IN 3240 / IN4240 Software Testing

Test progress monitoring and control

Chapter 5 – Part 2

3. Test progress monitoring and control

4. Configuration management

5. Risk and testing

6. Defect management

1. Test organization
- *1.1 Test organization and independence*
- *1.2 Tasks of the test leader and tester*

2. Test planning and estimation
- *2.1 Test planning*
- *2.2 Test planning activities*
- *2.3 Entry criteria*
- *2.4 Exit criteria*
- *2.5 Test estimation*
- *2.6 Test strategy, test approach*

3. Test progress monitoring and control
- *3.1 Test progress monitoring*
- *3.2 Test reporting*
- *3.3 Test control*

4. Configuration management

5. Risk and testing
- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Test progress monitoring

- The purpose of test monitoring is to give feedback and visibility about test activities.
- Information to be monitored may be collected manually or automatically and may be used to measure exit criteria, such as coverage.
- Metrics may also be used to assess progress against the planned schedule and budget.

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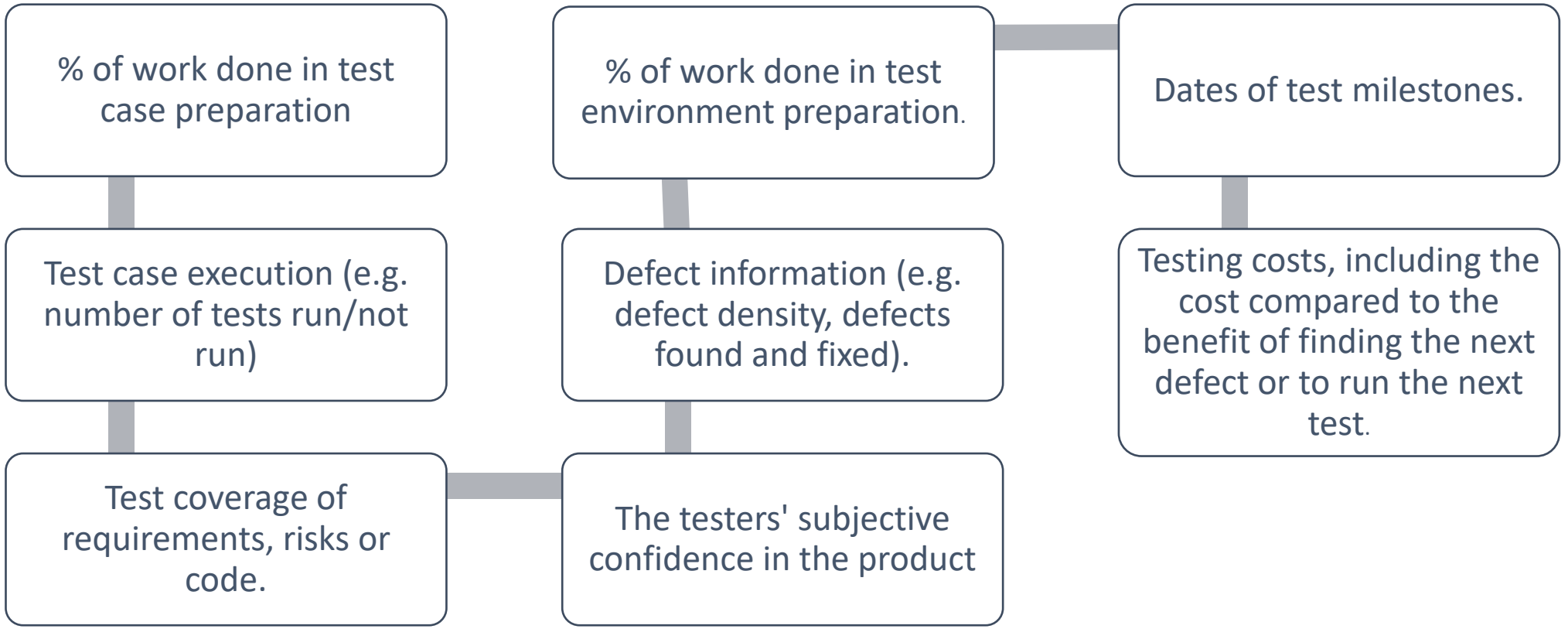
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- *3.1 Test progress monitoring*
- *3.2 Test reporting*
- *3.3 Test control*

