Topics To Be Covered

• Definitions
• Quality Assurance Issues
• Deming's 14 Points
• Five Basic Steps to Quality Assurance
• Discussion
Quality Assurance is defined as a set of procedures designed to ensure that quality standards and processes are adhered to and that the final product meets or exceeds the required technical and performance requirements.

Quality Assurance covers all activities from design, development, production, installation, servicing and documentation. It includes the regulation of the quality of raw materials, assemblies, products and components; services related to production; and the management, production, and inspection processes.

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Quality Assurance may be considered as a means of doing business and offering the customer the highest quality product and assuring a level of confidence.

On July 8, the world's most esteemed luxury auto maker suffered the humiliation of seeing its ranking in the annual J.D. Power & Associates Inc. survey of car dependability plunge to No. 26 from No. 16 last year, eight slots below the industry average, trailing Chrysler, Ford, and Plymouth. Ouch! In 1990, Mercedes-Benz proudly ranked No. 1. "Once it was the nameplate of envy. It may be losing some of that shine," says Brian Walters, J.D. Power's research director. Problems cited by consumers in the 962-page report included handling, braking, shocks and struts, electronic window controls, and inaccurate fuel gauges.

Steep Slide At Mercedes DEPENDABILITY RANKING (The methodology of the study, which covers three-year-old vehicles, has changed over the years.)

- 1990 #1
- 1995 #3
- 2000 #6
- 2003 #26

Data: J.D. Power & Associates
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As you can see Quality Assurance is a means of conducting business while Quality Control focuses on the one particular product or service. In this sense mapping checking or closing a traverse would fall under quality control, while training and leadership by management would constitute part of a quality assurance program.

Total Quality Management: (TQM) is a management strategy aimed at embedding awareness of quality in all organizational processes. TQM has been widely used in manufacturing, education, government, and service industries, as well as NASA space and science programs. TQM requires that the company maintains this quality standard in all aspects of its business. This requires ensuring that things are done right the first time and that defects and waste are eliminated from operations. To implement this program can be very costly and time consuming.

ISO 9000: Is a widely accepted series of standards that specifies requirements for a Quality Management System. ISO 9000 was created by the British Standards Institute as BS 5750. The standard is now maintained by ISO (the International Organization for Standardization) and administered by accreditation and certification bodies. It is widely accepted, although its high price and effort has led to many companies using alternatives such as IC9700, or IC9200, both of which are issued by the International Charter.
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Both TQM and ISO 9000 (and its deviants) are very complex programs requiring a great deal of management’s time and training throughout the enterprise. I will refrain from referring to these programs as in my opinion they do not address the focus of my columns. They are valuable programs and for many large private and public sector contracts the qualifying firms must demonstrate either ISO 9000 or a TQM certification. Keep in mind that both of these programs require external and internal audits of your firm or agency’s business and client service practices and cover gamut from your accounting system to how you answer the phone. ISO 9000 covers the basics of what quality management systems are and also contains the core language of the ISO 9000 series of standards. ISO 9001 is intended for use in any organization that designs, develops, manufactures, installs and/or services any product or provides any form of service. It provides a number of requirements which an organization needs to fulfill if it is to achieve customer satisfaction through consistent products and services which meet customer expectations.
Common Quality Issues

- Too many Cost Over Runs
- Poor Record of Technical Oversight
- Lack of Technical & Quality Training
- Many New Employees
- Mitigating the Effects of Staff Turnovers
- Different Cultures & Standards
Common Quality Issues (2)

- Multiple Offices
  - Work Sharing
- Diverse Client Types
  - Internal and External
- Project Scoping and Oversight of Scoping
  - Knowledge of the “Bigger Picture”
- New Technologies Require New Techniques and Standards
Common Quality Issues (3)

- Lack of Formal Documentation
- Lack of Formal Procedures for the Many Tasks We Do
- Technical Manuals Need Review & Update
- Operations & Quality Assurance Manual
Current Quality Issues (4)

- Subconsultant Management
  - Contracts
  - Scope & Deliverables
  - People
- Work Plans
  - Lack of Project Focused Quality Assurance Element
- Lack of Respect
Quality Assurance programs can find their roots in the teachings of William Edwards Deming (W. Edwards Deming). Deming is to quality as Peter Drucker is to management (Management by Objectives) and Tom Peters (In Search of Excellence) is to client service.

