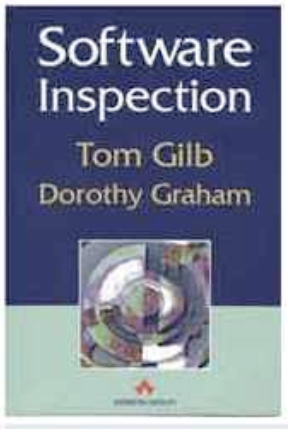


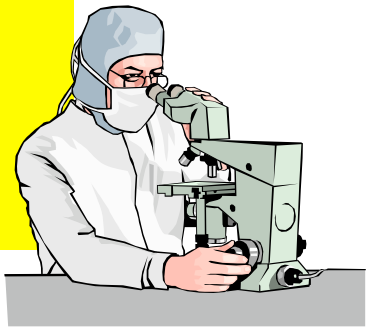
AGILE INSPECTIONS: !
Reviews by !
sampling"and measuring defects"

Extreme inspection and reviews based on objective and quantitative review methods.

JUSE, Tokyo 2008!

Keynote 90 minutes with Consecutive Translation (45 minutes effectively)!

Tom Gilb!



Tom@Gilb.com!

kyoritsu-pub.co.jp!

Defect Rates !
in 2003 Pilot Financial Shop, London, Gilb Client!
Spec QC/Extreme Inspection + Planguage Requirements#

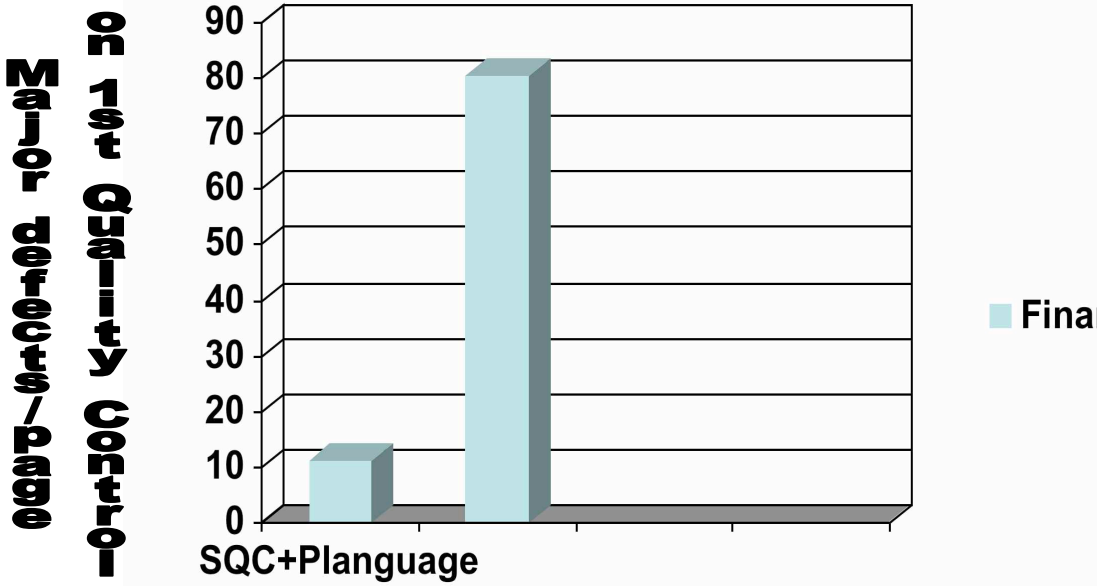
Across 18 DV (DeVelopment) Projects using the new requirements method, the average major defect rate on first inspection is 11.2.

4 of the 18 DV projects were re-inspected after failing to meet the Exit Criteria of 10 major defects per page.

A sample of 6 DV projects with requirements in the 'old' format were tested against the rules set of:

- The requirement is uniquely identifiable
- All stakeholders are identified.
- The content of the requirement is 'clear and unambiguous'
- A practical test can be applied to validate it's delivery.

The average major defect rate in this sample was 80.4.



Case: Real Inspection

- "of System Requirements Specification (SRS) of 82 pages for a major US corporation.

This presentation

shows

how we carried out a short

specification quality control

process

with senior/middle managers.

The purpose is to
make managers aware
that they play a key-role
in creating projects
delays
by approving poor
quality of requirements
specifications.

The results shown in this real-life example successfully predicted a project delay of at least 2 calendar years.

Poor quality marketing requirements documents prove time and again to be a good predictor of project delays.

- "The clue is that
- "requirements documents
  - "with a high defect density
  - "are an indicator of
  - "a truly *unprofessional* engineering culture.

Framework

- "Demonstration of power of Inspection
  - "8 Managers
  - "2 hours
  - "4 real requirements specifications offered ,
    - "1 used

We Introduced best practice **Rules for Requirements**

- "1. **Unambiguous** to intended Readership
- "2. **Clear** enough to test.
- "3. **No** unintentional **Design**

We Explained the definition of **Defect**

- A **Specification Defect** is a *violation of a Specifciation Rule (a 'standard')*
  - "Note: If there are 10 ambiguous terms in a *single* requirement
    - " then there are 10 defects!

