Productivity and scrap benefits thru optimized at-tool tracking

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With increasing competition, there is a growing need for wafer fabs to improve both scrap and productivity performance. Using the Six Sigma DMAIC process, we identified various components of the tracking procedure that contributed to productivity losses and scrap. Freescale developed a system concentrating on standard automated tracking procedures. The key components include enforcement of standardized staging, light towers, barcode tracking, tool initiated SPC completion and lot track out. The enhancements contributed to a 94% reduction in operator missprocess scrap in our focus area.

Analysis of the workflow revealed inefficiencies and inherent opportunities for swapped lots. Operators had to switch back and forth between as many as four input devices to perform lot tracking: keyboard, mouse, barcode gun, and tool light pen. We eliminated some non-value-added steps and migrated all the inputs to barcode-selection with the exception of tool light pen where applicable. Improvements in productivity ranged from 25%-40% depending on the tool.

Analysis of the lot completion workflow revealed that operator interaction at trackout was time-consuming and very serial. The only value-added portion is physically moving the cassette from the tool to the lot box. When normal processing occurs, the automation systems perform the verification, lot tracking and applicable SPC functions. Under abnormal processing conditions a variety of handlers determine the proper status of the tool and the lot (eg: lot hold, SPC failure, lot history comments, etc.). This cut out approximately 75% of the operator interaction time associated with trackout and data collection.

The at-tool barcode tracking, tool-triggered automatic trackout, and automatic SPC data collection, coupled with other improvements like light towers for reduced lot/tool idle losses and optimized staging, provided substantial productivity improvements and reduction in operator-induced scrap.