

# System 800xA Simulator gave Östrand skilled operators from day one



**Simulator training is becoming an important factor for the pulp and paper industry, as the simulators have become increasingly realistic and provide challenging training for the operators. In all major automation projects today, a simulator is included as an option in the project.**

Good experiences from previous endeavours are among the reasons that the use of simulators is on the increase in the pulp and paper industry. SCA Östrand pulp mill invested in a simulator for the new recovery boiler that started up in 2006. Being able to run control logic in a realistic manner, for example during checkout, was seen as a great asset both by production and the automation department. The simulator is an important tool to check the control logic code in the automation system in connection with the Factory Acceptance Test (FAT). For SCA Östrand the simulator paid good dividends, both short and long term.

– Today's management would probably prefer that we used the simulators in more areas than we actually do, says Lars-Åke Sundberg, system engineer at SCA Östrand. We use the simulator for educational purposes, but it could also be used for optimisation, development and maintenance of the production system. We could take much more advantage of these opportunities.

### **Simulator an important factor when choosing a system**

Östrand have a long-rooted tradition in doing its own programming. Lars-Åke Sundberg believes that this input into the programming and other aspects of the project is a major contributing factor in today's successful operation.

– Troubleshooting and development is easier when you have been involved in building the system. Choosing a realistic simulator also means that we can teach, train and develop in the same environment as the real system.

Until now the main use for the simulator has been education. The simulator was part of the system from ABB that controls the new recovery boiler from Andritz. This was ready in October 2006. Andritz also delivered the process model. From day one, the new recovery boiler was run by experienced operators, largely due to training in the simulator.

– No one was allowed to operate the recovery boiler without one week of simulator training, Fredrik Jönsson explains. He has been responsible for the project which aimed at complete the training of the operators before launching the new system. The training was partly carried out in the control room at Östrand, with two operators at a time, one per training station, and Fredrik Jönsson as the instructor. In a 40-hour week, the operators were educated in all the functions of the new system. Half of the 18 operators were trained before the start of the recovery boiler, the other half, for practical reasons, had to wait until the weeks after launching the system. However, no operators were allowed working at the recovery boiler before the training was completed.





Photos pulp mill: SCA. Photos control room: Nils Lindstrand.



The control system for Östrand's new recovery boiler was a successful cooperation between SCA Östrand, ABB and Andritz. Here Lars-Åke Sundberg (sitting), Lars Ledung (behind) and Fredrik Jönsson. ABB can today offer complete simulators including customized process models for the whole pulp and paper industry. This simplifies projects for the mills.

The possibilities to educate and test in a simulator were important factors when choosing the automation system. – The whole package must be in accordance with our needs, states Lars-Åke Sundberg, and among the final suppliers we were choosing from, ABB's solution for the simulator was the best option. It gave us a very realistic simulation, as the functionality in the simulator is the same as in the real automation system, with additional simulation functions. Other alternatives, such as emulating the automation system by the model vendor, seemed far less suitable for us.

#### Training in the simulator runs continuously

The simulator's potential for education was utilized prior to the start-up 2006, and is still used on a regular basis, both for new recruits and further training. It is very useful when exploring elements of the process that are not often encountered, such as start-ups and emergency stops. – We also use the simulator to train the students from Östrand high school who come here for work experience, Fredrik Jönsson says. Due to the realistic nature of the simulator as it is placed in the same control room as the real

'thing', the students receive realistic training in operating the recovery boiler without causing a disruption to the real process.

This has been a success and many students who got their work experience at Östrand in the last years have later been employed as operators. Thus the simulator becomes a factor in recruitment, because high schools seldom have the capacity to let the students work in realistic work situations as a modern pulp mill cannot let high school students interfere with the control of its processes. That dilemma is solved by the simulator and gives high school students a realistic insight to the interesting job of an operator, using today's level of advanced technology.