Explain the definition of **Major** defect

- **Major:**
  - a Defect that *potentially*

costs more

  - to find and fix
  - **later** in the development process
  - than it would cost *now*.
  - We need to get rid of it NOW!

Agree with Management on Exit level

- **Exit Conditions:** (when Requirements can go forward to Design, Test etc with little risk)

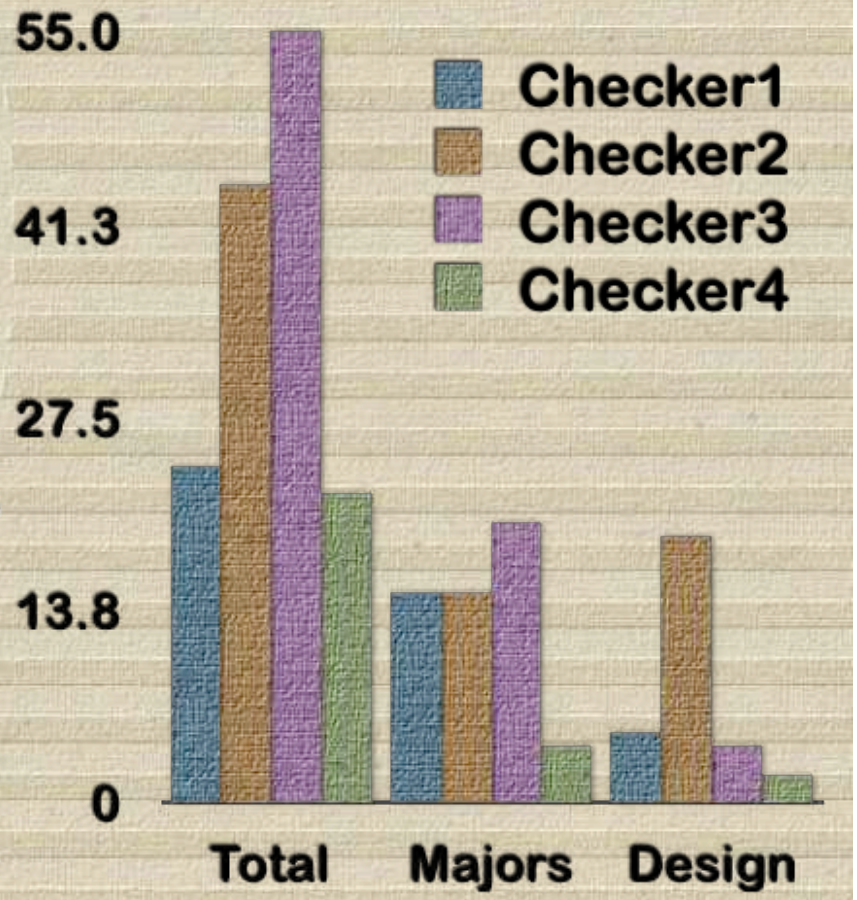
  - "**Maximum 1 Major Defect/ (Logical) Page**

  - "**Logical Page** = **300** Non commentary words.

the Job

- "You have up to 30 minutes
  - "check 1 sample requirements page (from an 82 page document)
- "Count all *potential* Rule Violations
  - "= Defects
- "*Classify* Defects as Major or minor

