243p Efficient Procedure for Estimating Process Design Reliability Coupled to Commercial Process Simulator

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Design reliability is the likelihood that a process will meet constraints under normal operation despite uncertainty in the underlying parameters used in the design calculations. It can be estimated by integrating the n-constraints in the p-parameter space. This integration requires identifying parameters sets which lie on the constraint boundaries, i.e. boundary point, and interpolating among all points to estimate the constraint boundary volume in p-space.

In order to do this integration, process designers would require the integration tool and a process design tool. Commercial simulators are examples of the latter.

This paper presents the coupling of the reliability estimation methodology and a commercial process simulator. This paper shows how to evaluate a conventional computational process flowsheet to estimate design reliability. The reliability computation methods become additional ‘modules' in the simulator's menu. Once the design has been developed, the reliability modules are added to the flowsheet. These then effectively search for boundary points and interpolate among them to estimate reliability. This coupling makes reliability estimation available to practicing engineers.

The reliability estimation methodology is that developed at the Kurata Thermodynamics Laboratory. The commercial process simulator used for this paper is Chemcad.