4. Configuration management

5. Risk and testing
- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Test progress monitoring



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- *3.1 Test progress monitoring*
- *3.2 Test reporting*
- *3.3 Test control*

4. Configuration management

5. Risk and testing
- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Test log - template

IEEE 829 STANDARD: TEST LOG TEMPLATE

Test log identifier

Description (items being tested, environment in which the testing is conducted)

Activity and event entries (execution description, procedure results, environmental information, anomalous events, incident report identifiers)

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- *3.1 Test progress monitoring*
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5. Risk and testing

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6. Defect management

Test case summary – common metrics

	A	B	C	D	E	F	G	H	I	J	K	L	M
1				System Test Case Summary									
2				Cycle One									
3													
4	Test			System	Bug	Bug	Run	Plan	Act	Plan	Actual	Test	
5	ID	Test Suite/Case	Status	Config	ID	RPN	By	Date	Date	Effort	Effort	Duration	Comment
6													
7	1.000	*Functionality*											
8	1.001	File	Fail	A	701	1	LTW	1/8	1/8	4	6	6	
9	1.002	Edit	Fail	A	709	1	LTW	1/9	1/10	4	8	8	
10					710	5							
11					718	3							
12					722	4							
13	1.003	Font	Pass	B			JHB	1/10	1/10	4	4	4	
14	1.004	Tables	Warn	B	708	15	JHB	1/8	1/9	4	5	5	
15	1.005	Printing	Skip					1/10		4			Out of runway
16		**Suite Summary**						**1/10**	**1/10**	**20**	**23**	**23**	
17													
18	2.000	*Performance/Stress*											
19	2.001	Solaris Server	Warn	A,B,C	701	1	EM	1/10	1/13	4	8	24	Replan 1/11
20	2.002	NT Server	Fail	A,B,C	724	2	EM	1/11	1/14	4	4	24	Replan 1/12
21					713	2							
22					725	1							
23	2.003	Linux Server	Skip					1/12		4			Out of runway
24		**Suite Summary**						**1/12**	**1/14**	**12**	**12**	**48**	
25													
26	3.000	*Error Handling/Recovery*											
27	3.001	Corrupt File	Fail	A	701	1	LTW	1/8	1/9	4	8	8	
28					706	2							
29					707	4							
30					709	1							
31					710	5							
32					713	2							
33	3.002	Server Crash	Fail	A	712	6	LTW	1/9	1/10	4	6	6	
34					713	2							
35					717	1							
36		**Suite Summary**						**1/9**	**1/10**	**8**	**14**	**14**	
37													
38	4.000	*Localization*											
39	4.001	Spanish	Skip										
40	4.002	French	Skip										
41	4.003	Japanese	Skip										
42	4.004	Chinese	Skip										
43		**Suite Summary**						**1/0**	**1/0**	**0**	**0**	**0**	

FIGURE 5.1 Test case summary worksheet

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- *1.2 Tasks of the test leader and tester*