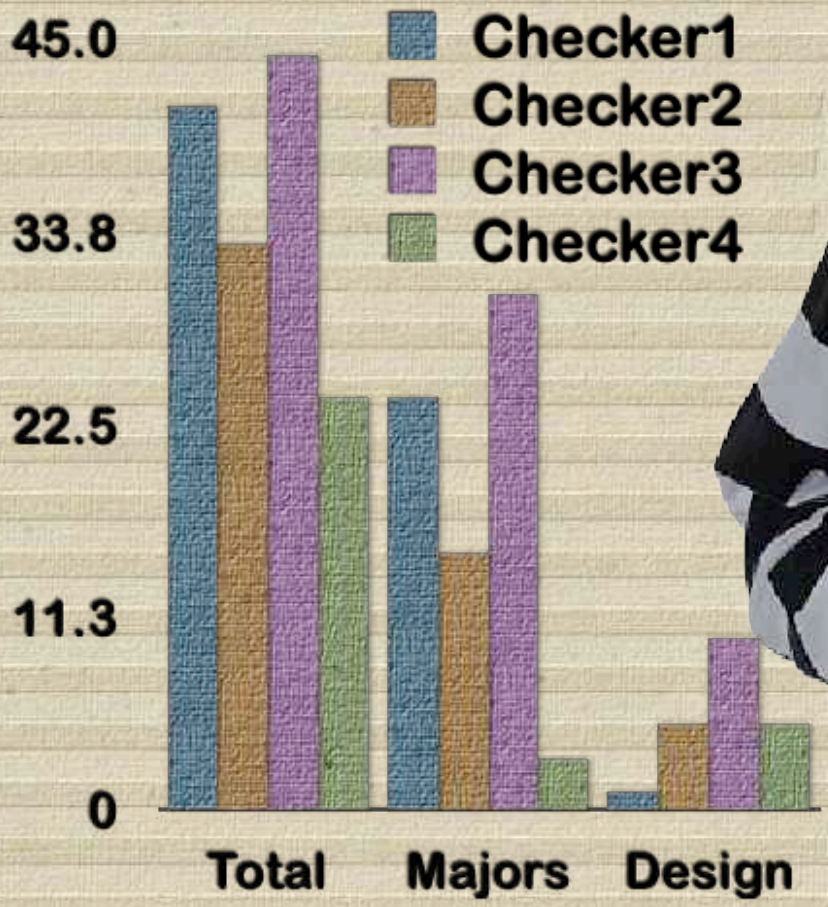
Report Page 81

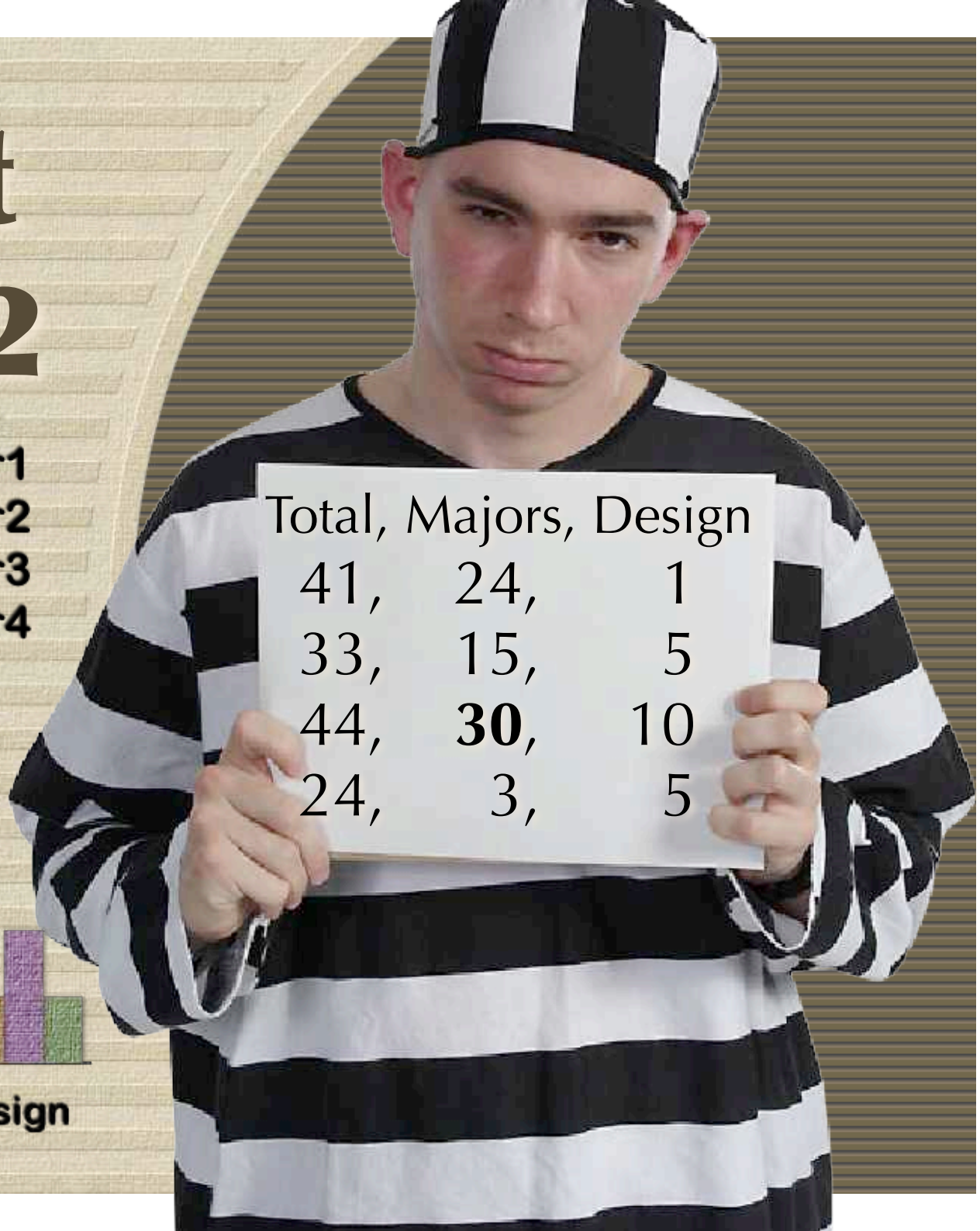


Defect Density Estimation

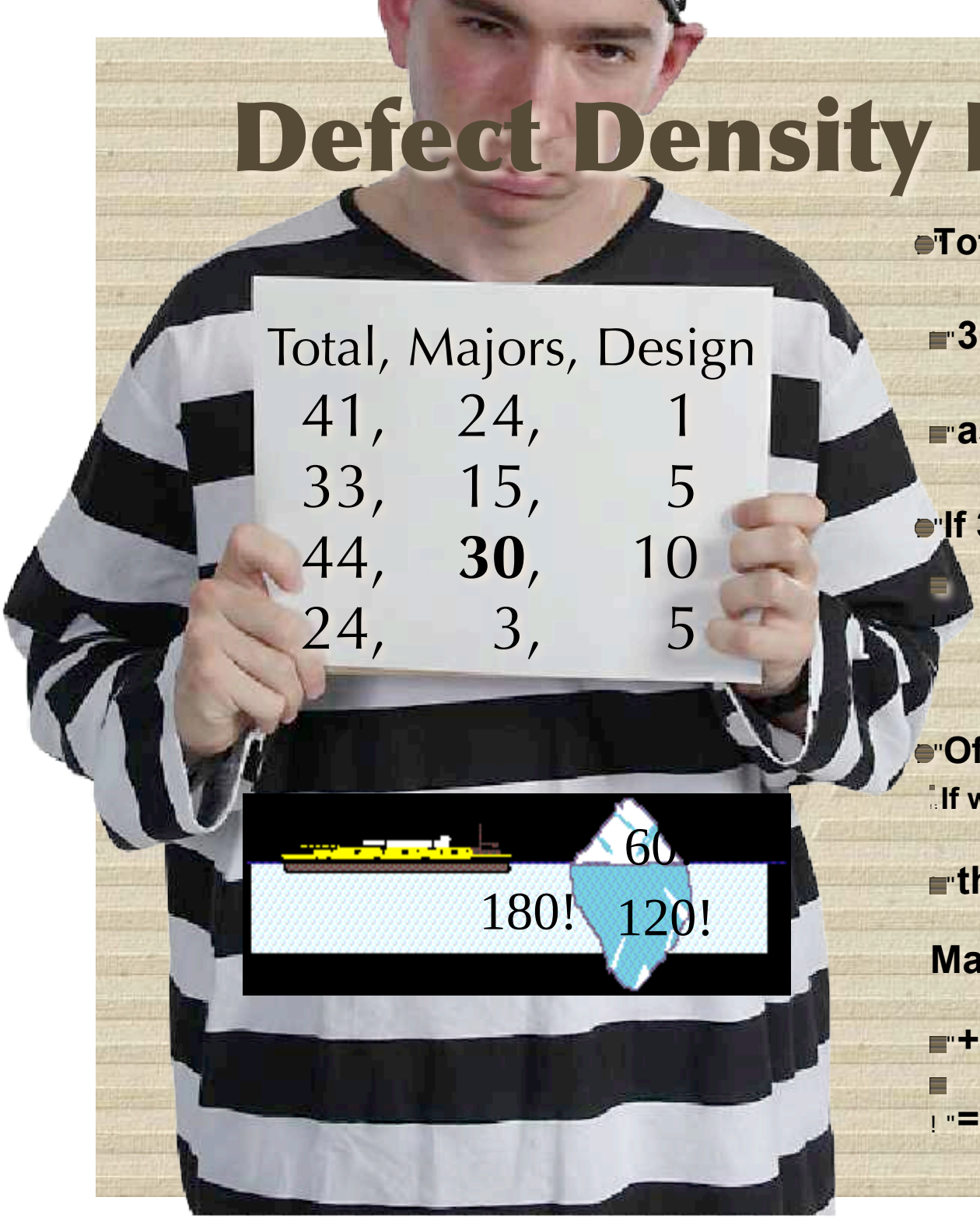
- Total for group (page 81)
  - 20 x 2 = 40 Majors
  - assume 40 are unique
- If 33.333% effective,
  - total in page = 3x 40= **120**
- Of which 2/3 or 80 were *not yet found*.
- If we fix all we found (40),
  - then the estimated remainder of Majors would be 80 (not found)
  - +8 “not fixed for correctly”
  - = **88** Majors remaining.

