

Capacity and Cycle Time integrated Cost of Ownership Modeling

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Most existing Cost of Ownership (COO) models are supplier-side driven. Suppliers want to focus on pure equipment performance, thus exclude factors outside their influence zone from the COO calculations, such as process-mix variations and decreasing fab cycle time objectives. As a result, the associated costs determined by such analyses assume maximum usage of the equipment, or in the best case, a usage of the equipment at a predefined utilization level. The resulting COO is more equipment performance than manufacturing usage based.

Experience has learned that the COO varies significantly with mix changes and with fab cycle time objectives. Therefore, in the 300mm multi-product multi-process waferfab at Crolles2, a new approach has been implemented. The associated method integrates a capacity model with COO and supports mix and cycle time cost-sensitivity analysis on top of all standard Semi COO features. The resulting analysis is used in our investment process and equipment Cost Improvement Programs. Currently, the method is also in use in Philips Semiconductor training programs that aim to increase the manufacturing-based Cost of Ownership awareness for our equipment engineers.

One of the results from the field showed that, for the furnace area, the equipment of supplier x is most cost-effective under the current situation. However, it is no longer most cost-effective with decreasing cycle time objective, or changing mix. To support those changes, additional equipment would be required to meet those objectives, where-as with supplier y, the mix and cycle time objectives can be met with the initial installed equipment. For another area and supplier, it showed that the COO was extremely sensitive to availability variations due to the requirement of an additional tool requirement to meet envisioned manufacturing demand.