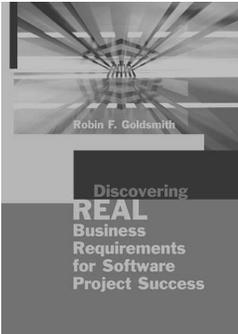
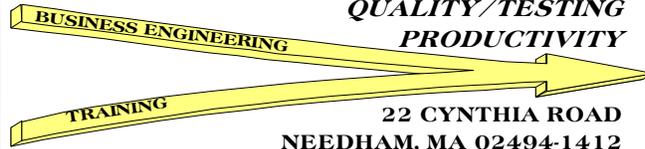


# Proactive SQA™ Overcomes 'Traffic Cop' SQA Resistance

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*SYSTEM ACQUISITION & DEVELOPMENT*  
*QUALITY/TESTING*  
*PRODUCTIVITY*



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# Are You Familiar with QA as 'Traffic Cop'



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- Enforcing compliance
  - Document formats
  - Following procedures
- Obstacle to
  - Progress
  - Delivery
- Understandable  
**RESISTANCE**

## Objectives

- Distinguish system/software quality, quality assurance (SQA), and quality control (SQC).
- Analyze conventional SQA/standards and why they so often are resisted, ignored, and/or fail.
- Describe the six functions Proactive SQA™ performs so
  - Involved parties understand and willingly participate in meaningful methods to assure software quality
  - Resisted practices are reduced, such as being a ‘traffic cop’
  - Higher quality software truly is delivered quicker and cheaper.

***Proactive SQA™ is a key basis of significant value-enhancing revisions to IEEE SQA Std. 730-2014***

## Exercise: What is Quality?

**Quality**

.

**System Quality**

.

**Software Quality**

.

## Exercise: What is QA?

### **Quality Assurance**

.

### **Quality Control**

.

## **System vs. Software Quality** **Relevance to SQC/SQA**

- At which life cycle phase is it decided whether solution includes hardware?
  - Requirements
  - Design
  - Build and test
- What impact on quality activities
  - If system vs. software initially misidentified?
  - If system vs. software subsequently changes?

***Is system vs. software distinction relevant, useful?***

## Exercise: Quality vs. Quality Control?

*Is Quality the same as Quality Control/Testing?*

*What else besides testing does quality involve?*

## Quality Is Key to Delivering Quicker and Cheaper

- "Quality is free"
- Cost of (poor) quality
  - Assessment (appraisal)
  - Prevention
  - Failure
    - » Internal
    - » External

-- Philip Crosby

## Some Common Definitions of Quality

- Customer satisfaction
- Meets or exceeds customer expectations
- Optimization, value
- Conformance to requirements (Philip Crosby)
- Percent of (a sample of) products passing inspection for defects; lack of defects (~Deming)
- Minimal variation within specification (Six Sigma)
- Fitness for use (Joseph Juran)

***Any problems with these definitions? Relation to systems?***

## What We

### *Mean By System Quality*

- Fits system specs
- Runs efficiently
- Doesn't blow up
- Follows standards
- Current technology
- Modern techniques
- Easily modified
  - without code change
  - when code changes

## What We Others

### Mean By System Quality

- Fits system specs
- Runs efficiently
- Doesn't blow up
- Follows standards
- Current technology
- Modern techniques
- Easily modified
  - without code change
  - when code changes
- Does what needs to be done correctly
- Performs adequately
- Reliable/consistent
- Easy to use
- Supported quickly and correctly
- On-time, in budget

## Until We Share a Common Definition of System Quality...



- ✓ Users, managers, developers, and Quality professionals will continue to disappoint each other
- ✓ Each has a different idea of what to deliver and how to tell whether it has been delivered adequately
- ✓ Each thinks the others don't care about Quality

 **★ Quality Dimension: Quality of Design** (*What's it need to do*)

- Required functions, capabilities, and performance levels defined appropriately
  - needs of all stakeholders identified
  - definitions accurate and complete
  - meaningful common understanding
- Design suitably meets requirements
- Costs/benefits/schedules are accurate
- Trade-offs based on adequate information