Report Page 82





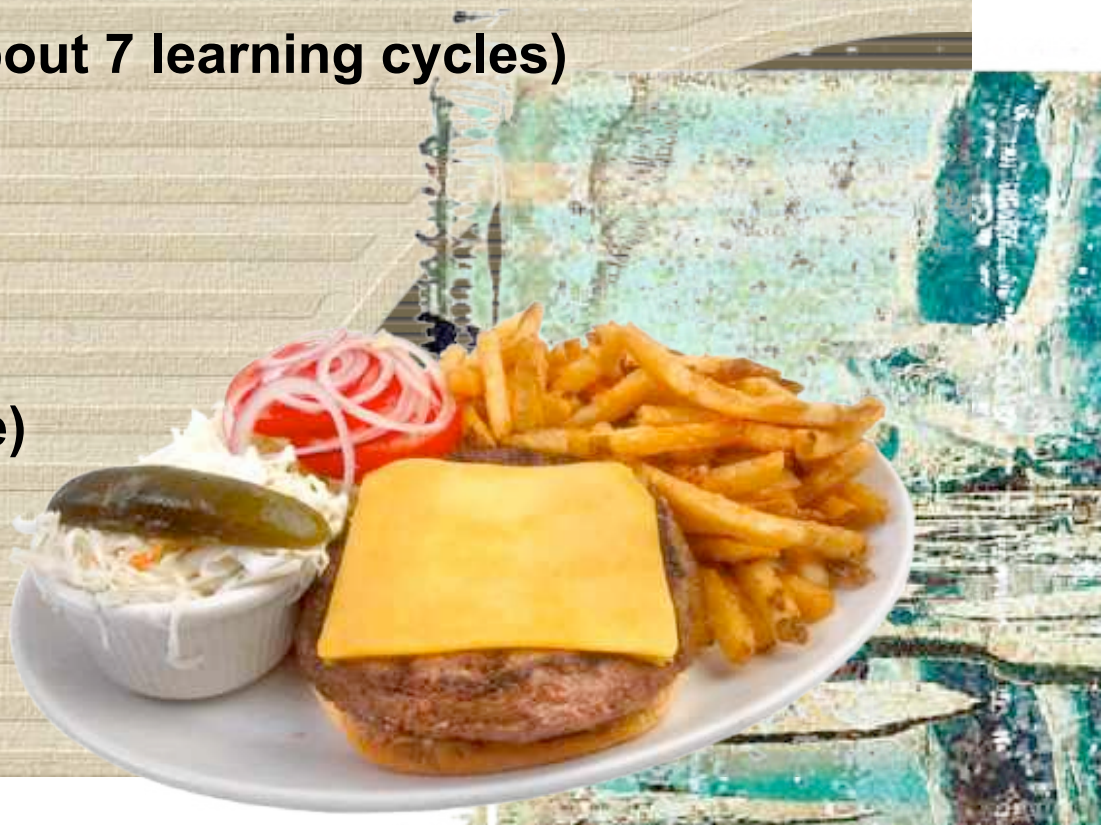
Defect Density Estimation



- Total for group (page 82)
- 30 x 2 = 60 Majors
- assume are unique.
- If 33.333% effective,
  - total in page = 3x 60 = **180**
- Of which 2/3 or 120 were not yet found.
  - If we fix all we found (60),
- then the estimated remainder of Majors would be 120 (not found)
- +10 “not fixed correctly”
  - = **130** Majors remaining.

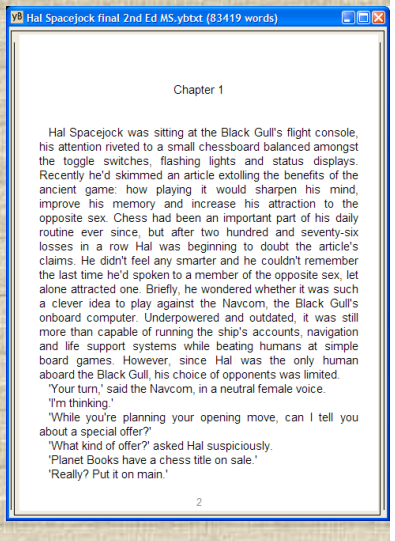
Conclusions

- Human *defect removal* by Inspections/reviews/SQC is
  - a hopeless cause: not worth it.
- Spec QC can be used, in spite of imperfect effectiveness,
  - to *accurately estimate* major defect level density.
- This measurement can be used to motivate engineers to
  - dramatically (100x! Over about 7 learning cycles)
    - reduce their defect insertion (rule violation)
  - to a *practical* exit level
    - (like *less than* 1.0 Majors/page)



Extrapolation to Whole Document

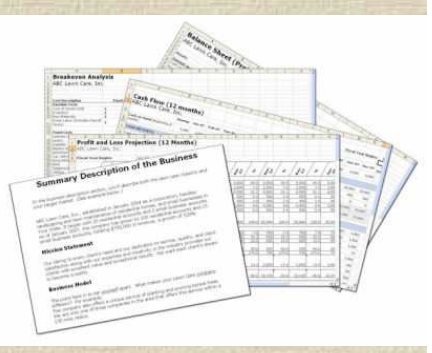
- **Average: 150 Majors/page**

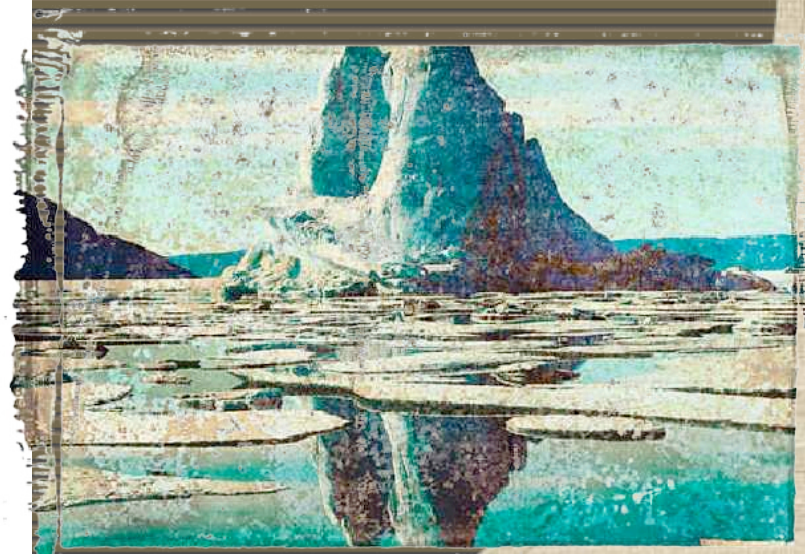


- Page 81: 120 majors/page
- Page 82: 180 Majors/page

- **Total in whole document:**

- **12,300 Majors**
- 150 Majors/page x 82 pages.





