

Bridging the Social Gap

Working Together for Continued Prosperity and Growth

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An important source of competitiveness in the compound semiconductor industry is the ability to introduce new process technologies quickly with high yields and low cycle times (1). A lot of attention has been paid to engineering performance based on process development/integration, production performance based on WIP management, and equipment effectiveness. However, very little study has taken place on the interaction between operators and engineers. Operators and Engineers are two very distinct and somewhat independent groups with a very complex and sometimes strenuous relationship. There are many reasons for this perceived and/or real tension. This paper is an opportunity to discuss those differences and learn how to integrate our unique knowledge and experiences for the continued prosperity and innovation of our companies.

Let's briefly explore the similarities and differences between the two groups. We all, operators and engineers, have a huge stake in our companies. Both groups strive every day to produce the highest quality work possible because it benefits our financial bottom line. It is also a matter of pride for all employees to do the best job that they are able. All employees regardless of job title come to work not only to provide for their families, but to ensure through their quality of work that they will continue to be employed for many years. This job security is something that everyone strives to achieve.

There are some significant differences that make a working relationship challenging. Education is a considerable difference that stresses the relationship between engineers and operators. Most if not all engineers have an advanced degree, which they have spent a huge portion of their adult life earning. Engineers have spent years if not decades honing and perfecting their expertise to make their process the best that they can by continually improving the processes. Operators are generally high school graduates, with a very small percentage having some college or a full bachelor's degree. This difference in formal education is often skewed by the experience that operators bring. Many operators have been in and around this industry for 25+ years. These individuals have experienced the field of semiconductors from its infancy and bring some very insightful and profound experiences to the discussion.

Understanding that we all have a very personal stake in our companies, what opportunities do we have? What projects can we take on together? Cooperatively can we change our process? Can we become more efficient communicators? Do we know where we fall short in our day to day experiences? Seeing the differences between the operators and engineers, acknowledging them, and using them to ensure progress in our company can be and should be a tool that we use on a daily basis.

Each group has a very unique set of responsibilities and knowledge. We need to focus on working together, doing things that benefit the company as a whole, not just individual achievement. How can we accomplish this objective? Operators need to work harder at following the instructions that are left for them. If the directions are vague, incomplete, or just wrong, don't blindly follow. This only leads to miss process and angry engineers. Engineers, listen to the operators when they have input. They are the people with the most constant and hands on experience with the process. Operators often assist engineers to write clear spec instructions, set up work methods, training procedures, recipe name convention, tool qualification checklists to avoid confusion, and make manufacturing mistake-proof. When excursions occurs operators are usually the first to observe the problem, such as low sink levels, dump rinse not functioning , and wafer discoloration. Experienced visual inspection operators often sense process shifting that most engineers cannot detect. For example, operators noticed the metal feature edge looked slightly dark, which indicated the photo profile had been changed. Engineers often rely on the detailed information operators provide for timely root cause identification. And above everything else, we are on the same team. Communicate everything. It is better for everyone involved to know what's expected at all times. Many continuous improvement projects were completed by operator and engineer teams, such as cycle time reduction, precious metal saving, test wafer reduction, defect reduction, reducing wafer breakage. When operators or production techs are trained to perform simpler manufacturing engineering tasks, engineers are free to work on more challenging work that is distanced from fire-fighting duties. The result is a win-win situation. Operators and production technicians enjoy job enrichment that increases their technical skills and adds variety to their daily tasks. Cross-functional meetings can serve as a forum in which engineers, operators, and technicians, for example, can reach consensus over task assignment and job roles, thereby assuring that everyone is familiar with their responsibilities, and that they agree to the roles that they are to fulfill (2).

The importance of this topic is that both groups, no matter their differences, bring very important and varied skills to our companies. Despite the educational and social differences between engineers and operators,

we have an opportunity to positively impact our companies, and insure the continued growth and prosperity for years to come.

Reference

1. Macher, Jeffrey T, Mowery, David C, British Journal of Management, Volume 20, Supplement 1, March 2009 , pp. S41-S62(22)
2. Diane E. Bailey, IEEE TRANSACTIONS ON ENGINEERING MANAGEMENT, VOL. 46, NO. 4, NOVEMBER 1999 417