging Multi-User Virtual Plant Environments and 3D Interactive Visualization to Optimize Plant Safety

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Abstract

The products and equipment handled throughout the plant operational lifecycle impose significant safety risks. Compounding this, are numerous systems, processes and regulatory requirements resulting in vast quantities of asset information in varying formats. Inability to access, understand and effectively use information is often cited as a leading cause of plant safety incidents and unplanned shutdowns. This paper will demonstrate how it is not only possible to mitigate these risks, but further, to enable a zero-safety incident culture via implementation of an innovative, technology based solution as a fundamental component of the operational safety program.

Historical evidence such as the Three Mile Island, Bhopal, and Deep Water Horizon incidents demonstrate all too well the significant role human behaviour plays in operational safety. Hence, in order to be truly effective, safety programs must include training which incorporates elements that appeal to and anticipate human actions. This can only be accomplished by creating a training environment that accurately reflects or mirrors the ‘real world.’ The paper explains how an interactive virtual plant environment or ‘virtual world’ can be used to enhance safety training exercises and simulate complex operational activities such as Failure Modes and Effects Analysis, Reliability Centred Maintenance and Risk Based Inspection.

Recommendations presented in the paper will be based on a qualitative literature review and insights from plant operators; both of which are aimed at identifying operational use cases posing the greatest safety risks and challenges as well as currently available technologies for creating virtual plant environments.

The paper will conclude by presenting key solution benefits in the context of operational risk assessment, control of safety-related activities, ensuring operational stakeholder competence, cross-discipline communication and process safety supervision and monitoring. As a direct outcome of this paper, operators will be provided with a technology-based framework to optimize safety performance.