

**TL 9000: ISO 9000 FOR  
THE TELECOMMUNICATIONS INDUSTRY**

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*Triche Guenin*  
*1250 S. Elizabeth St.*  
*Denver, CO 80210*  
*303-777-9680*  
*303-765-4567 fax*  
[tguenin@partnersthroughchange.com](mailto:tguenin@partnersthroughchange.com)

# TL 9000 – ISO 9000 for the Telecommunications Industry

*Triche Guenin*  
*Partners Through Change, Inc.*  
*1259 S. Elizabeth St.*  
*Denver, CO 80210*  
*303-777-9680*  
[tguenin@partnersthroughchange.com](mailto:tguenin@partnersthroughchange.com)

**Abstract:** *The globalization of telecommunications is one of the key forces driving the need for the standardized quality requirements found in TL 9000. Companies have complained that one of the reasons the cost of doing business on a global scale is escalating is because of overlapping standards and audit procedures. Therefore, a consortium of over 150 companies comprised of telecommunication service providers and their suppliers have joined forces to address this issue. They have developed a set of requirements based upon the ISO 9000 International Quality Management System Standard and have included some “adders” specific to the telecommunications industry - hardware, software, and services related. In addition, industry performance metrics have been developed.*

*This paper serves to help management and professionals understand TL 9000, what registration or compliance entails, and how it supports other quality and business initiatives. It is important to note that TL 9000 is not just more rules with which a company must comply, but that it must be an integral part of the organization’s quality system. Upon implementation, most organizations have found that the compliance process really helps them improve the way they operate.*

## ISO Background – Then to Now

Before jumping into explaining what TL 9000 is and what are its associated benefits, it’s necessary to understand ISO 9000 first, since it is the foundation upon which TL 9000 was developed.

ISO is the International Organization for Standardization. It was founded in 1946 in order to facilitate manufacturing, trade, and communication throughout the world. Originally comprised of 92 member countries, ISO was based in Geneva Switzerland and was made up of technical committees, which developed standards of special interest. An example of one of the first standards adopted is

the global standardization of the width of railroad tracks. Some of the more commonly seen items in our everyday lives that were standardized by ISO are color print film (e.g. ISO speeds 200, 400, 1000), medical equipment, and signage for flammable materials. In the past, these standards have usually been product related, but in the last fifteen years, management system standards have also been developed (e.g. quality, environmental, health/safety).

ISO 9000 is an International Quality Management System (QMS) standard, which was first developed in 1987 to provide guidelines that would ensure consistency or improvement in the quality of a product or service. Its focus on quality was to emphasize prevention of defects or errors vs. detection of them – a proactive vs. reactive approach. The standard has been updated twice since then – in 1994 and just recently in December 2000.

ISO 9000 was developed generically enough to be applicable to all organizations: large or small, public or private, profit or non-profit, domestic or global, etc. Originally implemented in manufacturing industries because of the ease of applying the concepts to “widgets”, the standard has seen a recent surge in popularity in the US in the education, government, and service sectors. Currently there are over 40,000 registrations in the US with an average of 500/month continued growth [1].

Organizations achieve registration to ISO 9000 for multiple reasons: business requirements, adherence to legal requirements (some countries require it prior to import and enforce it at customs), or fulfillment of contractual requirements for the customer. In other cases, registration to ISO 9000 is driven by strategic implications, to use as an effective marketing tool, to gain international acceptance, to demonstrate management’s commitment, to increase customer satisfaction, or to reduce product/service lead-time. But overall, registration or compliance to ISO 9000 makes good business sense and provides a bottom line impact: it improves product quality (e.g. reliability, quality of incoming material/services), lowers costs (e.g. order processing time, errors/waste/rework, inventory turns,

productivity), improves on-time delivery, and reduces industry assessments.

However, because the ISO 9000 standard is so generic, certain industries have decided to develop their own specific guidelines. The first industry to develop its own specific guideline based upon the ISO 9000 QMS standard was the auto industry in the early 1990's. Their standard is called QS 9000. This was followed by the aerospace industry in the mid '90's with AS 9000 and now by the telecommunication industry in the late '90's with TL 9000. These industry specific "standards" are actually only requirements, not accepted ISO standards, and therefore not recognized worldwide.

### **So what is TL 9000?**

TL 9000 is a set of guidelines for quality system requirements and metrics for Telecommunications Service Providers (TSP) and their suppliers. It was developed by the QuEST Forum and first published in 1999. Because consumers are becoming more and more conscious of quality in both goods and services, "quality" is becoming a major differentiator among TSPs. These guidelines provide a template on how to develop or improve quality systems in the telecommunications industry.

