Don Payne

Auditing the PCB Fabricator

Seven steps to saving time and money.

An audit is a verification process, basically consisting of two parts: verifying that what is said is done and verifying what is done is effective (vs. established goals). For our purposes, there are three categories of audits:

- Supplier survey (also called supplier evaluation).
- Technical capability audit (also called manufacturing capability audit).
- Supplier quality system audit.

A supplier survey is conducted at the pre-contract stage. A simple set of questions verifies two key aspects of a company: the organization's physical location and its ability to handle your business needs. Prior to a formal survey, discuss mutual expectations. A potential supplier's cooperation during the audit process is critical for an on-site survey. Discuss how long the survey will take, the personnel you will need to speak with and any processes you wish to observe. This allows the supplier to facilitate the auditor's needs with minimal interruption to daily operations. An on-site supplier survey can typically be completed in one day.

One objective of the technical capability audit is to take a hard look at the organization's documentation vs. its actual practices. This type of audit measures the company's technical capability against specific standards and requires specialized knowledge from key personnel such as the Quality Assurance representative. The Quality rep will answer questions regarding personnel and equipment such as employee training programs, technical expertise, etc.

A quality system audit examines how QA is managed within an organization. The main objective of this type of audit is to evaluate how the company reacts and corrects internal quality issues. International and industry management system standards are commonly used as the measuring stick. A quality system audit includes the customer's specific needs, such as the use of specific software, purchasing practices and process benchmarking. This type of audit may be a "desk audit," reviewed by the client at its leisure. The potential supplier will provide complete Quality Management System (QMS) documentation. The auditor will evaluate the system and note specific questions and clarifications. This way, clients can save the time and expense of an initial on-site visit.

Of course, other process and product audits exist. Process audits are conducted for a series of production processes or a specific process. This type of on-site audit may be helpful if major process changes occur due to new technology; e.g., laser drilling. Product audits are used to monitor a specific part number through the manufacturing and assembly process.

When conducting the QMS audit, take note of the supplier's internal audit schedule. The schedule details the type and the frequency of internal audits. By scrutinizing the IAS at pre-contract stage, any red flags can be discussed and avoided before time and money are invested.

Auditors' Tasks

The auditor must verify, through objective evidence, whether the potential supplier meets the organization's needs. These needs may run from specialized equipment to geographical location. Auditors should communicate honestly any requirements and expectations. A common mistake of an auditor is to permit the supplier to directly or indirectly dictate the direc-

Seeing is believing: Failure to verify the fabricator's physical location may lead to unpleasant surprises.

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tion of audits. Train the auditor to remain on task while maintaining some flexibility. In the preliminary meeting, make it clear to the supplier the audit must be completed and the results reviewed before being approved.

Auditors are required to look at the spirit as well as the letter of the standard against which a supplier is measured. An auditor must make quick decisions on whether that supplier has met the objectives of the standard and carefully weigh the impact of each issue against the scope of the audit. Using local personnel to audit potential suppliers will allow common language and an understanding of the culture and thus, more effective auditors. This specifically is key for offshore suppliers.

Identifying competent suppliers cannot occur by browsing the Internet or online directories. The evaluation should include recommendations from current and former users and (whenever possible) a facility tour. One oft-requested service is supplier identification. Since the early days of overseas procurement offices, there has been a need to support the procurement arm of multinational companies in seeking credible and reliable manufacturers.

My advice: Use a systematic approach to supplier identification. Here's a seven-step identification process:

1. Check existing supplier databases, industry sources or customer lists.
2. Telephone verification of a supplier's physical facility existence. Sometimes subcontractors pose as full-service suppliers.
3. Communicate your interest to work with them.
4. Solicit basic information on size and manufacturing capability via fax, email, etc.
5. Select a few suppliers for scrutiny.
6. Visit plants for verification and general observation.
7. Provide an evaluation report and recommendations.

Steps 6 and 7 comprise the supplier survey.

When identifying potential suppliers, an understanding of how offshore suppliers work and how they differ from the domestic supplier is critical. Further, in-depth knowledge of second- and third-level suppliers in the supply chain enables a more realistic view of potential problems, something an onsite visit cannot achieve.

Four auditor skill levels are designed to fit the complexity of supplier quality engineering. **Source inspectors (level 1)** provide on-site inspection and product quality verification at the supplier's facility. They perform basic line checks, ensuring identified process controls are applied correctly. **Quality engineers (level 2)** conduct on-site process audits, root cause analysis, process improvement and control. QEs provide feedback to the client and coordinate customer-supplier management programs. **Quality specialists (level 3)** perform full system audits against ISO 9000 or similar standards. These specialists are trained to handle customer-supplier conflict, working directly with the supplier to resolve major quality issues. **Quality managers (level 4)** have hands-on experience in the development and implementation of an effective QA system. QMs aid the supplier in updating existing systems, fostering a partnership and ensuring greater client confidence in the supplier's capabilities.

Another duty of the QM is to develop a Project Quality team. Each PQ team is assigned a specific project selected by the supplier's quality representative and the QM. This technique ensures that the customer is not dependent on the specialized skills of the quality representative. The QM is ideally one with proven ability working independently at suppliers and has a good command of the local language.

Outside Help

Downsizing has led to outsourcing of certain services including auditing and lab work. Supplier management services (SMS) can provide a range of scalable services and include supplier identification and surveying, qualification, contract implementation, source and pre-shipment inspections, technical and quality system audits, in-process monitoring and buying agent services. SMS's are suited for moving prototype designs into low-cost manufacturing regions, but are not set up to monitor production or become involved in the time-consuming and expensive management of supplier operations.

Accredited laboratories must maintain high standards of proficiency, as they are subject to mandatory reassessments, surveillance visits and compulsory participation in proficiency testing activity at least once every four years. An accredited local lab can often test product to ensure it meets required international standards such as CE, GS and TUV. If UL testing is preferred for products used in the U.S., request the lab perform a pre-test prior to manufacturer shipment, time permitting.

Managing supplier quality is about managing risk at an acceptable price. The cost of managing this risk increases with distance. No matter the location, it pays to access the resources of technically competent people who speak your language and understand the local culture.

To ensure continuity of supply, the ideal supplier is one that either owns, or is aligned with, an offshore fabricator with a domestic manufacturing facility and support team. ■