

Test Effort Estimation

Ruud Teunissen

Polteq IT Services BV – The Netherlands

Nieuwegein – May 23rd 2007

www.polteq.com
slide nr. 1



How do you estimate your effort,...

- ... if you don't know what to do
- ... if you don't know how to do it
- ... if you don't know who will do it
- ... if you don't know where to do it
- ... if you don't know with what to do it
- ... if you don't know when to do it
- ... if you don't know what to do first, last, ...

.....

www.polteq.com
slide nr. 2





Test Effort Estimation - Approaches

- Experiences in similar/previous projects
- **Historical data**
- Predefined budget
- Intuition of the experienced tester
- **Extrapolation**
- Bottom up from work breakdown structure
- **Testing best practice**
-

www.polteq.com
slide nr. 4



Historical data related to:

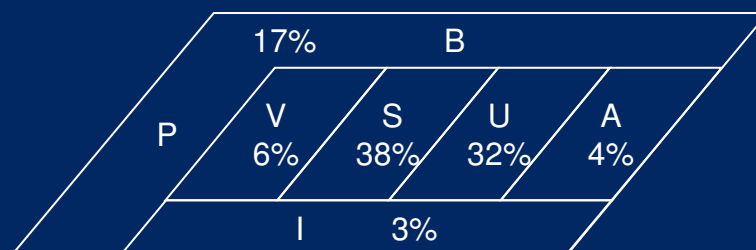
- Time spent in design and realisation phases
- Size of test basis
 - e.g. number of user requirements, number of pages, function points
- Data model
 - e.g. number of entities, fields
- Number of screens or fields
- Size of test object
 - e.g. KLOC

www.polteq.com
slide nr. 5



Extrapolation

- Determine hours spent on test design for part of the system
- Extrapolate to estimate test design hours for total system
- Relate test design time to total testing time
 - e.g. using the TMap® life cycle



TMap® is a registered trademark of Sogeti

www.polteq.com
slide nr. 6

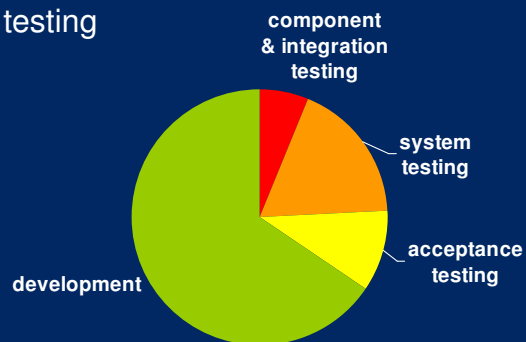


Testing best practice

On average 35% of the hours spent on the total development project is reserved for testing

- 5-7% for component and integration testing
- 18-20% for system testing
- 10% for acceptance testing

development =
FD + TD + RE



www.polteq.com
slide nr. 7



polteq

Question

What makes a test
effort estimate
reliable?

www.polteq.com
slide nr. 8



polteq

You need to know what to test...

- the software, including documentation
- the infrastructure, including procedures
- the organization, user and operation

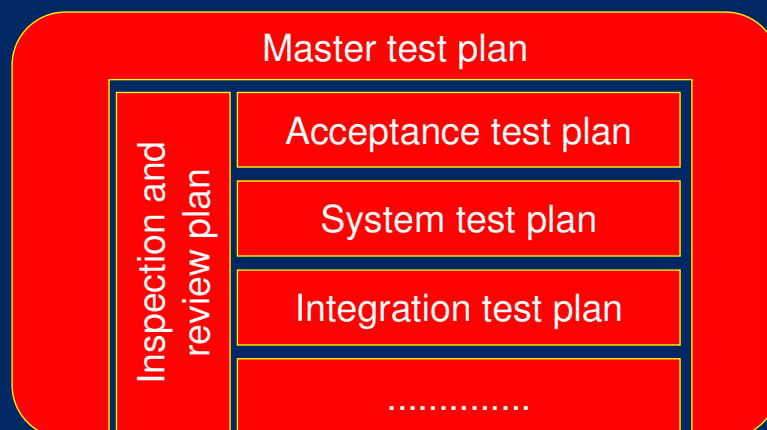
... and how it is designed and built!!