#### **But why is one telecom standard needed?**

There are multiple reasons why one standard within the telecommunications industry is so overwhelmingly supported. The number one driver is the cost of poor quality. It is estimated that approximately \$750 million is wasted annually on poor quality of hardware alone in the US. Extrapolating that estimate to a global perspective and including waste and inefficiencies generated by poor quality in software and services, approximately \$10-\$15 billion is contributed worldwide annually to bottom line spending on poor quality within the telecommunications industry [2].

In addition, multiple requirements and audits from customers confuse suppliers. TSPs are committed to working with their suppliers to ensure satisfaction of the final customer (the consumer), by first conforming to quality requirements and then by reducing variations. This will improve the reliability and response cycle time to benefit the consumers, their supplier base, and themselves

Other benefits derived from adhering to only one standard include: global harmonization, synergy in 1st, 2nd, and 3rd party auditing, measurement standardization, higher level of customer satisfaction, and ultimately lower costs.

Over 10,000 telecommunication suppliers around the world are expected to benefit from TL 9000 [3] Not only will communication between TSPs and suppliers be enhanced, TL 9000 will provide a common language, encourage continual improvement, standardize performance metrics, reduce customer problems/complaints, increase reliability, improve software development and life-cycle

management, and provide specialized attention to service functions (e.g. installation, engineering).

### **What makes up the TL 9000 Standard?**

The TL 9000 Requirements were developed from a number of different source documents: ISO 9001 International Quality Management System Standard; Telecordia (Bellcore) standards, specifically GR-1202 (Infrastructure), GR-1252 (Hardware), and TR-179 (Software); ISO/IEC 1220 which addresses software life cycle processes; ISO 9000-3 for software guidance; and finally input from members of the QuEST Forum itself.

### **Who/What is the QuEST Forum?**

The QuEST Forum was created in 1996/97 to focus on Quality Excellence for Suppliers of Telecommunication (QuEST), hence its name. The original founders include Bell Atlantic, Bell South, Pacific Bell and Southwestern Bell, but now membership consists of TSPs and their suppliers from all over the world. As of April 2001, over 150 member organizations are represented from around the globe with approximately one third of the meetings of the QuEST Forum taking place outside the US.

The QuEST Forum's purpose is varied:

- ◆ to foster continued improvements to the quality and reliability of telecommunications service
- ◆ to develop and maintain a common set of quality system requirements, including reportable performance based metrics to guide progress and evaluate results of quality system implementation
- ◆ to promote quality systems that effectively and efficiently protect the integrity and use of telecommunications products and services
- ◆ to enhance customer-supplier relationships
- ◆ to increase industry's conformity with assessment processes

### **The TL 9000 Registration Process is Simple**

For those familiar with ISO 9000, the registration process is the same for TL 9000. Once an organization has implemented TL 9000, a third party called a Registrar performs a registration audit. The accredited TL 9000 Registrar checks to make sure the organization is in compliance with the requirements and metrics set forth by TL 9000.

An organization may choose to register by facility or organizational unit, by product/service line of business, or some combination. The registration scope is distinguished as Hardware, Software, or Service, or any combination. The organization may produce/deliver some or all of these and may choose whether to receive a single or multiple registrations. A registration is granted for a three-year

period. During that interval, multiple surveillance audits by the Registrar will assess 100% of applicable TL 9000 elements and metrics. For organizations that have already implemented other quality initiatives (e.g. ISO 9000, QS 9000, CSQPSm), migration paths are possible. Registration is achieved when an organization can prove compliance to the requirements.

### **TL 9000 Requirements/Metrics are Contained in Two Volumes**

Book One makes up the TL 9000 Quality System Requirements. It is comprised of the actual ISO 9000 standard and additional TL requirements, whether they are common or specific to any combination of hardware, software, or service suppliers. It also contains an introduction, details about the requirements' structure, information about the administration of the requirements, an appendix, and a glossary.

Book Two details the TL 9000 Quality System Metrics. The telecommunications industry is the first to develop benchmarkable measurements that are customer-focused. This book contains an overview of the metrics data collection process, the structure of the metrics themselves, the common telecom measurements, as well as those metrics specific to hardware/software service suppliers, an appendix, a glossary, and a bibliography.

