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CPR for New Product Introductions: The Keys to Staying on Track

The trick is to integrate the knowledge of sourcing, production and service teams to identify controllable sources of process variance and improve production yields and product quality -- early in the NPI process.

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By

Despite the recent economic slowdown, product manufacturers have continued to increase the pace of new product launches to take advantage of consumer spending and maintain revenues and profit margins. The market window for selling many products has shrunk to much less than a year for products such as disk drives and mobile devices. Rapid product lifecycles and high development costs pressure manufacturing firms to not only cut their development times (time-to-market), but also the time to reach full capacity utilization (time-to-volume.)

The steady march of new offerings from electronics manufacturing companies continues across a wide range of vertical markets despite tough economic times:

- Telecommunications equipment providers are quickly developing higher-speed 4G IMT-Advanced networking devices
- Smartphone innovation continues to advance with new versions of the iPhone 3G, Palm Pre, Blackberry Storm and many others
- The profusion of medical electronics devices continues to grow in many new areas including combining a defibrillator and a cardiac-resynchronization therapy device to both shock the heart and pace its left and right chambers in a synchronous manner
- Automotive technology is making great strides towards reducing carbon consumption and increasing safety through the innovative use of energy storage and conversion

In this increasingly demand-driven world, added focus needs to be placed where success is measured most: Improving the ability to bring new products to market, as quickly as possible -- while maintaining the highest level of quality. Changing consumer dynamics and competitive landscapes are increasing the pressure to reduce lead times -- and introduce the most innovative and desirable products that strike this evolving customer demand. Getting products in the hands of a customer first can deliver significant business benefits, including increased revenue, market

capture, profit improvements and brand loyalty. Repeating successful product launches is critical to sustaining above average long-term profits.

Production Ramp-up Overview

The key period between completion of development (analysis/concept) and full capacity manufacturing (implementation) is known as production ramp-up. Two conflicting factors are characteristic of this period: low production capacity and high demand. High demand arises because the product is still relatively fresh and may be the only product of its type, so customers are ready to buy at a premium price, yet production is low due to low production rates and low yields.

Production Ramp-up can be Viewed as a 3 Phase Sequence:

1. **Release to Production** -- This step is the validation of the manufactured product against a design specification, prior to ramping up to full volume manufacturing. Activities leading up to this hand off include monitoring test results of initial board build vs. a gold standard and adjusting test programs, test fixtures, and assembly issues. This phase also includes initial analysis of parametric process and test data to utilize during the qualification process against design specifications. The product must meet minimum functional standards at the conclusion of release to production in order to complete the handoff from product design to manufacturing, but it is recognized that yields and cycle times will often still be sub-optimal.
2. **Optimization** -- This phase is focused on getting yields and cycle times to meet the target for full-volume production and involves heavy use of parametric data and correlation analysis to determine operational performance and adjust to the center "sweet spot" of the production process. Steps taken here include close inspection of internal manufacturing repair data and correlation to identify component problems, design and/or assembly tweaks to center the performance of certain product elements including test sequence modifications to optimize performance at each test gateway in the production flow.
3. **Sustaining** -- This phase is concerned with maintaining yields, reducing bone piles and keeping the manufacturing line operational. Activities can include minor modifications to the test equipment to reduce failures, increase speed of testing, modifications to support faster line change-out times and improving line layout (lean techniques.)

Critical Program Rescue (CPR)

Despite the challenges presented by new product introductions, there are steps that can be taken to speed time to market, while reducing overall risk and costs. The key to quickly and accurately coordinate the information between component sourcing, design teams and the quality organization is the ability to gather a wide variety of process and product test data in real-time to move products rapidly from concept to the consumer. Sourcing, production and service teams rely on information about quality, performance and dependability in their roles -- the trick is to integrate the knowledge and insight they have to identify controllable sources of process variance and improve production yields and product quality -- early in the NPI process.

Components -- Better Materials and Suppliers

- Component quality data obtained from component manufacturers, ensuring that key performance and margin specifications are verified before the production process begins.

Assembly -- Efficient Designs that Survive the Rigors of Mass Assembly

- Assembly test steps -- including Automated Optical Inspection (AOI), X-Ray and In-

Circuit Testing (ICT) -- data, which can be gathered and analyzed to quickly identify process and mechanical design flaws, before they become issues.

- Product test data, which is generated after a series of assembly steps to ensure proper operation of sub assemblies before moving to subsequent assembly steps. This information can assess primary product quality and reliability by analyzing key product parameters including anything from pass/fail to advanced parametric data, and is performed to verify that the products designed are built and operated to intended levels.

Repair data = Identification or Repeatable Problems

- Manufacturing repair center operations data, including reported behavioral problems, component failures, usage feedback and other field exposure results. This data identifies process and mechanical design issues early, before issues arise in the hands of the precious customer base.

For today's electronics manufacturers, growth is at a premium. Where many traditional business advantages are faltering, innovation and new product introductions remains a central source of value and competitive advantage. Product innovation, whether directed at breaking open new markets or deepening existing customer relationships, is potent fuel for new revenues, profits and shareholder returns. The ability to develop predictable product launches can capitalize on the full value of innovation.

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