 **★ Quality Dimension: Quality of Conformance** (*How it's produced*)

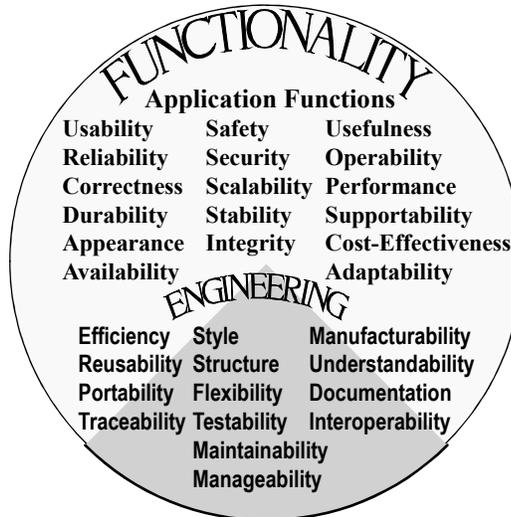
- Products conform to design
- Products apply standards/conventions
- Workers use expected skill and care
- Workers apply defined methods, tools
- Management uses appropriate practices
- Product is delivered on-time, in-budget


**★ Quality Dimension: Quality of Performance** *(How it's delivered)*

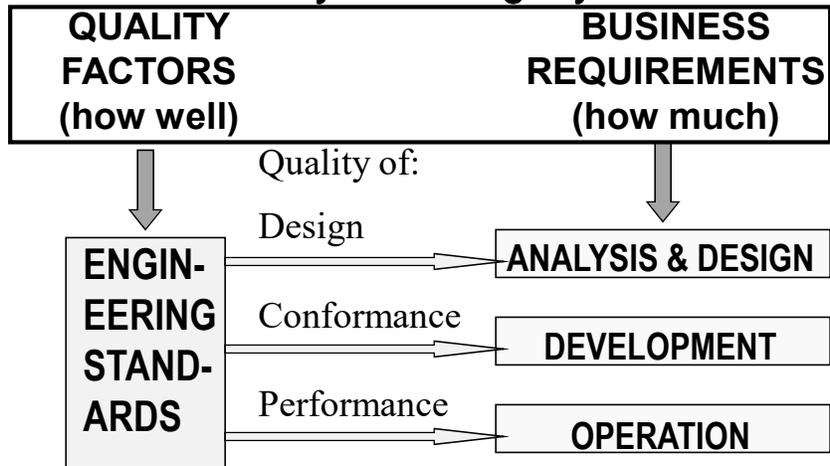
- Product is available as needed for use
- Product works in intended manner
- Product works reliably and accurately
- Product handles workload adequately
- Product is supported and maintained responsively


**★ Addressing Quality Factors**

Factors:  
 Exterior  
 Interior  
 Future



## Turning Requirements Into a Quality Working System



## Our Working Definition of System Quality

The **extent** to which **it meets** weighted stated and implied exterior, interior, and future **REAL business requirements** of all affected internal and external stakeholders **consistent with standards** of design, workmanship, and performance.

The more of the relevant requirements which are met, and the more demanding the standards are with respect to meeting those requirements, the higher the quality.

**Quality** is absolute. The amount of quality one receives is governed by available resources, priorities, and other constraints.

**Value** is the perceived benefit of quality received relative to the costs of producing and receiving it.

## Quality Assurance (QA) vs. Quality Control (QC)/Testing

Dynamic Code Execution

- QC/Testing examines end products, typically for conformance to specifications (but which often are referred to as 'requirements')

Static Reviews of Requirements and Designs

- QA assures the processes producing the end products produce quality products

- To some, that means examining intermediate products within the development process
- Often checks compliance of documents/procedures to standards/guidelines ("traffic cop")

***These are QC too—examining products***

## IEEE Std 12207-2008 Systems and software engineering —Software life cycle processes 1/4

### 7.2.3 Software Quality Assurance Process

#### 7.2.3.1 Purpose

The purpose of the Software Quality Assurance Process is to provide assurance that work products and processes comply with predefined provisions and plans.

***Traditional—reactive—definition of SQA  
Starting point for revision of IEEE Std. 730 for SQA***

**IEEE Std 12207-2008 Systems and software engineering —Software life cycle processes 2/4**

**7.2.3.2 Outcomes**

As a result of successful implementation of the Software Quality Assurance Process:

- a) a strategy for conducting quality assurance is developed;
- b) evidence of software quality assurance is produced and maintained;
- c) problems and/or non-conformance with requirements are identified and recorded; and
- d) adherence of products, processes and activities to the applicable standards, procedures and requirements are verified.

**IEEE Std 12207-2008 Systems and software engineering —Software life cycle processes 3/4**

**7.2.3.3 Activities and tasks**

The project shall implement the following activities in accordance with applicable organization policies and procedures with respect to the Software Quality Assurance Process.

**7.2.3.3.1 Process implementation.** This activity consists of the following tasks:

**7.2.3.3.1.1** A quality assurance process suited to the project shall be established. The objectives of the quality assurance process shall be to assure that the software products and the processes employed for providing those software products comply with their established requirements and adhere to their established plans.