William Edwards Deming, (October 14, 1900 - December 20, 1993) was an American statistician, widely credited with improving production in the United States during World War II. However, Deming is perhaps best known for his work in Japan; where from 1950 onward he taught top management the principles of Statistical process control (SPC) a forerunner of Total Quality Management (TQM). During the post war reconstruction of Japan General Douglas MacArthur invited Deming to assist in the rebuilding of Japanese industry. At that time products made in Japan were considered to be of very low quality. Some Japanese cottage industries had located in the village Usa so they could claim the their products were made in the USA. This did not help very much. When Japanese cars began arriving in the United States in 1960 they were laughed at by the Detroit automakers. We all know the end of the story. It is the Japanese and Korean automakers that are now building their cars in the real USA and are known for quality.
Deming’s Fourteen Points (1-2)

1. Create constancy of purpose for the improvement of product and service, with the aim to become competitive, stay in business, and provide jobs

2. Adopt the new philosophy of cooperation (win-win) in which everybody wins. Put it into practice and teach it to employees, customers, and suppliers

NOTES

Under Deming’s stewardship Japan became renowned for producing innovative high quality products. Deming is regarded as having had more impact upon Japanese manufacturing and business than any other individual not of Japanese heritage.

Deming taught that by adopting appropriate principles of management, organizations can increase quality and simultaneously reduce costs (by reducing waste, rework, staff attrition and litigation while increasing customer loyalty). The key is to practice continual improvement and think of manufacturing as a system, not as bits and pieces. In 1960, Deming became the first American to receive the Second Order of the Sacred Treasures from Prime Minister Nobusuke Kishi. An accompanying citation stated that the people of Japan attributed the rebirth and success of their industry to his work. Today the highest prize awarded by the Japanese Union of Scientists and Engineers (JUSE) for industrial achievement is the Deming prize. This would be similar to our Malcolm Baldridge award.

Create constancy of purpose for the improvement of product and service, with the aim to become competitive, stay in business, and provide jobs

Adopt the new philosophy of cooperation (win-win) in which everybody wins. Put it into practice and teach it to employees, customers, and suppliers (Sub Contractors and Consultants)
Cease dependence on mass inspection to achieve quality. Improve the process and build quality into the product in the first place.

End the practice of awarding business on the basis of price tag alone. Instead, minimize total cost in the long run. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.
Deming’s Fourteen Points (5-6)

5. Improve constantly and forever the system of production, service, planning, or any activity. This will improve quality and productivity and thus constantly decrease costs

6. Institute training for skills

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Institute training for skills
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Adopt and institute leadership for the management of people, recognizing their different abilities, capabilities, and aspiration. The aim of leadership should be to help people, machines, and gadgets do a better job. Leadership of management is in need of overhaul, as well as leadership of production workers.

Drive out fear and build trust so that everyone can work effectively.
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Break down barriers between departments. Abolish competition and build a win-win system of cooperation within the organization. People in research, design, sales, and production must work as a team to foresee problems of production and in use that might be encountered with the product or service.

Eliminate slogans, exhortations, and targets asking for zero defects or new levels of productivity. Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force.
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Eliminate numerical goals, numerical quotas and management by objectives. Substitute leadership

Remove barriers that rob people of joy in their work. This will mean abolishing the annual rating or merit system that ranks people and creates Competition and conflict
Deming’s Fourteen Points (13-14)

13. Institute a vigorous program of education and self-improvement.
14. Put everybody in the company to work to accomplish the transformation. The transformation is everybody's job

NOTES
The Seven Deadly Diseases
1. Lack of constancy of purpose.
2. Emphasis on short-term profits.
4. Mobility of management.
5. Running a company on visible figures alone.
6. Excessive medical costs.
7. Excessive costs of warranty, fueled by lawyers that work on contingency fee.