- traditional waterfall
- V-model
- iterative, incremental, ...

www.polteq.com
slide nr. 9



... master test plan or detail test plan, ...



www.polteq.com
slide nr. 10



...and what stage of the project you're at?

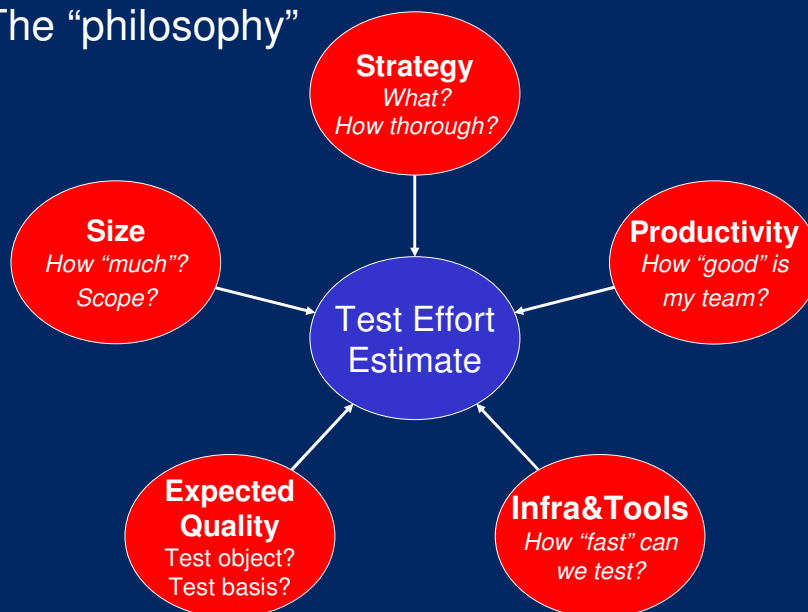
- Project initiation
 - global estimate ($\pm 30\%$?)

- High level tests
 - insight into "Functional" solution ($\pm 10\%$?)

- Low level tests
 - insight into "Technical" solution ($\pm 10\%$?)



The "philosophy"





Test Point Analysis

TPA® is part of the TMap® Approach


TPA® and TMap® are registered trademarks of Sogeti

Nieuwegein – May 23rd 2007



www.polteq.com
slide nr. 13



Quality Characteristics

<i>Dynamic explicit</i> <ul style="list-style-type: none">• Functionality• Performance• Suitability• Security	<i>Static</i> <ul style="list-style-type: none">• security• continuity• traceability•
<i>Dynamic implicit</i> <ul style="list-style-type: none">• Performance• User friendliness• Maintainability• Traceability•	

www.polteq.com
slide nr. 14



Influencing Factors

(Sub)System Factor

- Interfacing
- Complexity
- Uniformity
- User importance
- Usage intensity

Environmental Factor

- Test tools
- Development tests
- Product documentation
- Development environment
- Test environment
- Testware

Test Strategy !!