Fredrik Jönsson says that he's been able to verify that the simulator really has the effect it is supposed to have on operators.

– I had the opportunity to operate the recovery boiler myself, after operating it in the simulator version only. I managed without problems.

Due to the similarities between the real automation system and the 800xA simulator, the simulator is relatively easy to update when the real system is further developed and modified. Keeping the simulator updated results in no negative training and the simulator is usable through the real system's life time.

### ABB can supply the full automation and simulator scope

When a new project is starting up many factors can lead to a better and faster implementation.

– Today we can deliver customized process models together with the System 800xA automation platform and 800xA Simulator, says Lars Ledung, Product Manager at ABB's Pulp & Paper business unit. We can offer the customers one single supplier for the entire simulator system.

ABB's realistic simulator system, called 800xA Simulator, is a result of the company's long experience with operator training simulators in oil&gas and nuclear power industries. Demand for simulators in these sectors is high, especially for safety reasons. Over the years highly advanced technologies for simulators have had the opportunity to grow.

– We saw that the pulp and paper industry could benefit from the simulator knowledge that ABB has built up over the years, says Lars Ledung.

– What makes 800xA Simulator unique is the possibility to connect a process model to the control system, which gives a completely realistic control logic execution and environment for the operator, with possibilities to run different scenarios, stop, restart and so on, says Lars Ledung. In training situations, an instructor manages the training by using a set of basic scenarios or saved snapshots of interesting real process scenarios and induces process upsets. It is possible to run the simulations in real time, faster/slower forward or pause.

– The communication between model and control system follows industrial standards like COM and OPC. This means that it is possible to use process models from any supplier.

### The simulator and ABB

ABB has long experience in supplying simulators to many industrial sectors worldwide. Recently the interest has increased noticeable also within the global pulp industry and there are several simulators based on ABB's 800xA Simulator in Sweden, Brazil, Australia and South Africa. In Sweden, apart from SCA Östrand and Södra Cell Värö, a simulator for recovery boiler and evaporation plant is now installed in SCA's mill in Obbola.

ABB's 800xA Simulator is a simulator adapted version of ABB's automation platform Industrial IT Extended Automation System 800xA. Except for the simulator enhancements this makes the environment identical to that of the actual automation system. The control logic is executed by controllers running in a Microsoft Windows environment. This reduces the hardware costs a lot compared to the distributed controllers in the real system. The simulator system uses the control logic and operator screen layouts directly from the real automation system. With identical system configurations, all training in the simulator is directly transferable compared to working with the real system.

The 800xA Simulator can be easily updated with modifications from the real system, and can therefore be used for a long time even when the automation system is developed or rebuilt, creating a cost-effective solution for the customer. An external process model can connect to 800xA Simulator to simulate the field I/O and to activate simulation functions in the control system.

**“The realistic simulator was an important factor in the choice of control system, says Lars-Åke Sundberg”**

#### ABB 800xA Simulator at SCA Östrand consists of:

- 800xA Simulator using the logic and screen layout for recovery boiler control from the plant's 800xA automation system.
- Process model of the recovery boiler supplied by Andritz.

(The System 800xA solution for the recovery boiler consists of five operator workplaces and four redundant AC 800M controllers. The total number of I/Os is approximately 3,000. Profibus is used for the communication with the process and the boiler has HART instrumentation.)

#### Facts about SCA Östrand

- Östrand is a pulp mill within the SCA Group and has approximately 400 employees.
- Located in the municipality of Timrå, north of the city of Sundsvall, Sweden.
- Östrand produces 430,000 ton annually of TCF softwood pulp. Approximately half of this is used in the production of hygiene and printing paper within the SCA Group.
- Östrand also produces 80,000 ton of CTMP, used for hygiene and packaging products.
- The new recovery boiler was put into service on the 9th of October 2006 and cost 1.6 billion SEK (approximately 145 million €). It generates 500 GWh green electricity annually.

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