

Effective Quality Procedures are a Necessity

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Cougar Components Corporation is a manufacturer of hybrid microcircuits, primarily amplifier components and amplifier-based subsystems, operating from 10 MHz to 12 GHz. We focus on the space, military and high-end commercial wireless markets. While much of the industry emphasizes commercial wireless applications, the higher-performance systems addressed by Cougar, and the quality programs they require, are still a significant part of the microwave business. A review of our experience with these quality procedures should be useful to any supplier, whether they are required by their customers or not.

With our recent certification from the Defense Supply Center Columbus (DCCC) in hand, we have more time to reflect on how our Technology Review Board (TRB) process actually works. We are now certified to MIL-PRF-38534 Class H and K, TRB Option and ISO-9001. Prior to certification, we spent much of our time in TRB ensuring that we had the appropriate documentation and controls necessary to validate our quality system's worthiness. There is strong evidence to suggest (primarily from our customer base) that our TRB process has many advantages over the typical "serial" or "function-to-function" problem-solving systems that are commonly found in our industry. The basis for our version of the TRB is the cross-functional weekly problem-solving meeting. In these weekly sessions, we review the quality and technical problems; we review critical process control documentation and data; we review critical technical contracts; and above all we continuously improve our entire quality system.

Our cross-functional TRB team consists of each discipline that materially affects the quality or reliability of our products or processes. We have select people in each of these roles and, since we are a small company of just

over 100 people, they are all functional managers. Our TRB membership is as follows:

- Quality Assurance, TRB Chairman
- Electrical Engineering
- Production (Test) Engineering
- Process Engineering
- Manufacturing
- Program Management
- Sr. Management Representative



Dan Cheadle Jr. has been with Cougar Components in various capacities since his father founded the company in 1986. He has held the office of Vice President, Operations since 1994. In 1998, Dan was responsible for establishing Cougar's certified quality system to meet both ISO 9001 and MIL-PRF-38534 Class H and K, TRB Option. Cougar was the seventh company to achieve Class K TRB status through DSCC. Dan holds both bachelors and masters degrees in Industrial Technology from San Jose State University. He is a member of IMAPS and ASQ and serves on both the DeAnza/CACT and San Jose State Manufacturing Advisory Boards. He can be reached at Cougar Components Corporation, 290 Santa Ana Ct., Sunnyvale, CA 94086; tel: 408-522-3838; fax: 408-522-3839; e-mail: danny.cheadle@cougarcorp.com

In broad strokes, Cougar's TRB charter includes the management of our entire Quality Management Portfolio. Our portfolio consists of six volumes containing our baseline QA manual and process procedures, as well as inspection and screening criteria. Cougar's Document Control department controls the binders for content and revision updates and requires a signature by the appropriate department representative to release each binder. The six volumes are placed throughout the company. Additionally, our off-shore assembly supplier has a set of the appropriate volumes from which to train and control their processes. The off-shore documents are updated along with our own in-house documentation as required. We have the six volumes organized by function:

- QA Manual and top level procedures
- Quality Assurance procedures
- MIC Assembly procedures
- Mechanical Assembly procedures
- Administrative procedures
- Material verification and screening specifications

Our weekly TRB meeting involves handling the typical Change Control Board (CCB) functions as well as the familiar Material Review Board (MRB) activity. A Document Control representative joins the TRB for a period of time each week to coordinate the CCB activity for all change orders. The

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TRB reviews proposed changes to procedures, assembly, test and screening specifications as they relate to product design, in addition to inspection criteria. While in the MRB mode, we discuss all new and open defective material reports (DMRs) awaiting resolution. As a group, we discuss strategies for failure analysis and corrective action to solve problems. Our Program Manager plays a role in this effort to create a direct link to our customers.

In addition, our TRB reviews critical sales orders, including all Class K orders where technical design or process challenges are likely. TRB members shepherd these orders until all outstanding issues are resolved or understood and finally released to production.

Critical production process controls are also reviewed during the weekly TRB sessions. Process review includes residual gas analysis (RGA) data from both sealer types; leak test data from all hermetic packages; foreign material in histogram format; and a rolling open DMR Pareto chart. While we do have SPC set up on all wire bonding and particle count processes, those processes are reviewed and acted upon real-time by shop floor personnel. TRB is also involved with establishing and running designed experiments (DOEs) for process characterization and improvement.

Detailed minutes from each meeting are ultimately copied to DSCC as part of our TRB Option certification. We keep a running list of open action requests and manufacturing notices (temporary process or documentation patches) that are also addressed each week. And if there is any time left, we cover miscellaneous or general business items. We retain all TRB records as part of our quality record retention program for customer or government review.

There is an important distinction between our version of the TRB and a management committee. The difference lies in how we make decisions and act on them.

We quickly establish an owner for each problem we face, and that individual must find a solution to the problem. He is free to use company resources available to him, including the advice of other TRB members. His only restrictions are time and his ability to convince a majority of the TRB that his solution is permanent. The advantage of seven capable professionals discussing problems and solutions simultaneously cannot be replicated easily without these real-time working TRB meetings.

Of the objectives we've tasked our TRB with, continuous quality improvement, or CQI as we call it, is among the most important. We view each problem we're presented, regardless of the origin, as an opportunity to improve our overall production system in some way. The late Dr. Deming once said management is responsible for 85 percent of all problems since management designed the process (system). Our TRB is by definition our technology management structure for Cougar and therefore responsible for 85 percent of the problems that appear. This realization is a key motivator for our TRB members to solve problems intelligently and permanently.

We do business directly with some of the biggest microwave systems builders (satellites, radar, electronic warfare, etc.) in the industry, including Hughes Space and Communications, TRW, Lockheed Martin, Motorola, Boeing, Sanders and Raytheon. We are a significant supplier for the F-22 Raptor fighter, as an example. These companies are extremely sensitive to quality, performance and, of course, on-time delivery. They are not easily satisfied and tend to push the performance envelope. As a supplier, we owe it to our customers and ourselves to explore all creative means to support these companies to achieve their expectations and more. We feel that the TRB methodology, especially as we've implemented it here at Cougar, is an effective and creative measure to help attract and keep these customers. ■