Productivity Factor

- Typical range: 0.7 - 2.0

Management overhead

- Team size
- Management tools

www.polteq.com
slide nr. 15

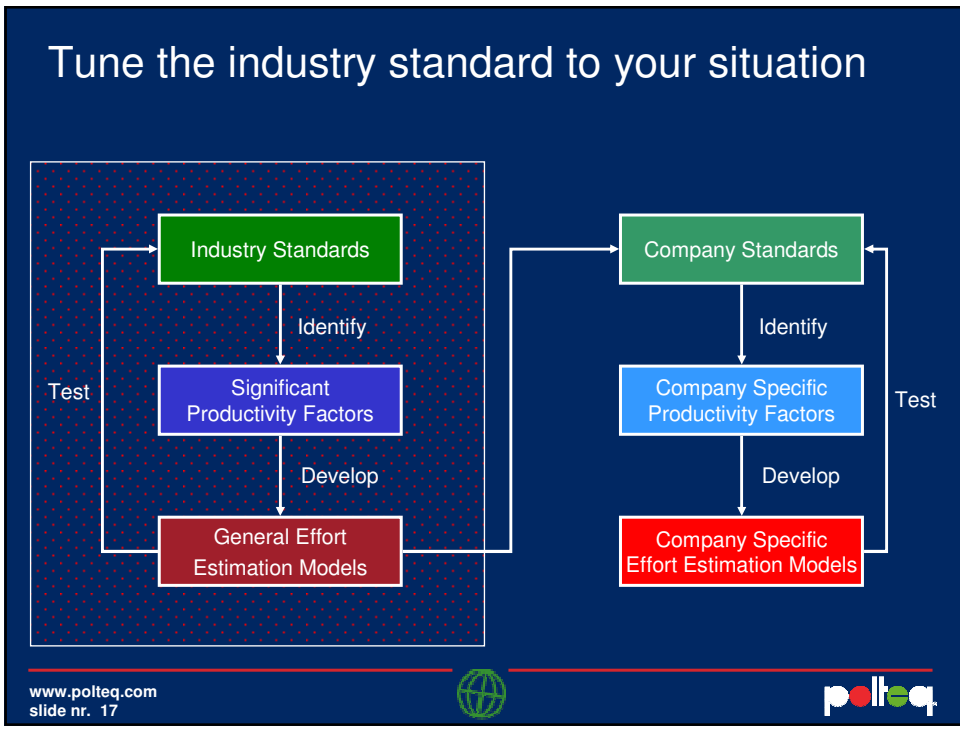


Pro's and Con's

- Pro's
 - Interacting with test strategy
 - "Absolute" numbers
 - Not related to other estimates (e.g. RQMS, design, development)
 - Transparent
 - Test process and design techniques according to TMap
- Con's
 - High level tests only
 - Function Point Analysis is required
 - Requirements need to be available at "FD" level
 - Test process and design techniques according to TMap

www.polteq.com
slide nr. 16





Project Risk Indicator

A Real Life Case by Ruud Teunissen
Polteq IT Services BV – The Netherlands

Nieuwegein – May 23rd 2007

www.polteq.com
slide nr. 18

Project Risk Indicator

Business point of view:

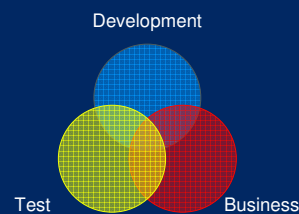
- Business risks
- Technology in operation

Design and development point of view:

- Expertise Design and Development team
- Complexity of the application
- Development method
- New build / maintenance

Test point of view:

- Expertise test team
- Level of re-usability testware



Business point of view:

- F1 Business risks

2	The priority of the project relative to other projects is low
4	The priority of the project relative to other projects is normal
8	The priority of the project relative to other projects is high

- F2 Technology in operation

4	The technology has already been used several times within the organization
8	The technology is new, but similar to others within the organization
16	The project uses a technology which is totally new to the organization



Design and development point of view:

- F3 Expertise Design and Development team

2	An experienced design and development team
4	A mixture of experienced and non-experienced design and development team
8	A non-experienced design and development team

- F4 Complexity of the application

2	The degree of complexity of the processing (simple, standalone) of the application relative to other applications is low
4	The degree of complexity of the processing (medium complexity, medium interfaces) of the application relative to other applications is normal
8	The project is focussing on (a) complex application(s) with many interfaces to other applications.