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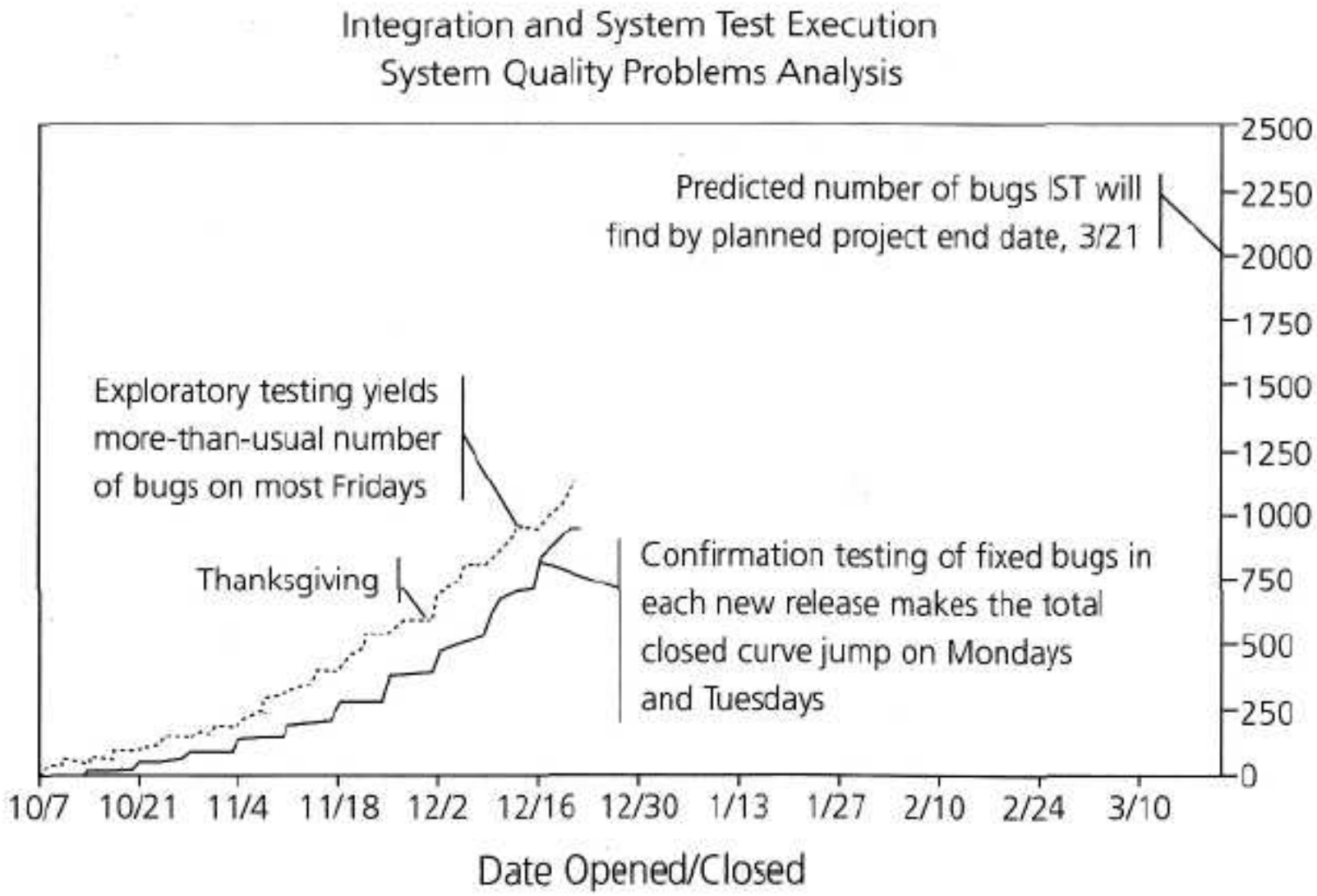
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6. Defect management

Total defects opened and closed chart



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- *3.1 Test progress monitoring*
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4. Configuration management

5. Risk and testing
- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Test reporting

Test reporting is concerned with summarizing information about the testing endeavor, including:

What happened during a period of testing

(ex: dates when exit criteria were met)

Analyzed metrics to support decisions about future actions

(ex: the economic benefit of continued testing)

*The outline of a test summary report is given in 'Standard for Software Test Documentation' (IEEE 829).

