


Help! I found a defect!

Brenda Fisk, Associate
Phone 1 (416) 444-8225 x305
North America Toll Free Phone 1-866-FIND-BIA
E-mail bfisk@bia.ca
Web www.bia.ca



Five Objectives

- Agree on some definitions first
- Explain why we document expected results
 - (need to start with action verbs as others are how about)
- Document a defect
- Understand the management processes
- Have some insight to management reporting




Agree on some Definitions



What is quality?

- Dictionary
“ something special about an object that makes it what it is: a characteristic or attribute; a grade of excellence; nature; disposition or temper; etc.”

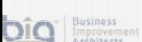


What is testing?

- Glenford J. Myers
The Art of Software Testing, page 6, 1975

“Testing is the process of executing a program with the intent of finding errors.”


ISBN 0-471-0428-1



What is test?

- A Test
“A means of determining an item’s capability to meet specified requirements by subjecting the item to a set of physical, chemical, environmental or operating actions and conditions.”


July 2002, *Quality Progress*, ASQ



What is Quality Assurance?

“Quality Assurance is all the planned and systematic activities implemented within the quality system that can be demonstrated to provide confidence a product or service will fulfill requirements for quality.”

July 2002, Quality Progress, ASQ



What is Quality Control?


“Quality control is the operational techniques and activities used to fulfill requirements for quality.”

July 2002, Quality Progress, ASQ




Some definitions of Software Quality

- Capers J. Jones
 - “The absence of defects that would otherwise make software either stop or produce unacceptable results.”
- James Martin
 - “Being on time, within budget and meeting user needs.”
- Tom McCabe
 - “High levels of user satisfaction and low defect levels, often associated with low complexity.”

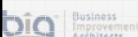



Some definitions of Software Quality

- William (Bill) Perry
 - “High levels of user satisfaction and adherence to requirements.”
- Norman Schneidewind
 - “Achieving excellent levels of fitness for use, conformance to requirements, maintainability, and reliability.”




Why document Expected Results?





Software Testing

- Quality must be built in from the START!
- Is executed by teams of Professionals
- Is successful with the team integrates skills from at least:
 - business analysts,
 - functional experts
 - technical resources
 - others to form a cohesive team
- Has a documented Test Strategy



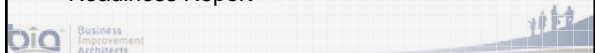
Test Strategy Document

- Test overview
- System overview
- Milestones
- Glossary
- Testing approach
- Levels of testing
- Types of testing
- Test tools needed
- Hardware/software requirements
- Test Environments required
- Library controls
- Risk, issue, change, defect management
- Internal, external roles and responsibilities
- **Deliverables**
- Schedule
- Test Specifications
- Completion criteria
- Constraints



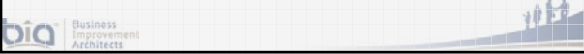
Deliverables

- Test Strategy
- Specifications for:
 - Phases
 - Business Process
 - Regression Testing
 - Environment
- Execution Procedures
- **Defect Management Process**
- Readiness Report
- For the Test:
 - Conditions
 - Cycles
 - Schedules
 - Scripts
 - Data
 - Expected Results
- Execution Logs and Results



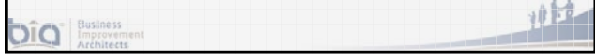
Deliverables

- Evaluation methods:
 - **Defect Reports and Logs**
 - **Defect Analysis techniques (Root Cause Analysis)**
- Completion Deliverables:
 - **Test Statistics**
 - Regression Test Package
 - Completion Report



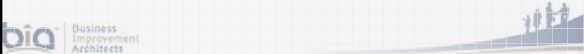
Why document expected results?

- With little design and documentation, testing is
 - Hard work
 - Provides little reward
 - Finds few defects
 - Is costly
- With design and documentation, testing can
 - Cover 80% or more functionality
 - Be fun
 - Finds lots of defects
 - Is cost effective



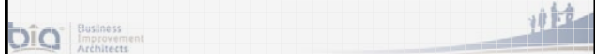
“If you can’t describe what you are doing as a process, you don’t know what you’re doing.”