Estimated Project Loss

- If a Major has
  - 1/3 chance of causing loss
- And each loss caused by a Major is
  - avg. 10 hours
- then total project Rework cost is
  - about ***41,000 hours loss.***
- (This project <u>was</u> over a year late)
- 1 year = 2,000 hours x 10 people

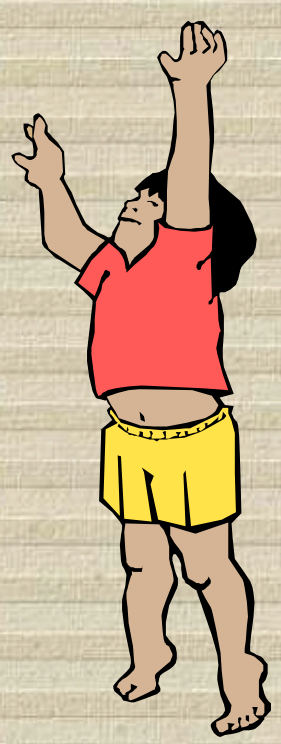
10 Top Inspection Principles

- Pr1. *Prevention* is more effective than Cure
- Pr2. *Avoidance* is more efficient than removal
- Pr3. *Feedback* teaches effectively
- Pr4. *Measurement* gives facts to control the process
- Pr5. Priority to the *Profitable*
- Pr6. *Forget perfection*, you can't afford it!
- Pr7. Teach *fishing*, rather than 'give fish'
- Pr8. *Framework for Freedom* beats bureaucracy
- Pr9. *Reality* rules
- Pr10. *Facts* beat intuition
  - More detail on these in my tutorial.

See detailed comment on each principle in slides in the full Team Leader course slides

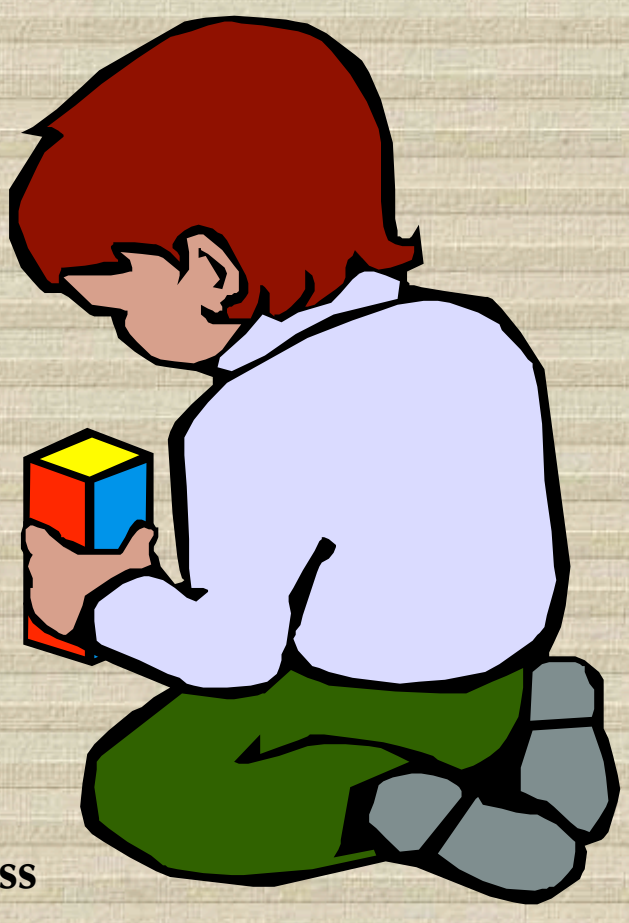
Inspection Objectives

- Central Objectives
  - 1. Engineering Process Control
  - 2. *Measuring Specification* Quality vs 'Standards' (= 'Rules')
  - 3. Reduce Project Time & Cost
- Secondary Objectives
  - 4. Identify and *(possibly!)* Remove Major Defects
  - 5. Reduce Service/Maintenance Costs
- *NOT* Objectives
  - Approve document *'content' versus 'Real World' (like ROI)*
  - Remove *minor* defects
  - *'Improve'* Quality of your end product



Inspection Paradigms

- P1. Engineering process control (E, X)
- P2. Cleanup is ineffective (Prevent)
- P3. Teamwork beats ego
- P4. Data beats guessing
- P5. Real Time Control
- P6. Author Responsibility
- P7. Checkers are Consultants
- P8. Author is Client
- P9. Optimize Checking speed
- P10. Quantified Gatekeepers
- P11. Rules Rule Objectively
- P12. Process Structure should satisfy your process objectives
- P13. What actually works, is right for you



Details of a Real Process Definition for Agile Inspection

- "We do not expect to lecture with these slides. They are background information.

Extreme Inspection. !
Version:January 12, Originated 2003!

Authors: Tom Gilb Tom@Gilb.com & Kai Gilb Kai@Gilb.com#

Intended Purpose:#

Extreme Inspection <client> Variation:!

a simple but powerful version of inspection (Specification Quality Control – SQC) that <CLIENT> can install immediately at low cost.!

Rules!