The latest version of Books One and Two have just recently been released in March 2001 to incorporate the newly released version of ISO 9001:2000. Version 3.0 for both books is now available for purchase from the American Society of Quality (ASQ) for \$90 each. Orders can be placed with ASQ at 800-248-1946.

### **What Doesn't Get Measured Doesn't Get Tracked....**

This is the focus of Book Two – the metrics guidelines. The telecommunications industry is attempting to benchmark itself. Reasons and benefits for doing this are pretty self-explanatory: accountability, common language, consistent measures across industry, means for industry benchmarking, information for management which provides objective evidence, identification of improvement opportunities, and ability to use resources effectively.

By requiring metrics to be in place as a condition of registration to TL 9000, it is felt that the standardized terminology will help with implementation and communication, not only within an organization but also across the industry. What will be tracked and reported on an industry-wide basis are the metrics per each category code that will include the following details: industry mean, standard deviation, median, range, and "Best in Industry". At no time will a specific organization be singled out with any specific metric information. This industry

benchmarking information will enable organizations to use the data for improvement of their own internal processes as well as provide competition between suppliers. Individual suppliers will not be ranked or scored!

Proof of reporting metrics is a requirement for TL 9000 registration. At least three months worth of data must be collected and submitted prior to certification. The data is to be collected monthly and forwarded quarterly. It must either reflect data for all customers in the QuEST Forum or the total customer base. Data on an organization's new products/services must be submitted within 6 months of general availability. In some cases, organizations must rely on customers to provide some of the data, so if the data is not provided to the organization by at least one customer, the metric is not required to be reported!

A "double blind" environment for data flow ensures anonymity and reliability. This is a rather complicated process, but essentially five groups are involved in making this work. Because of the complexity, the organizations should feel assured that their data is confidential and should therefore provide it in an accurate and timely manner. The groups involved in gathering the industry data and their associated roles and responsibilities are as follows: Organization, Customer, Metrics Administrator, QuEST Forum Administrator, and Registrar.

*Organization Responsibilities* - document and follow procedures to track metrics: submit profile to QuEST Forum Administrator to receive encryption key, work with customer to develop means of measuring customer satisfaction, jointly review metrics with customer at defined intervals, submit data, correct data discrepancies, ensure mechanisms in place to fix discrepancies, implement required corrective actions based on analysis of industry benchmarking statistics, make records available, and submit report monthly data.

*Customer Responsibilities* - provide organizations (their suppliers) with data needed to generate required metrics, as well as use the metric data to assess the performance of their suppliers, to determine overall value of products, to establish joint customer-supplier improvement teams, and to develop supplier report cards

*Metrics Administrator Responsibilities* – receive initial/revised data from organization's encryption key, contact QuEST Forum Administrator that information was received (identify where transmittal is inaccurate if applicable) from organizations via encrypting key code, calculate industry benchmark information, transmit benchmark information to QuEST Forum Administrator, and ensure confidentiality of data/service. The Metrics Administrator is housed at the University of Texas, Dallas (UTD).

*QuEST Forum Administrator Responsibilities* – issue an "encrypting key" upon receipt of organization's profile, receive and acknowledge receipt of data from

organizations via UTD, identify missing or questionable data and reports to organization, aggregate industry benchmark data, post metric data to the QuEST Forum website, and ensure confidentiality of data/service. The QuEST Forum Administrator, physically housed within ASQ, will determine when sufficient data has been collected for each metric product category to publish statistically valid results. The Metrics Administrator will do the actual data collection and analysis. Data will be posted to the website as least quarterly

*Registrar Responsibilities* – validate and verify at TL9000 registration and each surveillance audit that the organization is in conformance and has an effective QMS (including metrics), check that the processes used ensures data validity, ensure that timely reporting of data to Forum Administrator occurs, ensure that corrections on non-conformances are on time, and issue certificate of registration to TL9000.

### **What are these metrics and what do they measure?**

Current business philosophy is rooted in decision-making being based on using data for information and to verify ongoing compliance. Data provides verification that processes are performing as expected and that desired results are achieved. If data doesn't exist, then neither do the facts! And consequently, decisions are either made from the gut or in a vacuum.

What compliance to the TL 9000 metrics attempts to accomplish is the achievement of improvement of customer service while reducing the overall costs to the TSP, the supplier and ultimately the consumer. That's why *these* metrics are measurements that are important to the customer, not necessarily to an organization trying to understand how efficiently it is running its operations.

The metrics that are applicable are based upon the scope of an organization's registration. There are metrics common to all organizations and some specific to whether the scope is for Hardware, Software, or Services. Those that are common include the following:

- ◆ Number of Problem Reports
- ◆ Problem Report Fix Response Time
- ◆ Overdue Problem Report Fix Responsiveness Measurements
- ◆ On Time Delivery.