Mention the New QA/QC Psomas’ Technical Manual
FIVE STEPS TO QUALITY ASSURANCE

In accordance with Deming’s 14 points I believe there are five basic steps to insure quality and outstanding client service in surveying and mapping. These steps may be defined as:

- Project Delivery Planning
- Adherence to Established Standards
- Clear Assignments of Tasks and Responsibilities
- Tracking and Documentation
- The Use of Qualified Staff
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Quality assurance begins with Project Delivery Planning. Technical standards and specifications, defining of deliverable items, and milestone schedules will be identified at the project planning stage. A written quality assurance plan is an element of all work plans. These plans vary widely by service and tasks being performed. The following guidelines can be used as a general checklist for the main elements of any project work plan. Unless a specific plan is required by the contract, at minimum the following should be considered as appropriate quality assurance measures:

- Detailed Statement of Work and Scope of Required Services
- Schedules, Budgets and Milestone Points
- Precise Definition of Required Deliverables Contract Standards, Client Imposed Standards and/or Industry Standards to Be Used
- The Use of Advanced Technology
- Tasks and Responsibilities
- Adherence to Established Industry and Professional Standards
- Forms and Reporting Documents that will be Required
- Compliance with Client-Mandated Standards and Deliverable Requirements
- Statements of Safety Procedures for Fieldwork
The Project Delivery Plan should include time and budget allowances for reviews and checking (Quality Control) that are a part of the quality assurance program. A few examples of your quality control plan might include the following:

- Survey or Mapping Criteria
- Definition of Standards and/or Agency or Client Manuals to Be Used
- Survey or Mapping Criteria Review and Checking Forms
- Drafting and CAD Standards to Be Used
- Computer Calculation Review Forms
- Field Survey Forms Required for the Project
- Internal Review Forms and Checklists:
Adhere to Established Standards

• Three Types of Standards Should Be Considered
  - Industry Standards
  - Client Imposed Standards
  - Your Firm or Agency Standards

• The Use of Advanced Technologies

NOTES

Three types of Established Standards should be considered for each project. They are; Industry or Discipline Standards, Client Imposed Standards and your Firm’s Standards. Industry Standards may be considered the minimum level of standards for a given project. These are the common standards used throughout the industry or discipline and are generally based on liability and protection of the public. Client Standards are those unique standards required by the client for the project. They may include CADD standards, drafting styles and the level of confidence (sigma) required for the data. Your Firm’s Standards are those developed by you for your local conditions or in-house operations. These standards focus on client service, communication, reporting, documentation, and the use of advanced technology, such as GPS, LIDAR, Ground Penetrating Radar and safety. When preparing a Work Plan you will need to consider all three types of standards and communicate these evaluations and decisions to the client prior to approval of the plan or acceptance of the assignment.

The Use of Advanced Technology

Advanced technology is great if everyone on the project teams understands the technology and knows how to use it. If the project manager is planning to use some advanced technology such as GPS or digital photogrammetry for the project this should be stated in the Project Deliver Plan so that all members of the project team will understand what is expected of them and the client will know how the results of the survey were obtained. When using advanced technology the advantages derived from this technology and its value to the project should be spelled out in some detail in the plan.
Clear Assignments/Responsibilities

- Provide a Complete Project Briefing Prior to Commencement of any Work
- Provide all Team Members or Subcontractors with a Written Work Plan
- Have the Subcontractors Transmit Weekly Situation Reports to the Project Manager via E-Mail
- Manage all Milestone Events on an Individual Basis

NOTES

Every Project Delivery Plan should contain a narrative of the tasks and responsibilities for each member of the project team. This is a very important quality assurance measure. While the project team members will be an integral part of the project schedule and budget showing their participation in tasks and the hours allocated to them it is still necessary to provide a narrative of what is expected of each member of the team and when it is due. Again, this is invaluable when project personnel change. It also prevents duplication of effort and the old saw of “I thought Joe or Mary was doing that.”