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- *3.1 Test progress monitoring*
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- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Test reporting

Metrics are collected at the end of a test level in order to assess:

The adequacy of the test objectives for that test level

The adequacy of the test approaches with respect to its objectives

The effectiveness of the testing with respect to its objectives

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- *3.1 Test progress monitoring*
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- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Test reporting

TABLE 5.1 Risk coverage by defects and tests

	Unresolved defects		Test cases to be run		
Test targets (product risk areas)	**#**	**%**	**Planned**	**Actual**	**%**
Performance, load, reliability	304	27	3843	1512	39
Robustness, operations, security	234	21	1032	432	42
Functionality, data, dates	224	20	4744	2043	43
Use cases, user interfaces, localization	160	14	498	318	64
Interfaces	93	8	193	153	79
Compatibility	71	6	1787	939	53
Other	21	2	0	0	0
	1107	*100*	*12857*	*5703*	*44*

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- *3.1 Test progress monitoring*
- *3.2 Test reporting*
- *3.3 Test control*

4. Configuration management

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- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Test summary report - template

IEEE 829 STANDARD: TEST SUMMARY REPORT TEMPLATE

Test summary report identifier

Summary

Variances

Comprehensive assessment

Summary of results

Evaluation

Summary of activities

Approvals

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- *3.1 Test progress monitoring*
- *3.2 Test reporting*
- *3.3 Test control*

4. Configuration management

5. Risk and testing
- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Test control

Projects do not always go according to plan.
Different factors can lead to deviations:

- New risks
- New needs
- Test findings
- External events
- Test environment problems

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- 1.1 Test organization and independence
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- 2.5 Test estimation
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- 3.2 Test reporting
- 3.3 Test control

4. Configuration management

5. Risk and testing
- 5.1 Project risks
- 5.2 Product risks

6. Defect management

Test control

Test control describes any guiding or corrective actions taken as a result of information and metrics gathered and reported.

Examples of test control actions are:

- Making decisions based on information from test monitoring
- Re-prioritize tests when an identified risk occurs
- Change the test schedule due to availability of a test environment
- Set an entry criteria requiring fixes to have been tested (confirmation tested) by a developer before accepting them into a build

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- *3.1 Test progress monitoring*
- *3.2 Test reporting*
- *3.3 Test control*

4. Configuration management

5. Risk and testing
- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Configuration management

The **purpose of configuration management** is to establish and maintain the integrity of the software and related products



through the project and product life cycle.

1. Test organization
- *1.1 Test organization and independence*
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2. Test planning and estimation
- *2.1 Test planning*
- *2.2 Test planning activities*
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- *2.4 Exit criteria*
- *2.5 Test estimation*
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3. Test progress monitoring and control
- *3.1 Test progress monitoring*
- *3.2 Test reporting*
- *3.3 Test control*

4. Configuration management

5. Risk and testing
- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Configuration management

The configuration management shall ensure that all items of the testware are

- identified
- version controlled
- tracked for changes

so that traceability can be maintained throughout the test process.

All identified documents and software items should be referenced unambiguously in test documentation.

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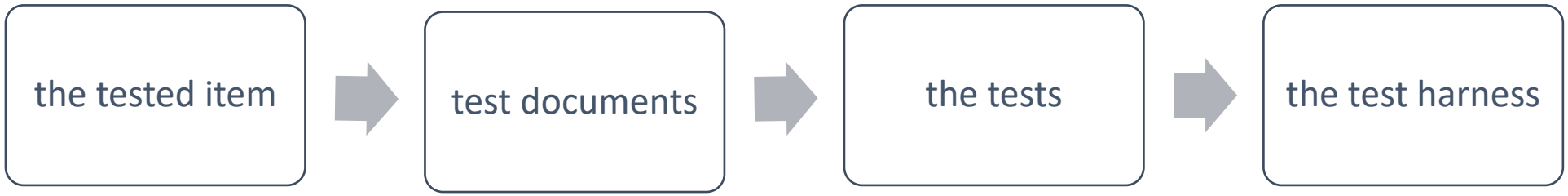
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5. Risk and testing
- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Configuration management

Configuration management helps to uniquely identify (and to reproduce)



Configuration management procedures and tools should be selected during the project planning stage.