Organizations providing hardware must also provide metrics on hardware returns – broken into first year returns and long term returns. Those with a software scope must also include metrics for Software Installation and Maintenance that actually break into four components:

- ◆ Release Application Aborts
- ◆ Corrective Patch Quality
- ◆ Feature Patch Quality
- ◆ Software Update Quality.

Additionally, hardware and software suppliers shall report on System Outage Measurements. And for organizations providing any type of service to the telecommunications industry, they must also include the Service Quality metric. These last measurements are the least defined but applicable to all sorts of services (e.g. installation, call centers).

All products/services must be measured and reported per product category code. As of version 3.0 of the Metrics Requirements, eight product category codes have been identified:

- ◆ Switching
- ◆ Signaling
- ◆ Transmission
- ◆ Operations and Maintenance
- ◆ Common Systems
- ◆ Customers Premises
- ◆ Services
- ◆ Components and Subassemblies.

In addition to identifying which metrics are applicable to which registrations, the Metric Handbook also provides guidelines in determining and calculating each respective metric. For each metric, it provides a general and detailed description, its purpose, the applicable product category codes, actual metric calculations/formulas, sample problems, data sources, and the proper method of reporting. The QuEST Forum Work Groups' goal has been to develop metrics that are meaningful and value-added. That is why normalization tables, product category codes, specific counting rules/exclusions, and definitions/ terminology are also included. The product category tables are constantly being updated as more organizations that supply to the telecommunications industry become registered to the requirements. See the web page [www.questforum.org](http://www.questforum.org) for the latest listings.

### **Metrics in review**

The Forum Administrator (ASQ) will provide industry metrics to all QuEST Forum members via their website. The raw metrics data will have been collected for each product/service provided by each organization based upon their scope of registration in a blind format by the Metrics Administrator (UTD). UTD will have crunched the data into benchmark type information and provided it to ASQ who in turn posts it. The purpose of making this information available is to enable the telecommunication industry to have accountability, a common language, consistent measures, a means for industry benchmarking, information that management can use to improve internal operations, as well as to give TSPs an ability to assess their suppliers against these values

## Getting Started: Clarifying Terminology

There are many terms that are used throughout multiple industries in many different ways. TL 9000 attempts to ground the reader with a set of definitions and clarifications that help in interpreting the requirements. First, since the requirements address a system, there is more than one player involved. Obviously the organization attempting registration is the central focus. However, they exist to serve the customer and unless they're at the end of the food chain, they can't do so without products/services from suppliers. So all three parties (customer, organization, supplier) have roles that are addressed in the TL 9000 requirements.

Second, there are some terms written within the requirements that determine whether an item is auditable or not. The word "shall" indicates that it is a mandatory requirement – it must be met to earn registration. "Should" means that the intent must be met regardless of what methodology is used. "Notes" indicate a recommendation for implementation but is not auditable. Other terms to be aware of include "product" which references products OR services, "method" which is a means by which an activity is accomplished that is not necessarily documented, and "procedure" which is a documented method. In the case of "methods", documentation is still recommended, although not auditable, to better ensure the QMS is implemented and maintained properly.

### Major differences between TL 9000 and ISO 9000

For organizations already compliant or registered to ISO 9000, they are already well on their way towards registration to TL 9000. There are a few differences between the two. Since TL 9000 actually incorporates the ISO 9000 standard within the body of its requirements, the differences are one of two kinds – either more specific than the ISO 9000 standard states or something completely new that ISO 9000 doesn't even address. There is also a heavier emphasis on upfront planning. Customer satisfaction and quality improvement issues are also threaded throughout. TL 9000 incorporates the concept of product/service life cycle. It also stresses customer/supplier communication, data driven goal setting and decision-making, and it requires metric reporting from a customer perspective.

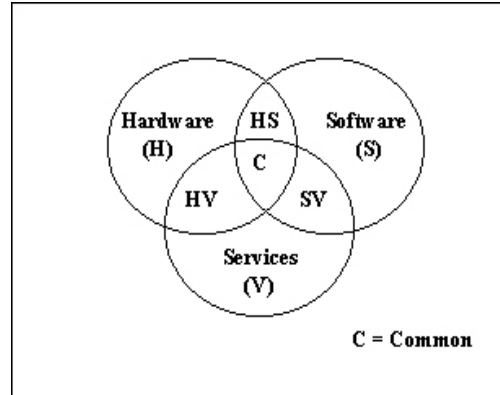


Figure 1: TL 9000 "Adders"

The adders are either common to all organizations or specific to whether an organization provides hardware, software, or services. An organization providing more than one of these categories is responsible for the combination of categories it represents. Refer to Figure 1 to determine which adders are applicable to an individual organization.