Deming’s 14 points are clear on this issue. A major part of the assignment of Tasks and Responsibilities will be the management of the various team members and subcontractors involved with this project. Management of these elements and insuring their compliance with the Work Plan, Standards, Schedule, Budget and High Quality Results will be the major task of the Project Manager. To insure quality and adherence to the project standards the Project Manager should schedule site visits within the scope of the project and should:

- Provide a complete project briefing prior to commencement of any work. The briefing should include all staff and subcontractors assigned tasks on the project.
- Provide all team members or subcontractors with a written work plan including a description of tasks, schedule, budget and specifications for the work involved
- Have the subcontractors transmit weekly situation reports to the project manager via E-Mail
- Manage all milestone events on an individual basis, i.e. the team members or subcontractors should not begin a new set of tasks until the milestone for the previous set of tasks has been met and accepted for quality and adherence to the stated project standards
NOTES

Forms and reporting documents that will be required

What forms and reporting methods will you use throughout the project? Will you use the firm’s standard project forms? Will you use client-mandated forms or will you need to create new forms? How will you report to the client? Will you report daily, weekly or monthly? Will you report via E-Mail, Fax or in person? These questions should be addressed in the Project Delivery Plan. All project team members should understand these requirements and they should be reviewed with the client prior to starting any work.

- Work accomplished this period
- Issues or problems encountered this period
- Solutions applied
- Work to be accomplished next period
- Potential issues or problems
- Assistance needed from the client
- Total project performance to date
- Anticipated date of completion
NOTES

Project reporting is a critical element of client service and quality. Client’s like to know how the project is progressing and if there are any issues, especially issues affecting the budget or delivery date. Suppose you have a week of rain and the field crews are not able to work. This will no doubt delay the project delivery date. Client’s want to know this.

Coordination and communications are equally critical to quality and cost control. Communications within the team should be conducted on a daily basis in person or via telephone, fax, and/or e-mail. Data files should be transmitted on a daily basis to the project manager to be reviewed and archived. Client communications should be focused through the project manager. Clients should be furnished with weekly status reports and information of any unique situations requiring client input. Today most of this reporting can be transmitted via e-mail,

This format will inform the client of your progress on the project and let him/her know of any problems or issues you have encountered and the solutions you have applied to mitigate of solve them. It is also an opportunity to request client assistance if required. The report can be prepared in a word processing program, converted to a PDF files delivered via E-Mail, Fax or in person at the client’s request.
The Use of Qualified Staff

- Qualified, Licensed Professional Surveyors Should be in Responsible Charge of the Work
- Consistency within Teams
- Reviews and Rewards
  - Spot Rewards
- Recognition

Cost control is synonymous with qualified staff, technical excellence, quality assurance and good project management. For any assignment you should consider the use of the following:

- Qualified, licensed professional surveyors should be in responsible charge of the work, and technical experts with unique qualifications specific to the task. All work should be carried out under the direct supervision of a locally Licensed Land Surveyor.

- State-of-the-art survey equipment, survey software, desktop and notebook computers, communications equipment, and the Internet for transmittal of data and reports

- Quality control provided at all phases of the work

- Hands on survey, mapping, imagining, GIS, modeling and photographic supervision and project management

- Using some type of time and cost reporting accounting systems. These costs should be traced on a weekly basis and on some of your smaller projects you may want to track your labor costs on a daily basis. You should have a standard time reporting method for all employees.
The Use of Qualified Staff (2)

• Training
  ▪ Technical
  ▪ Leadership
  ▪ Management
• Cost Control

NOTES

Training is a critical element of a quality assurance program. Trained professional, technical and administrative staff provide a basis for all your technical excellence, development, innovation and client service. At a minimum you should consider providing or participating in technical or management training on at least an annual basis. This training should include, but not be limited to:

Basic Project Management
Advanced Project Management
Technical Training Classes
  – GPS
  – Remote Sensing and Imagining
  – Geodesy
  – Uses of New Field to Office Software
  – Client Services & Communications

CADDS and Computer Modeling Training
Basic Office Tools
Government And Quality

- Can A Government Agency Achieve True Quality Assurance?
- Many Agencies Have Tried and Failed
- The Best Example Is The Military
  - Teamwork is Essential
- Bureaucracy Makes It Difficult
  - Too Many Power Centers
  - Changing Political Leadership
In Conclusion

- Quality Assurance is a Top Down Process
  - Senior Leadership Must be Committed to the Program
- Passion is Required
  - A Culture of Quality
- People are the Greatest Asset
- Eliminate Fear
Discussion