**7.2.3.3.1.2** The quality assurance process should be coordinated with the related Software Verification (subclause 7.2.4), Software Validation (subclause 7.2.5), Software Review (subclause 7.2.6), and Software Audit (subclause 7.2.7) Processes.

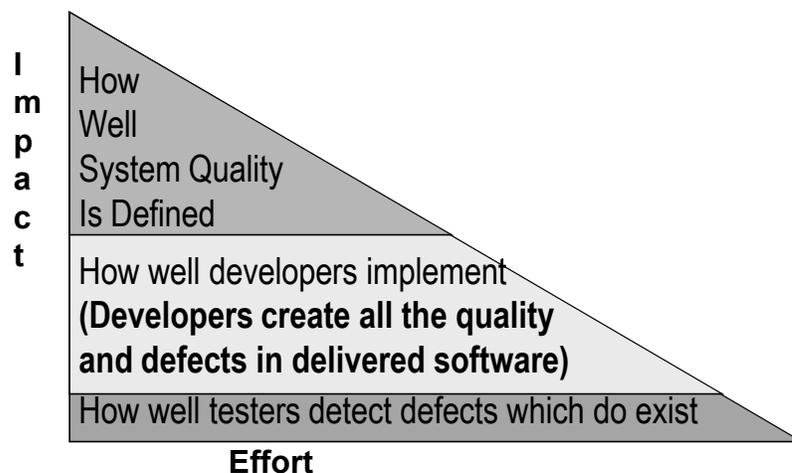
## IEEE Std 12207-2008 Systems and software engineering —Software life cycle processes 4/4

7.2.3.3.1.3 A plan for conducting the quality assurance process activities and tasks shall be developed, documented, implemented, and maintained for the life of the contract. The plan shall include the following: Original Std. 730 scope

- a) Quality standards, methodologies, procedures, and tools for performing the quality assurance activities (or their references in organization's official documentation).
- b) Procedures for contract review and coordination thereof.
- c) Procedures for identification, collection, filing, maintenance, and disposition of quality records.
- d) Resources, schedule, and responsibilities for conducting the quality assurance activities.
- e) Selected activities and tasks from supporting processes, such as Software Verification (subclause 7.2.4), Software Validation (subclause 7.2.5), Software Review (subclause 7.2.6), Software Audit (subclause 7.2.7), and Software Problem Resolution (subclause 7.2.8).

***How similar is this to what your organization does?***

## System Quality Results From



# Proactive System Quality Assurance (SQA)<sup>TM</sup> Direction of New IEEE Std. 730



## PROCESS

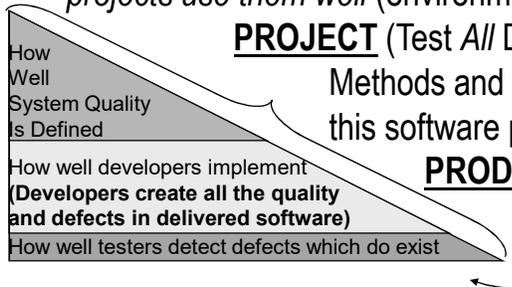
*Define* appropriate methods and techniques and **assure** all projects use them well (environment that promotes quality)

## PROJECT (Test All Development Deliverables)

Methods and techniques used to create this software product were appropriate

## PRODUCT (Testing the Code)

Delivered software works properly



# Proactive SQA<sup>TM</sup>: Establishes an Environment that Promotes Quality



**//// The 6 Functions of SQA *Actually HELP***

**A  
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- ① Define Quality Assurance Plans (What to do)
- ② Define, methods, practices, and standards (How to do it well)
- ③ Assure systematic quality controls of processes and products (Make sure it gets done right)
- ④ Maintain quality records (Keep track of it)
- ⑤ Analyze and report on quality (Learn from it)
- ⑥ Direct attention to improving quality (Encourage it)

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**//// 1 Define Quality Assurance Plans**

- The project plan for QA, becomes part of overall project plan—tasks, resources, budget, schedule
- Identifies every task and other information needed to assure software product quality
  - Templates, common to all projects
  - Tasks unique to project
  - Balanced with risk, needs, and constraints
- Used to monitor/control progress

***Entire focus of IEEE Std. 730 until current revision***

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## Exercise: What QA tasks on your plan?