- *" The primary Rules we check against are the same Rules that writers will use when writing specifications. !*
- *" Initially they will be Clarity, Unambiguousness, Consistency, Traceability, separation of requirements and solutions, and separation of Performance, Functions and Designs. !*
- *" See separate document: “Rules for Specification Writers.” #*

Extreme Inspection Outcome#

- **"The outcome of this type of inspection is to give a fair measure of Major defect density.#**

Intent of Outcome#

- " The intents of the Major defect density measure are:#
- " Clean: to make sure that polluted specifications do not enter the next working processes. #
- " Learn: to motivate specification writers to learn and follow <CLIENT> best practice specification rules.#

Internal Extreme Inspection Goals#

- " ***“The expected effects of rigorously carrying out this process are:”!***
- " **Density: #**

  Scale: Estimated remaining Major defect density per logical page (300 Non Commentary words) #

  Past [December 2002] 50-100 Majors/Page <- Multiple sample inspections #

  Goal [Jan 2003] less than 10 Majors/Page#

  Goal [Jan 2004 or sooner if feasible!] less than 1 Major/ Page #

External Extreme Inspection Goals#

Project Efficiency#

Scale: Total project time to successfully complete a project#

Past [Dec 2002] ???#

Goal [Dec 2003] = 70% of Past [Dec 2002]#

Goal [Dec 2004] = 50% of Past [Dec 2002] #

Comment: !

This will be accomplished by !

!less back and forth, !

!and reviewing of requirement documents, !

!and by shorted coding and test times, !

!and by less effort when work is contracted out of country or to sub-suppliers. !

More time at the requirement stage is expected.!

Process Management of Extreme Inspection: 1"

–"***1. Inspection Outcome Justification***

- "The outcome of this variation on conventional Inspection processes is **to determine 'specification exit'** by measuring and estimating Major defect density. The outcome is NOT (as with conventional inspection) to 'clean up' bad work.!
- "The result of this outcome limitation is that many of the time honored conventions of Inspections (as in Gilb & Graham: Software Inspection) are NOT necessary or desirable. We only need to do whatever gives a **reasonable measure of defect density**. We only need to focus on determining that the specification is exit-able or NOT.!
  - "So we do not need to get maximum effectiveness by having a large team or by using one hour per page or by looking at all pages (we can sample in 10-40 minutes and use one or 2 people).!
- "In simple terms **if we find (checker detects) one or more Majors** in a page, it is NOT exit-able, because the real estimated quantity of majors actually there, exceeds the Exit limit of 'one per page'. If we find less than one major defect on 4 pages, it probably is *economic* to exit the spec.!
- "***Economic*** is the key word. We are trying to determine **if it pays off** to exit now, or to rewrite the spec to a cleaner level now.!

2. Inspection Cost Charging.

- " ! All costs for the writer, the checker and a possible process guide, will be !
  - "charged to the project the writer is working on, !
  - "and to the QC process costs specifically.!
  - "*Rationale: so we can track the true costs of doing this and the degree to which it is done*.

3. Auditing this process:

- "!The Inspection (Spec QC) process must be regularly (monthly) audited!
  - "to make sure it is really conducted according to intent !
  - "and is not corrupted or misunderstood.!
- "This includes double checks on audits!
  - "to see if the conclusions of the check and the audit are reasonably consistent. !
- "Frequent audits are necessary in the beginning and with newcomers. !
- "Auditing will be done by the process owners.!

Process Management of Extreme Inspection"

- "***4. Process Improvement***!
  - "The process needs to be continuously updated !
    - "mainly in the tools kit which defines and supports the inspection process: !
    - "the checklists, !
    - "the process definitions, !
    - "the computer data collection support !
    - "by the official process owner.!

5. Process Ownership!

- " ! There must be an official process owner to champion (and to manage ‘local’ champions), !
  - –"!spread, !
  - –"!audit, !
  - –"!and improve the process, !
  - –"!as experience and insight dictates. !
- "!This can be a group.!

6. Process Sponsorship!

- "The executive sponsor of this process should be official and visible !

7. Confidentiality!

- ! The checker shall *never* reveal the numeric result of an Inspection to anyone else except the writer. !
  - The writer may reveal the results if they want to, but they are not obliged to do so even to their direct manager (who should not even ask!). !
  - The results of an inspection, as recorded in the Specification Quality Control Database, are never to be released, revealed or reported with the name of the writer or information (such as document ID) that can lead to their identification.!
- *Rationale:*
  - *to prevent fear of defamation leading to false reporting of results*.
  - *To emphasize that the process is there to help the writer reach the corporate quality level required*.
  - *It is not in any way of time to be used for personal job performance evaluation*.
  - *Evaluation should be based on EXITED specifications, and their timeliness only*.
  - *Managers need to be informed and reminded of this cultural paradigm by the process owners*.

Process Management of Extreme Inspection: 3"

- "***8. Expected Effectiveness***
- " !We expect that the Major defect finding effectiveness of the checking process will be in the range of 10% to 35% of the actual real Majors present in a specification. !
- "This is quite sufficient to *estimate* the actual total number of majors actually present. !
- "We can then estimate with *sufficient accuracy* (say ±20%) determine levels of Majors in entire spec and in spec after correction of listed (by checkers) defects.!

Defect Rates!
Here is what really happened afterwards !
in 2003 Pilot Financial Shop, London, Gilb Client!
Spec QC/Extreme Inspection + Planguage Requirements#

Across 18 DV (DeVelopment) Projects using the new requirements method, the average major defect rate on first inspection is 11.2.