*W. Edwards Deming, Ph.D
Quality Management theorist,
consultant and author
1950, 1986, beyond*



Expected Results


- Most important aspect of testing to do BEFORE the test begins—why?
- Regardless of the data, the results must be defined
- When done well, will result in re-usable and repeatable test cases and scripts
- Must be realistic within the business function
- Should not be overly complex




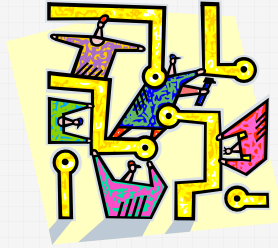
When will we be done?

Will we stop when...

- All test are executed; all defects found?
 - Exhaustive testing takes time
- A percentage of defects are identified?
 - Needs historical data upon which to base decision
- The productivity starts to fall off?
 - Numbers of new defects are few




Understanding the Defect Management Process




Costly Bugs add up to \$59 B.

- NIST Planning Report 02-03. "*The economic impacts of inadequate Infrastructure for Software Testing.*" *Quality Digest August 2002*
- Based upon 50% cost reduced by the introduction of infrastructure improvements will:
Cost of inadequate software testing
 - Developers \$21,155 m.
 - Manufacturing users \$ 3,375 m.
 - Service users \$ 8,299 m.
 -
 - Total annual costs \$59,477 m.
- www.nist.gov/director/prog-ofc/report02/3.pdf



Quality exists when...

- The product or service being measured meets or exceeds the expectations of the person doing the measuring.
- Therefore...quality is compliance to requirements.




Outcomes of effective quality testing include

- Improved product or service quality
- Reduced time-to-market
- Reduced costs by eliminating redundant efforts
- Improved customer or client satisfaction
- Enhanced competitiveness




Two types of Defect Removal

- Dynamic -- define now; discussed later
 - MUST have some code available against which to do some things...like test!
- Static
 - No code, any document




Defect Removal Techniques

Dynamic	Static
<ul style="list-style-type: none">• Test Strategies<ul style="list-style-type: none">▪ Unit, System, Acceptance▪ Stress, Performance▪ Business Release	<ul style="list-style-type: none">• Joint Application Design• Prototyping• Function Points• Reviews<ul style="list-style-type: none">▪ Reviews and inspections▪ Walk through




What do these techniques do?

- Uncover and remove defects
- Serve as a teaching tool
- Motivate the team to produce higher quality deliverables
- Promote uniformity
- Improve customer satisfaction and confidence
- Facilitate defect detection
- Serve as a test management tool



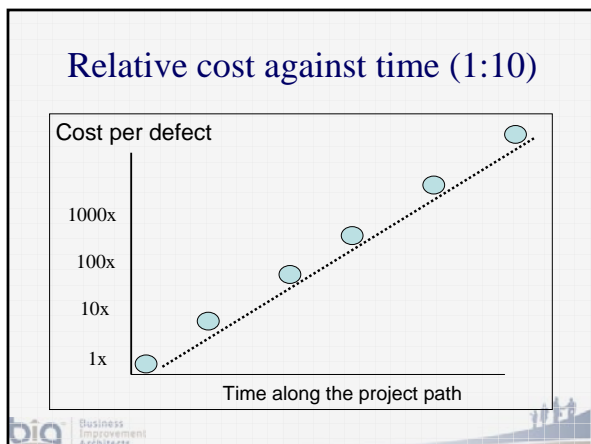

Overview to the Defect Process

- Execute a test
- Compare actual results to expected results
- Difference exists; raise defect
- Confirm validity of defect
- Assign appropriate resource to resolve
- Monitor process
- Retest results
- Repeat if necessary
- Close




Facts about Defects

- What is it?
 - “A product’s or service’s non fulfillment of an intended requirement or reasonable expectation for use including safety considerations” (ASQ)



Defect Management

- Within ISO 9000:2000
 - 8.3 Control of Non Conforming Product
 - 8.4 Analysis of Data
 - 8.5 Improvements
- Depending upon when the non conformance is discovered, the team could use
 - Issue management
 - Risk management
 - Change management or
 - Defect management techniques



Defect Reports

Single incident per report will typically include:

- Identification
- Reference
- Tracking Dates
- Short descriptions
- Expected Result
- Actual Results
- Business Impact if not resolved
- Resolution History
- **Root Cause**
- Supporting Documents
- Signed-off when completed

Bottom Line—sufficient information for resolution



Root Cause Analysis

What do you think caused this defect?