***Tasks and other information needed to assure software product quality***

## Consider Instead ...

- Taking a deliverables approach
- Based on agreement of informed involved parties
  - Deliverables that knowledgeable experience agrees aid creating/maintaining/operating
  - Software products of suitable quality

***But, caution....***

## QA Plan, Very Detailed Deliverables Mil. Std. 2167 Requirements Analysis Phase

Computer Software Configuration Item  
 Functional Requirements  
 Performance Requirements  
 Interface Requirements  
 Qualification Requirements  
Software Requirements Specification  
Interface Requirements Specification  
Software Development Plan  
Software Standards and Procedures Manual  
Software Configuration Management Plan  
Software Quality Evaluation Plan  
Operational Concept Document  
Software Specification Review  
 Allocated Baselines for each CSCI  
 Authenticated SRS  
 Authenticated IRS(s)  
 Ongoing Internal Reviews Verification

## QA Plan Deliverables & Checklist Generic Quality Checkpoints

	Date Completed
Feasibility Analysis Report	
Business/User Requirements	
System Requirements Spec.	
System Design	
Conversion Plan	
Technical Test Plans	
Acceptance Test Plans	
User Documentation	
Operations Documentation	
Technical Testing Completion	
Production Turnover	
Acceptance Testing Sign-off	
Post-Implementation Review	

## QA Plan Deliverables & Action Plan Generic Quality Checkpoints

	Applicable		Budget	Actual	Date	Date
	Standards	Resp	Hours	Hours	Due	Done
Feasibility Analysis Report						
Business/User Requirements						
System Requirements Spec.						
System Design						
Conversion Plan						
Technical Test Plans						
Acceptance Test Plans						
User Documentation						
Operations Documentation						
Technical Testing Completion						
Production Turnover						
Acceptance Testing Sign-off						
Post-Implementation Review						

## QA Plan Deliverables, QA Action Plan Generic Quality Checkpoints

	Development				Quality Assurance Review				
	Std	Rsp	Hrs	Date	Resp	Budg	Act	Due	Done
Feasibility Analysis Report									
Business/User Requirements									
System Requirements Spec.									
System Design									
Conversion Plan									
Technical Test Plans									
Acceptance Test Plans									
User Documentation									
Operations Documentation									
Technical Testing Completion									
Production Turnover									
Acceptance Testing Sign-off									
Post-Implementation Review									

## Exercise: Managing SQA Tasks, Resources

*How would you handle and account for?*

*Development deliverable is delivered after SQA review was scheduled to begin*

*SQA review finds a development deliverable inadequate and needs the deliverable to be corrected and re-reviewed*

*The SQA review takes longer and/or more effort than planned*

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**Go Pro Management, Inc. Seminars/Consulting--Relation to Life**

**Proactive Software Quality Assurance™ Online coming--ask Credibly Managing Projects and Processes with Metrics**

**System Measurement ROI Test Process Management**

**Proactive User Acceptance Testing**

Feasibility Analysis    Systems Analysis    Reusable Test Designs

Defining and Managing User Requirements    System Design    Development    Implementation    Operations Maintenance

Test Estimation

Writing Testable SW Requirements    Risk Analysis    Proactive Testing: Risk-Based Test Planning, Design, and Management

Re-Engineering: Opportunities for IS    Testing Early in the Life Cycle

21 Ways to Test Requirements

Managing Software Acquisition and Outsourcing:  
 > Purchasing Software and Services  
 > Controlling an Existing Vendor's Performance

**Making You a Leader**

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**Email me for updated slides**

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- Partner with ProvelT.net in REAL ROI™ and ROI Value Modeling™.
- Previously a developer, systems programmer/DBA/QA, and project leader with the City of Cleveland, leading financial institutions, and a "Big 4" consulting firm.
- Degrees: Kenyon College, A.B.; Pennsylvania State University, M.S. in Psychology; Suffolk University, J.D.; Boston University, LL.M. in Tax Law.
- Published author and frequent speaker at leading professional conferences.
- Formerly International Vice President of the Association for Systems Management and Executive Editor of the *Journal of Systems Management*.
- Founding Chairman of the New England Center for Organizational Effectiveness.
- Member of the Boston SPIN and SEPG'95 Planning and Program Committees.
- Chair of record-setting BOSCON 2000 and 2001, ASQ Boston Section's Annual Quality Conferences.
- TechTarget, SearchSoftwareQuality requirements and testing subject expert.
- Member IEEE Std. 829-2008 for Software Test Documentation Standard Revision Committee.
- Member IEEE 730-2014 Working Group rewriting IEEE Std. 730-2002 for Software Quality Assurance Plans.
- International Institute of Business Analysis (IIBA) Business Analysis Body of Knowledge (BABOK) subject expert.
- Admitted to the Massachusetts Bar and licensed to practice law in Massachusetts.
- Author of book: *Discovering REAL Business Requirements for Software Project Success*
- Author of forthcoming book: *Cut Creep—Put Business Back in Business Analysis to Discover REAL Business Requirements for Agile, ATDD, and Other Projects*

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