A systematic approach to setup and execute Equipment Productivity Projects to increase FAB-performance on the example of a Strip Ash Tool

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Introduction / Problem Definition

Despite the present recovery of the semiconductor market strong requirements still exist on semiconductor manufacturing regarding flexibility, quality and productivity.
Factory performance criteria's like fulfillment of cost targets, avoidance of capital investment by increasing factory capacity, shorter product turn-around times and shorter product development cycles lead to the necessity for a strategic and systematic analysis of the installed equipment park on potential candidates for strategic equipment productivity projects to fulfill these criteria's. Trigger of these systematic investigations within IFX was a common project with an equipment supplier which results in over 80% throughput improvement with minimal expenditure. The main levers of this project were equipment settings, Continuous Improvement Programs and hardware upgrades.
On the basis of this and some subsequent projects the authors developed a methodology, which is introduced successfully in many of the Infineon factories. In the presentation all single components of the method will be described on the example of a Strip-Ash equipment. Essential analysis tools e.g. simulation tools and analysis-software will be described.

Methodology

In the last decade many equipment productivity methods were only focused on equipment availability, like OEE method or analysis of man – machine interactions. Beside these methods the authors also successfully applied the method of Intrinsic Equipment Effectiveness which was developed during the last years and which focuses on reducing non-added value times of the raw tool time. Internal wafer handling and logistics, control times and recipe designs were systematically analyzed and solutions were developed to minimize their impact on process speed.

Setup of Equipment Productivity Projects

In order to achieve the maximum potential of the existing equipment a in-depth analysis and the work on details is necessary including all groups of technical experts such as hardware and software experts, maintenance experts and process engineers. Typical project duration is 6 – 12 month. Key success factors for a successful project are:

- Including Equipment Supplier in the Project
- Team members of the core team
- Lead time to investment decision
- Clarification of resources and priorities
- Escalation procedures

The authors will explain in detail the project phases preparation, diagnostic, planning, implementation and deploying on the basis of a Strip Ash multi chamber mainframe. After the project finished a throughput gain of 23% could be achieved.

Rollout and lessons learned

In particular the tight technical exchange of the experts by Face-to-Face meetings and regular tele- or videoconferences supported the progress of the project and the successful roll out to other factories.
The authors will explain in the presentation important lessons learned, in particular with the project selection and the project definition and describe solutions too always recurring problems.