### Documentation - a Necessary Evil?

Although documentation may be viewed as a paperwork nightmare, it is in fact a critical success factor in facilitating consistent quality. Because of its importance, "quality system" and "documented quality system" really mean the same thing. If it is not documented, it is not a system. The idea is to follow the KISS principle (Keep It Short and Simple) and make it easy to use. Having a format that is user friendly is most important in order to ensure that it is being followed. It may not necessarily follow the standard/requirement numbering scheme or be auditor friendly but that's OK as long as the employees follow it.

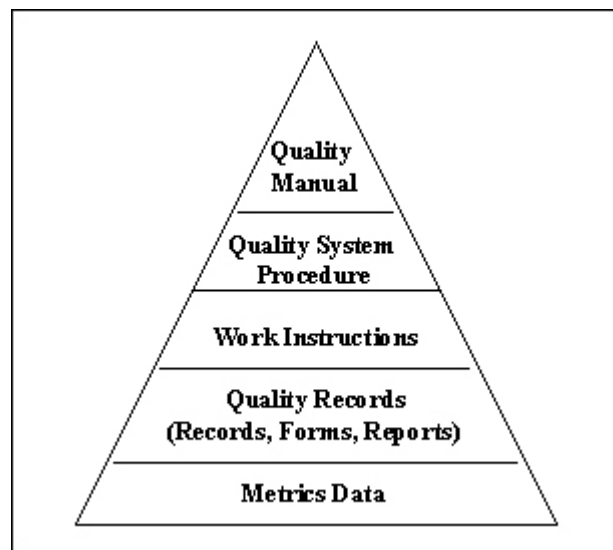


Figure 2: TL 9000 Documentation Hierarchy

A documentation system for a QMS follows a hierarchy. See Figure 2. The top level (apex of the pyramid) doesn't change very often. It is the Quality Manual and provides the roadmap for the rest of the documentation structure. It also houses the Quality Policy and quality objectives. The Quality Manual provides guidelines as to the scope of the TL 9000 requirements and addresses, at a high level, the interaction between the processes of the QMS. It also identifies the applicable elements and metrics the organization will be registering to.

Level 2 and 3 continue to provide details as to what and how to perform an activity (e.g. procedures, work instructions). Some organizations choose to combine these levels into one since they may change quite frequently. Level 4 is the proof that levels 1-3 have been followed. This objective evidence can take many forms (e.g. invoices, contracts, bills of lading, filled out forms, customer complaints, recordings of phone calls, pictures). Level 5 encompasses the applicable metrics and essentially measures if what has been done according to the previous levels is effective.

Essentially, a document control system ensures that all levels of these documents/records are properly "controlled". Attributes of control include: proper approval cycles/signatures for initiation and/or changes, necessary reviews/updates conducted, changes/revisions managed, documents/records which are legible and readily identifiable, origin/distribution tracked, and obsolete documents handled properly. In addition, records are stored, protected, retrievable, retained for the correct length of time, and disposed of properly. These requirements apply not only to documentation/records originating from the organization, but also to those coming from customers and suppliers. This is applicable to documents as well as data.

### Product Life Cycle: a "Cradle to Grave" Perspective

For small pockets of industries (e.g. software) or products (e.g. laser printer cartridges) a product life cycle is not a new concept. However, for a majority of organizations this is the first time they will have to think of their product/service past getting it into the hands of their direct customer. It promotes a level of responsibility heavily touted by many in the environmental field - that of long term planning of what will happen with the product/service once its "life" is no longer needed. This can be viewed either as a complicated or a common sense approach. Essentially, this concept looks at a product/service from soup to nuts, cradle to grave, or womb to tomb. This fosters a long term plan, a strategy, and thinking of the future - a novel idea for many! Many product/service Life Cycle Models exist (see Figure 3). Regardless of their name or number of steps or whether they

are implemented serially or concurrently, these models are made up of these basic concepts:

- ◆ idea
- ◆ development/testing into viable product/service
- ◆ production or delivery
- ◆ field operation of product/service by customer
- ◆ maintenance of product/service
- ◆ end of life of product/service.