1. Test organization
- *1.1 Test organization and independence*
- *1.2 Tasks of the test leader and tester*

2. Test planning and estimation
- *2.1 Test planning*
- *2.2 Test planning activities*
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- *2.4 Exit criteria*
- *2.5 Test estimation*
- *2.6 Test strategy, test approach*

3. Test progress monitoring and control
- *3.1 Test progress monitoring*
- *3.2 Test reporting*
- *3.3 Test control*

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5. Risk and testing
- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Risk and testing

- Risk is the possibility of a negative or undesirable outcome, the possible problems that might endanger the objectives of the project stakeholders.
- Risks are related to the
  product
  project
- Risk analysis and risk management can help us plot a course for solid testing.

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2. Test planning and estimation
- *2.1 Test planning*
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- *2.4 Exit criteria*
- *2.5 Test estimation*
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- *3.2 Test reporting*
- *3.3 Test control*

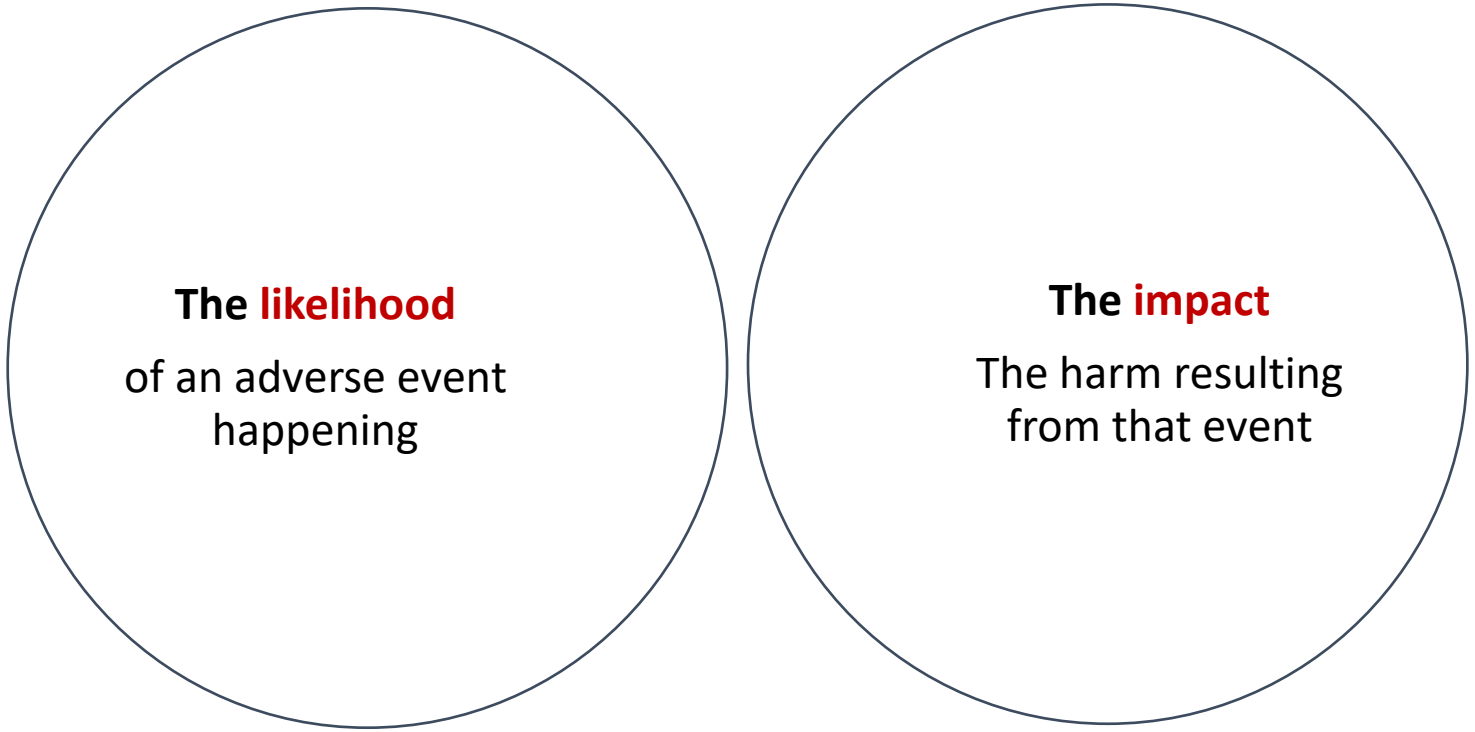
4. Configuration management

5. Risk and testing
- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Risk and testing

The level of risk is determined by:



