Supporting the Human Factors design process with Virtual Reality

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Abstract

Human Factors specialists at the Institute for Energy Technology / OECD Halden Reactor Project have completed a number of control centre design and evaluation projects. These range in scope from developing a review methodology to ensure that Human Factors considerations have been appropriately addressed in a design, proposing conceptual designs for control centres, and performing CRIOP validations of existing control rooms.

These projects are typically performed according to the process outlined in ISO 11064: gathering a team of relevant personnel, performing analyses, proposing a conceptual design, developing detailed designs, and performing verifications and validations.

During these design projects, it became apparent that Virtual Reality (VR) technology could contribute significantly to the process. Thus, the Halden Virtual Reality Centre developed a tool to support control centre design by allowing users to build VR models of the control centre, modify the design, and verify the design against ergonomic guidelines.

The design process has been considerably improved by VR. The model provides a focal point for team discussions and allows the team to view the control centre from any working position. Verification and reporting capabilities enable the team to identify necessary changes at an early stage in the design process.

Control Centre Design

Human-centred design (HCD) focuses on the requirements of the people who will be interacting with the system under development. The process, as outlined in a number of standards and guidelines (ISO-11064; NUREG-0700; Collier & Green, 1999; Green, Collier, Sebok, Morisseau, Seim & Skriver, 2000; O'Hara, Stubler, Higgins, & Brown, 1996), is an iterative one. HCD requires that multiple stakeholders are involved in the design project. In the process control industry, a human-centred control centre design is performed by people from a variety of disciplines and with various interests in the project. Operators (end users), engineers, human factors