TL 9000 requires that all hardware, software, and service suppliers develop Life Cycle Models for each of their products/services. Certain products/services may lend themselves better to one model versus another. Therefore, it is highly likely that an organization may operate with multiple Life Cycle Models. However, steps must be taken to ensure that the product/service that is being produced/delivered follows the cycle that had been initially determined for its life. Products/services, in existence prior to this requirement, can be grandfathered into the system. Therefore, there is no need to identify its history, although that exercise may help in analyzing trends and cycles that future developments may want to follow. What is required is that for those products/services which already exist, a life cycle model be developed, documented, and followed for the remainder of their lives.

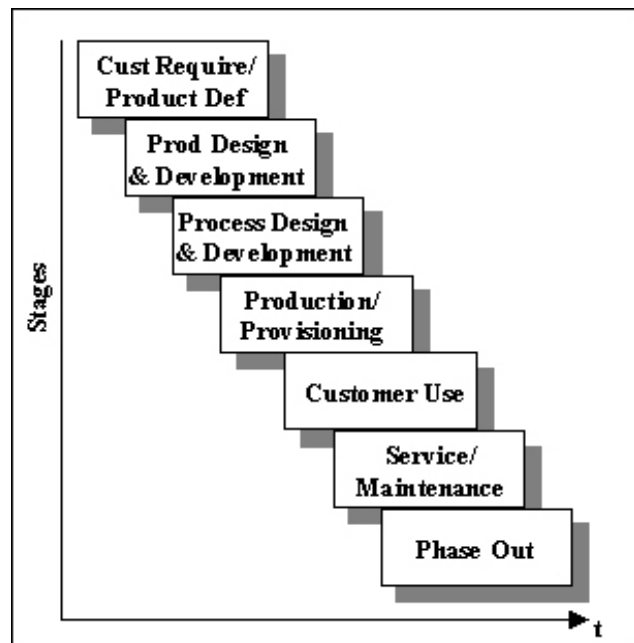


Figure 3: Example of Life Cycle Model

## TL 9000 Requirements Align Along Business Processes

The requirements for TL 9000 (ISO 9000 standard and specific telecom “adders”) are broken into four major sections:

- ◆ Management Responsibility
- ◆ Resource Management
- ◆ Product Realization
- ◆ Measurement/Analysis/Improvement

*Management Responsibility* aims to provide evidence of management commitment, to develop and improve the QMS through contractual and legal requirements, quality planning, QMS responsibility, authority, document/records management, and a system-wide review. Specifically this section targets the following topics: Management Commitment, Customer Focus, Quality Policy, Planning, Responsibility/Authority/Communication, and Management Review.

*Resource Management* speaks to the provision of the human, structural, and work-environmental resources required to establish and improve the QMS. This section emphasizes proper resources, suitable tools, and working conditions through a detailed examination of the following areas: provision of resources, human resources, infrastructure, and work environment.

*Product Realization* determines which processes and their respective sequence and interactions are required to achieve product/service conformity and to meet the requirements of the customer. This section concentrates on value chain activities and is mostly associated with “touch” labor: product realization planning, customer related processes, design and development, purchasing, product/service provision, and control of monitoring/measuring devices.

*Measurement, Analysis, and Improvement* looks at using data to measure, monitor, analyze, and audit processes to improve the product/service realization processes and as a basis on which to assure conformity and achieve improvement. This section is the source for continual improvement. It focuses on the organization’s role in planning and implementing a monitoring and measurement system. This system encompasses data analysis and improvement to the processes that demonstrate conformity and continual improvement of products/services and the QMS.

### How Long Will it Take to Get Registered?

Organizations often want to know how long it will take to get registered. There is no canned answer since every organization is unique. There are many factors that impact the timing:

- ◆ Starting point (how far away the organization is from compliance to the requirements)
- ◆ Size of the organization
- ◆ Priorities (e.g. customer expectations)
- ◆ Resources
- ◆ Readiness of organization to undergo change
- ◆ Leadership commitment

Depending on whether an organization has already implemented some type of QMS or not will greatly determine the time required to achieve compliance to the requirements. Organizations that are starting from scratch will most likely take longer. The size of the organization will also impact the length of time needed – how many employees, spread over how many facilities, in how many different locations, operating in how many different shifts, producing how many different types of products/services... An organization’s size will dictate the number of audit days, will affect the type of communication/training provided, and will drive the implementation/phasing, etc. The “financial size” (e.g. revenues, sales) does not have a role in this – only the operational aspect of “how” the products/services are produced/delivered is considered.