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- *2.1 Test planning*
- *2.2 Test planning activities*
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- *3.1 Test progress monitoring*
- *3.2 Test reporting*
- *3.3 Test control*

4. Configuration management

5. Risk and testing
- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Risk and testing

For any risks you have four possibilities:

- Mitigate
- Contingency
- Transfer
- Ignore

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- *2.6 Test strategy, test approach*

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- *3.1 Test progress monitoring*
- *3.2 Test reporting*
- *3.3 Test control*

4. Configuration management

5. Risk and testing
- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Risk and testing

When analyzing, managing and mitigating these *risks*, the test manager should follow well established project management principles.

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- *1.1 Test organization and independence*
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- *3.1 Test progress monitoring*
- *3.2 Test reporting*
- *3.3 Test control*

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5. Risk and testing
- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Project risks

Typical project risks

- Logistics or product quality problems that block tests
- Test items that won't install in the test environment
- Excessive change to the product that invalidates test results or requires updates to test cases, expected results and environments
- Insufficient or unrealistic test environments that yield misleading results

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- *3.1 Test progress monitoring*
- *3.2 Test reporting*
- *3.3 Test control*

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5. Risk and testing
- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Project risks

Project risks = the risks that surround the project's capability to deliver its objectives, such as:

Organizational factors:	Technical issues:	Supplier issues:
• skill and staff shortages • personal and training issues • problems with testers communicating their needs and test results • improper attitude toward testing (i.e. not appreciating the value of finding defects during testing).	• problems in defining the right requirements • the extent that requirements can be met given existing constraints • the quality of the design, code and tests.	• failure of a third party • contractual issues.

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- *3.3 Test control*

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- *5.1 Project risks*
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Project risks

Organizational issues
such as shortages of people, skills or training, problems with communicating and responding to test results, bad expectations of what testing can achieve and complexity of the project team or organization.

Technical issues
such as problems related to ambiguous, conflicting or unprioritized requirements

Supplier issues
such as
- problems with underlying platforms or hardware
- failure to consider testing issues in the contract
- failure to properly respond to the issues when they arise

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- *3.1 Test progress monitoring*
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- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Product risks

Product risk
is a risk directly related to the test object

Product risk is the possibility that the system or software might fail to satisfy some reasonable customer, user, or stakeholder expectation.

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- *2.4 Exit criteria*
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- *3.1 Test progress monitoring*
- *3.2 Test reporting*
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5. Risk and testing
- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Product risks

Product risks = Potential failure areas in the software.

They are a risk to the quality of the product, i.e.:

- Failure-prone software delivered.
- Software/hardware could cause harm to an individual or company.
- Poor software characteristics (e.g. functionality, reliability, usability and performance).
- Software that does not perform its intended functions.

Risks are used to decide where to start testing and where to test more.

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- *3.1 Test progress monitoring*
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6. Defect management

Product risks

Testing is used to

reduce the risk of an adverse effect occurring,
reduce the impact of an adverse effect.

In a **risk-based approach** the risks identified may be used to:

- Determine the test techniques to be employed.
- Determine the extent of testing to be carried out.
- Prioritize testing in an attempt to find the critical defects as early as possible.
- Determine whether any non-testing activities could be employed to reduce risk (e.g. providing training to inexperienced designers).

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- *5.2 Product risks*

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Risk analysis

Risk analysis

- Identifying the risk items
- Determine the likelihood and impact for each item
- Use a rating scale (1 – 10) classify the level of risk for each item
- Priority the risk items according to their rating values

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- 2.4 Exit criteria
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- 2.6 Test strategy, test approach

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- 3.1 Test progress monitoring
- 3.2 Test reporting
- 3.3 Test control

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- 5.1 Project risks
- 5.2 Product risks

6. Defect management

Risk analysis

Risk analyses are educated guesses! Make sure that you follow up and revisit the risk analysis at key project milestones.