Design and development point of view:

- F5 Development method

2	The project development method for the application has been commonly used within the organization for several times in the past
4	The project is to be developed using a new development method, similar to others within the organization
8	The project is to be developed using a new development method, which is considerate experimental within the organization

- F6 New build / maintenance

4	The project is primarily a maintenance project, involving only updates on the current applications
8	The project is a combination of a changes project and new build
16	The application is primarily new build



Test point of view:

- F7 Expertise test team

2	An experienced test team
4	A mixture of experienced and non-experienced test team
8	A non-experienced test team

- F8 Level of re-usability testware

4	A usable, general initial data set (tables, etc.) and specified test cases are available for the test
8	A usable general initial data set (tables, etc.) is available for the test
16	No re-usable testware is available



Project Risk Indicator

$$PRI = (F1+F2+F3+F4+F5+F6+F7+F8) / 44$$

Project Risk Indicator	% Project time spent on testing
< 0.70	29%
0.70 – 0.90	32%
0.90 – 1.10	36%
1.10 – 1.30	41%
> 1.30	45%



Project Risk Indicator - Extended

$$PRI = (F1+F2+F3+F4+F5+F6+F7+F8) / 44$$

Project Risk Indicator	% Project time spent on testing	UT	ST	PAT	UAT
< 0.70	29%	5%	14%	3%	7%
0.70 – 0.90	32%	5%	16%	3%	8%
0.90 – 1.10	36%	5%	18%	4%	9%
1.10 – 1.30	41%	6%	20%	5%	10%
> 1.30	45%	7%	22%	5%	11%



User Acceptance Test

Another Real Life Case by Ruud Teunissen
Polteq IT Services BV – The Netherlands

Nieuwegein – May 23rd 2007



User Acceptance Test – Context

- Test Process Improvement
- Professionalize the UAT team
- Improve Test Management
 - *including Test Effort Estimation*
- “Best practice”
 - Design & Develop : Test Engineering = 5 : 2



1st group of “influencing factors” – T.E.E.1

1. Complexity	H	12
	M	6
	L	3
2. Quality Requirement Documentation	H	3
	M	6
	L	12
3. Quality Previous Tests	H	2
	M	4
	L	8

$$T.E.E.1 = (1. + 2. + 3.) / 16$$



2nd group of “influencing factors” – T.E.E.2

4. Functionality	M	1,00
	S	0,75
	C	0,50
	W	0,00
5. Reliability	M	0,06
	S	0,05
	C	0,04
	W	0,00
6. Usability / Suitability	M	0,15
	S	0,10
	C	0,08
	W	0,00
7. Efficiency	M	0,15
	S	0,10
	C	0,08
	W	0,00
T.E.E.2 = 4. + 5. + 6. + 7.		

www.polteq.com
slide nr. 29



3rd group of “influencing factors” – T.E.E.3

8. Productivity	Senior	1,00
	Medior	1,20
	Junior	1,80

T.E.E.3 = 8.

www.polteq.com
slide nr. 30



Test Management Estimate

Test Management Estimate	
Monitoring & Control	0,1 * Final Test Engineering Estimate
Reporting	0,1 * Final Test Engineering Estimate

Project type	Create Test Plan
Project	4,0 days
Light Project	3,0 days
Request for Change	2,0 days



Test Effort Estimate - Example

Test Engineering Estimate Calculation	
Design & Develop	1000 hrs
Initial Test Engineering Estimate (T.E.E.I)	400 hrs
Final Test Engineering Estimate = T.E.E.I * T.E.E.1 * T.E.E.2 * Productivity	

Test Engineering Estimate Calculation - Example	
Final Test Engineering Estimate = $400 * (22/16) * 1,16 * 1,2$	766 hrs
Test Management Estimate Calculation - Example	
Final Test management Estimate = $0,2 * 756,6 \text{ hrs} + 4 \text{ days}$	186 hrs





Questions?

Ruud Teunissen
Polteq IT Services BV – The Netherlands

Nieuwegein – May 23rd 2007

www.polteq.com
slide nr. 33



Thank you very much for your attention!

Ruud Teunissen
Polteq IT Services BV – The Netherlands

Nieuwegein – May 23rd 2007

www.polteq.com
slide nr. 34