Obviously a sense of urgency will play into the timing – if the registration is a requirement from a customer with a deadline, there’s a higher probability that it will have top priority than if it is viewed as a “nice to have” marketing goal. The number of resources dedicated to coordinating the effort, writing the procedures, performing the audits, training, etc. will also affect the timing. Delegating the implementation of a TL 9000 QMS to one individual will not only NOT succeed, since it is an organization-wide effort, but it will take forever to try to attempt to implement it before the effort fails.

Although “soft” in concept, the readiness of the organization to change is often overlooked. If employees view this as another “program-du-jour” or are burnt-out from another recent change (e.g. implementing an ERP system, starting up a new product/service line), their ability to change may not only be diminished but nonexistent. Individuals, as well as organizations, can only handle so much change at one time. However, the most important factor that impacts the time required to earn TL 9000 registration is the level of commitment by the management team to allow all of these other things to occur. Without their buy-in and their support, resources will not be available, priorities will not be met, and cultural changes will never occur.

### Lessons Learned in Implementing a QMS

Since implementing QMS is not a new phenomenon, there are many lessons to be learned from organizations that have already had the experience. Some of the universal trends that have been benchmarked across different types of industries show similarities in the following areas:

- ◆ Obtain management commitment
- ◆ Allocate appropriate resources
- ◆ Train excessively
- ◆ Document procedures
- ◆ Implement procedures
- ◆ Maintain records
- ◆ Implement metric tracking
- ◆ Audit the system

As mentioned earlier, if the leadership of the organization is not committed towards achieving TL 9000 compliance/registration, the effort is doomed to fail. Management's commitment can be seen in a number of simple ways: attendance at meetings, accountability for getting things done, allowing their employees to work on the program during normal work hours, role modeling appropriate behaviors, clearing roadblocks, feedback and reinforcement to employees, etc.

If the right amount of resources (e.g. people, capital/expense, time) is not made available, the program will barely get started before it becomes apparent that management's commitment is not there. As a result nothing positive will get accomplished. This not only affects the timeline of the project, but also adversely affects morale to those who are involved in its implementation. Experience has shown that the Quality Management Representative's role must be full time till the QMS is up and running. Subsequently, the role can be part-time to maintain the efficiency of the system. A word of caution here, registration to TL 9000 cannot be delegated to one individual. If consultants are to be used, their role should be to oversee the project, anticipate pitfalls, provide insight/advice/guidance and help interpret the requirements and their application to the organization. They should NOT write procedures. They can help in setting up the structure of the documentation and can facilitate sessions in which procedures/work instructions are the end result. But the employees need to "own" the documentation and if written by outsiders (e.g. consultants, management representatives), they will not.

Training cannot be overemphasized. Not only do the TL 9000 requirements contain new content areas, but the way in which departments, employees, customers, and suppliers work together will change and this also needs to be addressed. Consideration should not only be given to training at the front end for current employees, but ongoing training should be provided for future new employees as well as refresher courses as the organization matures and standards change.

Documentation of procedures, methods, and work instructions can never be emphasized enough. Everyone should be trained on the documentation format and process, since everyone will be using documentation and should know how to develop their own. This discipline provides structure for all involved and ensures consistency of what

needs to be done. In setting up the documentation format and structure, the KISS principle should be used.

It is also very important to have an implementation plan. Such a plan will ensure that the appropriate documentation is completed in a timely manner. This plan will also facilitate the process of successful registration as well as define the timetable for implementation – all at once or in phases.

Records, which are the objective evidence or proof of compliance, also need to be kept and maintained. Again procedures need to be developed on how to perform all aspects of this (e.g. medium, space, personnel effort, technology, security, duration, accessibility).

What differentiates TL 9000 QMS from all other formal QMSs is the requirement to provide metric information. For most organizations tracking customer related data is new and will be addressed in the following section. The main objective of collecting industry data is to continually improve internal operations by establishing and comparing against benchmarks.

Performing internal audits ensures that an organization's QMS is operating per expectations. Results from this activity help drive continual improvement.