If you're following a V-model, you might perform the analysis during

- the requirements phase
- at the end of the design phase
- at the end implementation phase
- prior to starting unit test, integration test, and system test
- during testing

You might find you have discovered new risks or found that some risks weren't as risky as you thought and increased your confidence in the risk analysis.

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- 3.1 Test progress monitoring
- 3.2 Test reporting
- 3.3 Test control

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5. Risk and testing
- 5.1 Project risks
- 5.2 Product risks

6. Defect management

Risk analysis

Risk-based testing also involves measuring how well we are doing at finding and removing defects in critical areas, as was shown in the table:

	Unresolved defects		Test cases to be run		
Test targets (product risk areas)	**#**	**%**	**Planned**	**Actual**	**%**
Performance, load, reliability	304	27	3843	1512	39
Robustness, operations, security	234	21	1032	432	42
Functionality, data, dates	224	20	4744	2043	43
Use cases, user interfaces, localization	160	14	498	318	64
Interfaces	93	8	193	153	79
Compatibility	71	6	1787	939	53
Other	21	2	0	0	0
	1107	*100*	*12857*	*5703*	*44*

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- *1.2 Tasks of the test leader and tester*

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- *3.1 Test progress monitoring*
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4. Configuration management

5. Risk and testing
- *5.1 Project risks*
- *5.2 Product risks*

6. Defect management

Risk analysis

- Analyze risks early in the project.
- You should manage risks appropriately, based on likelihood and impact, but do not confuse impact with likelihood or vice versa.
- The goal of risk-based testing should not be - cannot practically be - a risk-free project.
- Best practices in risk management to achieve a project outcome that balances risks with quality, features, budget and schedule.

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Defect management

Defect
(Def.) Discrepancies between actual and expected test outcomes.

Defect management
(Def) The process of recognizing, investigating, taken action and disposing of incidents.

Defect report
A report document reporting on any event that occurred, e.g. during testing, which requires investigation.

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Defect management

What is the objectives of a Defect report?

Provide developers and other parties with feedback about the problem to enable identification, isolation and correction as necessary.

Provide test leaders a means of tracking the quality of the system under test and the progress of the testing.

Provide ideas for test process improvement.

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6. Defect management

Defect reports

To write a good Defect report you must keep in mind the following questions:

- What is the objective of the report?
- What is the purpose?
- Who is the reader(s)?
- What goes into it?

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6. Defect management

Defect reports

What goes in a Defect report?

- A description of some situation, behavior or event that occurred.
- One or two screens – with information gathered by a defect-tracking tool.
- A description of the steps done to reproduce and isolate the incident.
- The impact of the problem.
- Classification information (i.e. the scope, severity and priority of the defect).

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6. Defect management

Defect reports

Continue…

- A level of priority, assigned by the test managers

- The risks, costs, opportunities and benefits associated with fixing or not fixing the defect assigned by the project team or a committee.

- The root cause, captured by the programmer,
  - the phase of introduction
  - the phase of removal

- Conclusions and recommendations captured by the managers, programmers or others

- Throughout the life cycle of the Defect report, the defect-tracking system should allow each person who works on the Defect report to enter status and history information.

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Defect reports

When to raise incidents?
During development, review, testing or use of a software product.

