Graphical visualization of process status for thermal power plants

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The operators' role in a thermal power plant is to control and monitor the process that turns combustible material into heat and electricity. It is important that the operators have a good apprehension of the plant status to make correct decisions and detect deviations early. This allows prolonged optimal operation. The aim of this project was to develop screen images to improve the visualisation of plant status for thermal power plants. Primarily, design concepts developed by IFE together with screen images from other domains were studied. Further, the visualisation needs for the operation of thermal power plants were investigated and used as a basis for the development of new screen images. The resulting screen images were based on the following principles:
1. Create a logical visual search pattern in the images.
2. Combine classical process mimic displays with supplementing visualisations.
3. Decrease the ever-present information, but facilitate display of additional information.
4. Adapt the content to the work situation.
5. Integrate presentation of alarms in ordinary screen images
An evaluation with operators gave a positive response to the screen images. The operators appreciated the effective use of graphical elements and saw benefits compared with traditional presentations.

Introduction

Background

As the complexity increases within different plants in the process industry with more use of sensors, higher automation and higher demands for quality, the challenges of visualizing adequate information within the control room for the operators increase as well. The current trend today involves collocation of minor control rooms, along with relatively few operators, and increased use of automation. This results in that each single operator has to monitor and control a larger part of the process than before. In order to support decision making for the process operators and thus rationalize monitoring and controlling of processes, screen images are required that take human cognitive abilities to process visual information during different situations into account. If the screen images are not designed with the operators'