### **Considerations for a data tracking system**

Many organizations track data to measure their actual results against their operational goals or financial budgets. TL 9000 metrics were developed to determine how an organization measures up to its customers' expectations. Because these are customer-focused measurements, there are some things that ought to be considered when implementing a TL 9000 QMS tracking system:

- ◆ Collection activities
- ◆ Reporting medium or distribution
- ◆ Acknowledging receipt
- ◆ Timeliness
- ◆ Data accuracy
- ◆ Trends analysis
- ◆ Subsequent actions

The QMS must assure adequacy of documented procedures for collecting, analyzing, and reporting information. How will the data be collected – out in the field, centrally through one point of contact, from the customer, etc.? Although there is a specific way to forward the metric data to the Metric Administrator in order to maintain TL 9000 registration, what is the best way to provide the data internally and back to the customer/supplier? Is it wit the use of graph or chart form, e-mail, or meeting with department heads/line supervision/leadership team, etc.? How will the acknowledgement of the receipt of the data be accomplished – and what if it's not correct? Although the metrics need to be forwarded to the Metric Administrator on a quarterly basis (grouped in a monthly format), how often will the

metrics be collected and distributed - daily/weekly/monthly? Who will be performing the trends analysis – the data collectors or someone else? How should the data be collected to provide meaningful information to the analyzer? And once the analysis is done, what happens? If the trends are on track, do they still get reported or does the organization operate by exception reporting? Who is responsible for correcting the trends going in the wrong direction?

Additional issues should also be considered. Is each applicable metric covered? Are appropriate employees trained? How is the effectiveness of training verified? What analysis tools are used to validate data and reports and how were these tools selected? What actions have suppliers taken to improve their processes, based on the data collected? How is performance against industry measures monitored? All of these things are to be considered when developing and implementing a data tracking system. Think the big picture before trying to implement.

## **TL 9000 Impacts the Organization Many Ways**

Implementing any kind of QMS will have an impact throughout the organization. However, the three major areas that will be affected the most by implementing a TL 9000 QMS are in the administrative, operational, and management arenas.

*From an administration perspective*, there will be a lot of documentation development and maintenance, particularly if an organization is not already performing those activities. Additionally, the metric tracking for internal and external use will cause some changes in whatever the current environment is for data collection/analysis/distribution. Thinking and tracking information to life cycle stages will also cause some changes.

*From an operational perspective*, basic change management issues will need to be addressed (e.g. project management, softer human needs). Anybody remotely involved with the quality of the product or service will be impacted. On the other hand, it may only affect internal infrastructure/ support functions (e.g. IS, HR, Accounting, Finance functions) minimally.

*From a management perspective*, more involvement and upfront planning with defined targets will be required. And throughout the organization, there will be more of a focus on continual improvement and customer satisfaction. It will no longer be OK to maintain the status quo. The intent of the metrics is to provide management with internal and external measurements for use in making informed decisions. Internally, they enable evaluation of business performance as seen by the customer, deployment of resources to areas that really need attention, and initiation of action in areas that will give the biggest payback. Externally, they provide a means of self-evaluation and comparison to industry

means, ranges, etc. They also promote fine-tuning of resource allocation in response to industry direction for product reliability, quality improvement, service expectations, and supplier responsiveness.

## **TL 9000 emphasizes self-checking**

TL 9000 emphasizes an organization's own responsibility for maintaining the QMS. Registration auditors are mostly interested in determining that an organization has a QMS, that it is compliant/used/maintained, and that continual improvement is the end result. Many elements of TL 9000 ask for records. Policies, procedures, controlled documents, proof of management commitment through management reviews, training, metrics, and internal audits are essential to TL 9000

## **In Summary**

TL 9000 harmonizes the telecommunication industry's QMS requirements by offering telecom service providers and suppliers significant benefits. It is based upon the international ISO 9001:2000 standard with telecom specific adders and associated metrics. By becoming registered to TL 9000, organizations should become more competitive. It should enhance the organization's image and improve the way business is conducted. And furthermore, it is endorsed by the telecommunications industry.

## **References**

- [1] American Society of Quality, April '01, 800-248-1946
- [2], [3] QuEST Forum, April '01, [www.questforum.org](http://www.questforum.org)

*Triche Guenin is founder of Partners Through Change, Inc. a Change Management Consulting firm. While guiding organizations through the TL 9000 registration process, she recognizes that for many this effort is very difficult not only in the discipline required by new processes but that many times the culture of an organization will also need to change. She therefore focuses on project management activities, problem solving skills, basic quality tools to improve business processes all while addressing the softer issues such as cultural behaviors, coaching, and team building. MBA, BS – Engineering, ASQ – re-certified CQM, APICS - CIM certified, Colorado Performance Excellence Award Organizing Committee, Denver Business Ethics Awards Selection Committee, ASQ Evaluator for Quality Grant Funding, Better Business Bureau's Evaluator for Excellence in Customer Service Award*