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6. Defect management

Defect reports

Statuses of Defect reports:

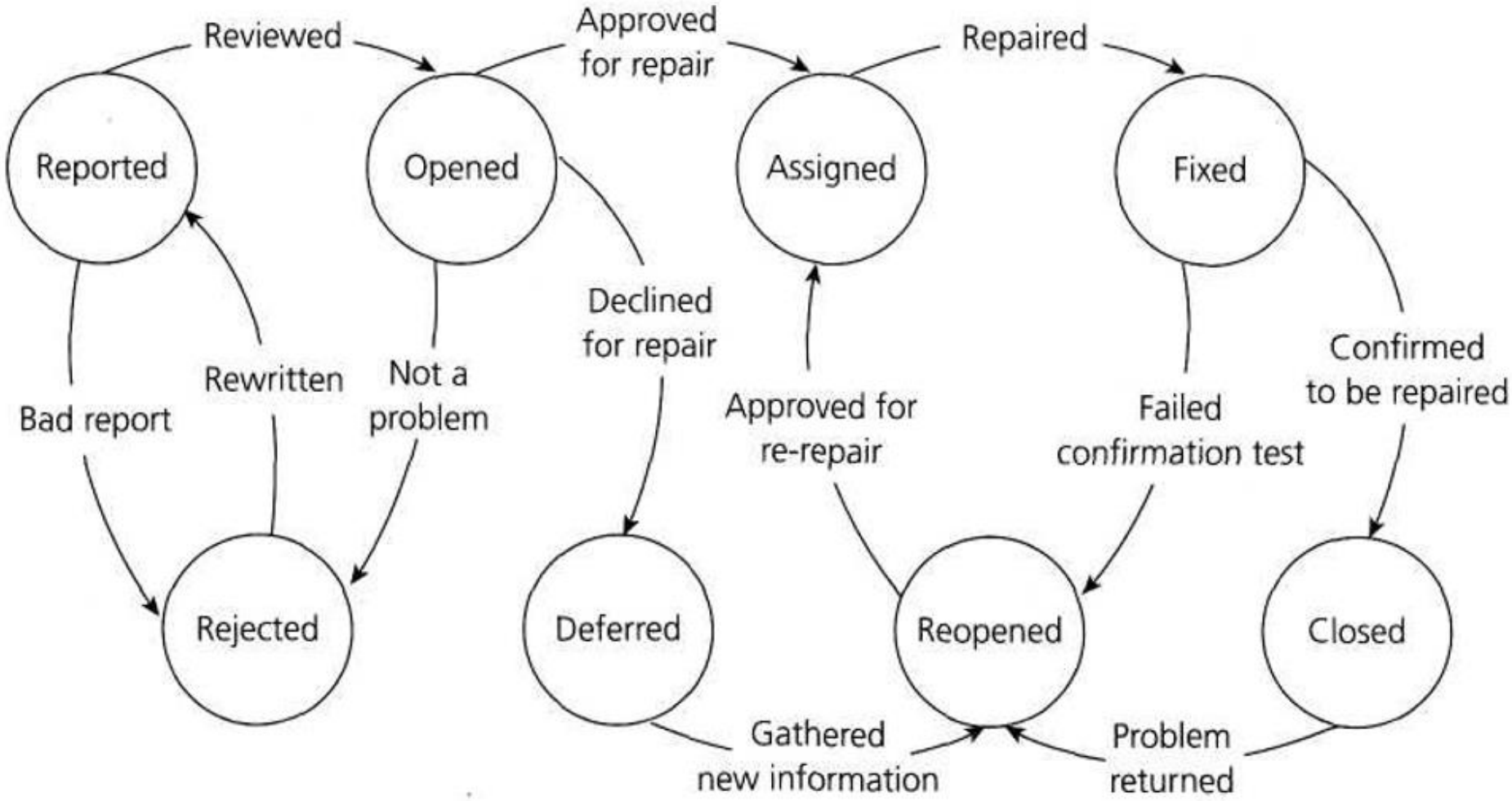


FIGURE 5.3 Defect report life cycle

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Defect reports

Details of the Defect report may include (cf. IEEE 829):

Date: _____

Project: _____

Programmer: _____Tester: _____

Program/Module: _____ Build/Revision/Release: _____

Software Environment: _____ Hardware Environment: _____

Status of the incident_____

Number of Occurrences: _____Severity: _____Impact____ Priority _____

Detailed Description: _____(logs, databases, screenshots)

Expected result / Actual result: _____

Change history_____

References (including the identity of the test case specification that revealed the problem_____

Assigned To: _____

Defect Resolution: _____