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Computer Simulation for Higher Profits

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Technological improvements in software for simulating sugar processing is radically reforming the decision making process for sugar companies. Using modern simulation software, engineers can build a computer model of their complete factory or refinery that allows management to evaluate detailed changes in the process or equipment with efficient use of their engineering talent. Evaluations, that in the past took weeks or longer can now be done in minutes with higher accuracy and in greater detail than was previously possible. The results are more accurate decisions that can save considerable investment money and at the same time generate more revenues for the company. For example, modeling and simulation of the vapor loads in a factory can define the surface areas needed for evaporator bodies and heat exchangers. Without accurate simulation, incorrectly sized heating surfaces can result in excessive investment cost for a company.

Computer modeling and simulation have other things to offer besides increasing the efficiency of a process and the effectiveness of engineers. In addition, it is used to: (1) train process engineers, (2) design new factories, (3) evaluate the feasibility of research and development projects, (4) reconcile process data, and (5) provide information about the process that cannot be measured.

Young process engineers, who are already adept at using software, can learn a great deal by building a model of a factory. Once the model is built, they can quickly gain experience by changing the operating conditions of the factory and observing how the model responds. The model will show which areas of the factory are significant regarding sugar recovery and energy consumption. This experience can be obtained in weeks, or even days, whereas without simulation, it may take years.

New factory designs are greatly enhanced with modeling and simulation. Building a computer model of a proposed factory allows alternate designs to be tried quickly and easily. The simulation results are used to see the advantages or disadvantages of the different alternatives. Changing the routing of a process flow stream is simply a matter of clicking on the flow stream with a mouse and moving it to another destination. Changing equipment simply requires changing the performance data for the station in the model and running another simulation to see the results.

Research and development projects can be modeled and simulated before funds are committed. The expected performance of the new process or equipment is entered into the model and a simulation is made to evaluate its effectiveness for improving factory operations. Projects that show significant potential financial gains can be given a higher priority than those that are less attractive.

Factory data can be reconciled using simulation by comparing measured and simulated values. Data that is not consistent can be disregarded; thus, the integrity of measured data is improved with simulation. Also, crosschecking of measured values can be very helpful for identifying faulty measuring devices.

Some flow streams in a factory cannot be monitored either because of their location, or because the data to be measured is not measurable with current instrumentation. Simulation can be used to determine the characteristics of these flow streams by inference from other flow streams that can be measured and checked against the results from simulation. This information may be necessary when designing equipment for the process.

The development of modern simulation software is revolutionizing sugar process design and evaluation. Sugar companies are benefiting from this new tool with higher profits, better information and more highly trained engineers. It is a technology whose time has arrived.