

Projections of productivity

An operator's dream: ergonomics for the control room

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It is a universal tenet that providing workers with the right tools augments their ability to produce efficiently. Progress in control room technology is a prime example of this. A good tool is defined not only by the scope of its functionality, but also by the ease with which it can be used. The operator needs rapid and intuitive access to relevant information at all times. A delay in obtaining information or a confusing format for its presentation increases the risk of misjudgment and lost production. ABB has taken on this challenge, taking control room ergonomics and interactivity to new heights, permitting operators to interact with all displays presented to them.



Productivity

An improved overview of production, an increase in workplace efficiency and better ergonomics are principal features of ABB's complete workplace for control room operators, the System 800xA Extended Operator Workplace.

Operators can see the entire plant in an overall picture, as well as viewing several other selectable images at the same time. When a fault arises they can see it and respond more quickly.

This workplace builds on ABB's unique System 800xA software and continuing technical progress. It was developed in conjunction with two Scandinavian companies, and has been available on the market since 2006. Many successful installations are completed within several different types of applications. The experience shows a more effective, safe and profitable production result ¹.

One frequent comment from those customers that have seen and chosen the ABB System 800xA and the Extended Operator Workplace is that they would like the operators in the control room to have the best available production overview. "We want our operators to have a good overview of the production process and better possibilities to ensure we produce the highest level of quality for our very demanding customers. So we chose ABB's System 800xA Extended Operator Workplace for our control room."

Another comment is that the Extended Operator Workplace is effectively combining a large overview display with several regular monitors, all with full interaction. "The most important thing is that our operators can see the entire plant in an overall picture, as well as viewing several other selectable images at the same time. When a fault arises they can see it and respond more quickly. It is also easier to remedy. This enables us to minimize the number of halts in production."

This new presentation technology is changing the industry standard.

Process industries, petrochemical industries and combined power and heating plants are amongst those who have seen the advantages of having an efficient workplace for their operators.

More than 40 percent of all halts in production involve operator errors. In most cases, these can be traced to operators not being able to access vital information quickly enough.

At the core of the workplace lies ABB's 800xA automation system with its special sub-function, Operations. The operations package contains the operator interface and the software that can display information in different ways on screens of various types. It thus opens the possibility for overview pictures of a completely unique type.

With Operations, the foundation was laid for the development of a com-

¹ A more effective, safe and profitable production with System 800xA and the Extended Operator Workplace.



pletely new operator station. ABB inaugurated a working relationship with two Nordic companies, Creative Grafiska Möbler AB, a developer and producer of control room furniture, and 3D-Perception AS, a supplier of projectors for large-screen displays. After several years of development work, System 800xA Extended Operator Workplace has now entered many control rooms around the world.

The operator workplace incorporates an operator desk that is available in two sizes. The desk can be selected to contain one or two operator stations, each with up to four monitors, and one operator station controlling a large screen onto which two or three projectors mounted behind the desk beam information. The workstations can be configured as desired through the unique software in the 800xA system that controls the display of images in an ergonomically correct manner and totally automatically. Among other things, this enables numerous combinations of image displays between the monitors and the large screen.

ABB believes that ergonomics and overview are vital in enabling operators to be able to act quickly and avoid making mistakes. The goal is to minimize the number of unintentional production stops and to maintain a high, safe and consistent level of quality in production.

The development work followed a number of guidelines for a good control room workplace. It must provide a good overview of the process; be fully interactive for quick action; be modern and attractive; have equipment that replaces existing, difficult-to-manage wall panels; be able to integrate video monitors, such as CCTV; be designed in such a way that visitors do not disturb operators; be ergonomically designed with good lighting and a low level of noise; and permit consolidation and communication between different control rooms in the flow of production.

The most important thing in a new control room workplace is the option of displaying an overview. It is common in many control rooms in most

Operators are offered optimal support by interactive display technology from ABB



industries to have large screens that do not offer any means of interaction and often only display images of trends that are not of particularly great use. The operator in such a room struggles with perhaps only two monitors, incomplete information and ineffectively placed video monitors for the important camera monitoring.

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The overview offered by System 800xA Extended Operator Workplace owes its advantage to the flexibly configurable display of information on different screens and projectors. Overview pictures can, for example, be displayed on the entire large screen, while the monitors show details, diagrams or other information. Or conversely, a single image, a diagram for example, can be spread across three

monitors as one total picture while the large screen shows trends in smaller windows. All images are opened correctly and automatically by the software in 800xA Operations, in separate windows and in a clear and readable format.

The large screen can be used in different ways:

- As a single continuous image
- In order to display all images in the system as overlapping images
- In order to build up group pictures of multiple images
- For displays for visitors
- For live video instead of separate video monitors

Another important purpose of the workplace is the improvement of the working environment for operators. ABB wishes to change the role of these operators so they can work more effectively and obtain greater satisfaction from the work they do.

The improvements to the working environment include the ability to raise and lower the curved working surface and the desk. Similarly, the large screen can be raised and lowered, as well as slightly bent in order to present a clear image from where the operators are sitting. By mounting the large screen directly at the rear of the desk instead of on a wall, as is usually the case, the overview is

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2 The Matrox remote graphics unit helps reduce heat and noise emissions in the control room by providing only the user interface to the operators. The computers are located in a separate room.



not disturbed by passersby. An additional improvement to the working environment is the option of moving the computers entirely outside of the control room to deal with the prevalent issues of heat, noise, space and security.

An example of how this can be done leverages new technology developed by the electronics company, Matrox Graphics. Matrox introduces a trans-

mitter card on the workstation or server, which replaces the standard graphics card and can be fiber-optically cabled to a remote graphics unit on the operator side. The remote graphics unit contains all the necessary I/O including: four monitor ports, six USB ports for peripherals such as keyboard and mouse, and audio connections for speakers. Matrox remote graphics units work with all installations of System 800xA 2.



Working environments are a concern of the international consulting company ARC Advisory Group, which was commissioned to compare different operator workstation technologies and make recommendations for future developments. As part of its task, it studied the System 800xA Extended Operator Workplace and praised it, describing it as “an ergonomically optimized workstation designed to enhance the operator’s working environment and effectiveness with features that reduce fatigue and extend the operator’s range of understanding.”

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The feedback on ABB's operator workplace has been very positive. Following an installation completed in 2007, one customer remarked: “I take the greatest pride in working in the center of intelligence, where we find comfort, beauty, technology and security in every corner of the room. Working in an environment like this is certainly exciting and motivating for the whole team. Those responsible for this project deserve congratulations – it exceeded our expectations.”

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