- Data
- Documentation
- Job Control Language
- Procedures
- Test Environment
- Test script
- Requirements
- Scheduler
- Security
- Specifications
- Standards
- Other?



Defect Log

Single LIST of all Defect Reports will typically include:

- Identification data
- Short description
- Status
- Tracking Dates

Used during the Daily Status meetings



Defect Management Stakeholders

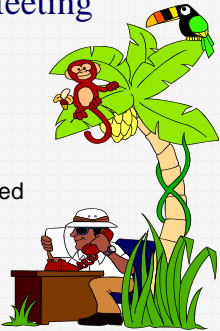
- Project Manager
 - Overall view of what is underway
- Test Manager
 - What needs to be adjusted
- Development Manager
 - Who is working on what
- Developer
 - Specifically what needs to be done
- Test Team Member
 - What has happened to the ones found



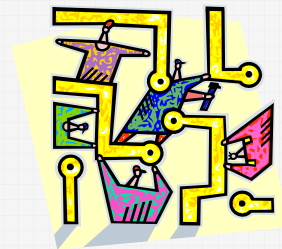
Daily Status Meeting

Purpose – review defects and test schedule

- Defect review
 - Priority set correctly
 - Duplicate or new
 - Mandatory fields completed
 - Description complete
 - Assign resource
 - Review progress
- Test Schedule
 - What is priority for the day



Understanding the Defect Management Process



Useful Statistics

Data worth collecting includes

- Duration of the test
- Number of business processes and functions per requirement
- Number of defects per test level
- Type of defect (root cause)
- Severity of the defect
- How many in which status
- Number of duplicates identified



Vilfredo Pareto – 80/20 Rule

- 80/20 rule applies to defect management
- 19th century economist
- 80% of the effects come from 20% of the causes!
- Identify defects early ; fix the root cause will result in an overall reduction
- Effective testing requires serious planning!



A Word about Status (Class)

- Four classes
 - Very serious – catastrophic loss
 - Serious – significant economic loss
 - Major – problem when encountered
 - Minor – imperfection when encountered
- For our examples let's assign
 - Very Serious = A
 - Minor = D



Business Function by Class

Business Function	Percent	Count	A	B	C	D
Statements	31.96	302	5	138	155	4
Marketing	15.56	147	59	44	40	4
Maintenance	14.5	137	13	39	83	4
Credit Management	8.89	84	33	15	64	2
Application	7.41	70	7	6	57	2



Root Cause by Phase

Root Cause	Percent	Total	Anls	Dsgn	Cons	UAT
Program	47.24	411	18	138	195	60
Documentation	9.31	81	1	1	59	20
Test Data	6.55	57	3		2	52
Configuration	4.14	50				36
Requirements	3.56	36	5	5	14	12
JCL	3.45	31		1	9	21
Test Script	2.99	26		1		25



Who has the most to Process?

Resource	Total	Assigned	Fixed	Test
Henry Developer	8	5	3	
Mary Statements	4	4		
Jerry Fixit	4	3	1	
Susie Sheer	3	1	2	
Allen Appleby	2		2	
Joe Small	2			2
Mary Analyst	1			1



Defect Reports across Status by Class

Status	Total	A	B	C	D
Open/ More Info	1			1	
Assigned	36	3	3	30	
Test	7		2	5	
Duplicate	22	7	7	8	
Closed	887	85	307	480	15
Totals	953	95	319	524	15

In Conclusion

- Thank you for agreeing on the definitions first
- Now you should understand:
 - why we document expected results
 - how to document a defect
 - understand the defect management processes
 - have insight to Defect Management Reporting

So...

Thank You!!!

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