4 of the 18 DV projects were re-inspected after failing to meet the Exit Criteria of 10 major defects per page.

A sample of 6 DV projects with requirements in the 'old' format were tested against the rules set of:

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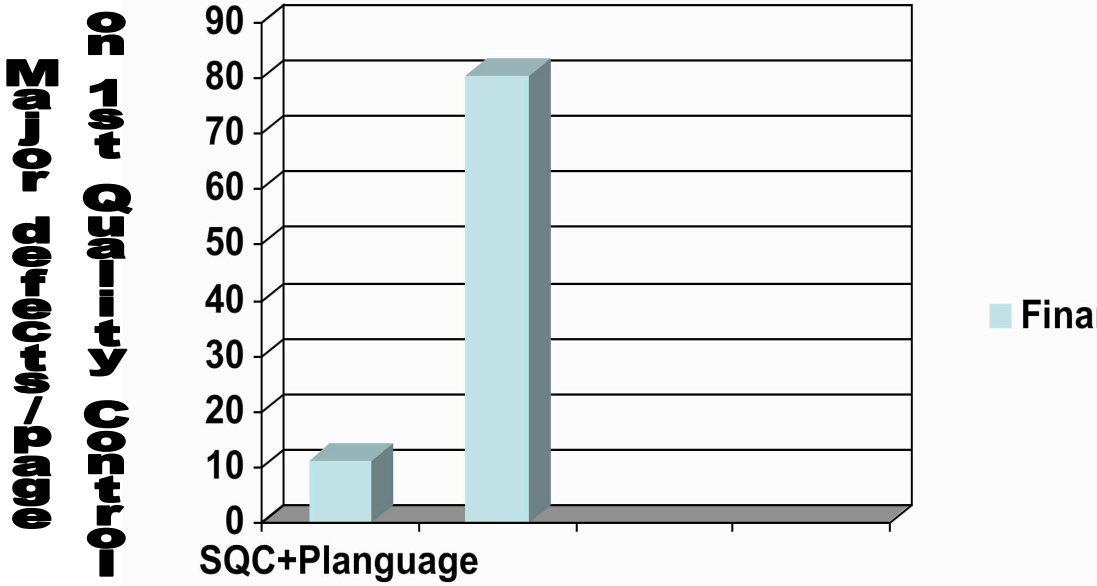
The average major defect rate in this sample was 80.4.



9. True Measure of Inspection Progress.

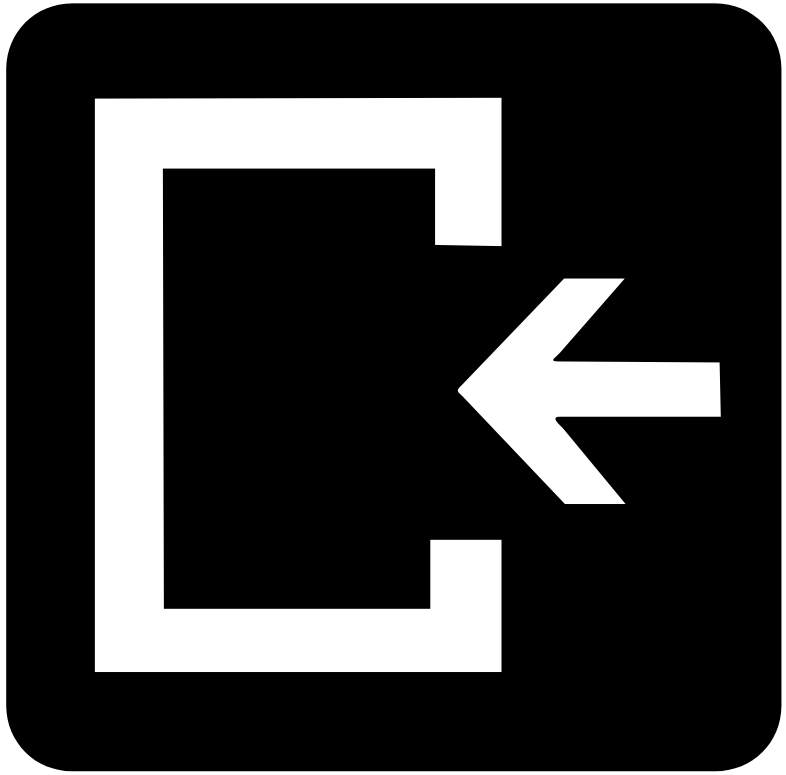
- The correct and relevant measure of how effective the Inspection process is working, is NOT as many would assume the quantity of Major defects found and fixed by an Inspection.
  - In fact we strongly recommend that this measure is well hidden from public view! (It has its uses!).
- The true measure is the average level of Major defects/Page which we can consistently release.
  - We need to move from about 100 Majors/Page down towards about less than one per page.
  - This cannot be achieved by finding and fixing defects (because we cannot find a large percentage at all)!
  - It can only be achieved in practice by *motivating* writers to reduce defects actually injected in their work, from 100, and move them down towards one maximum injected/page.
  - This is the 'individual defect injection learning rate'.
  - Individuals seem capable of reducing their own defect injection by about half (50% fewer for each cycle of learning (write, inspect and rewrite with 50% less cycle).
- The measure of real progress is the released defect density, and it is this measure which will most closely correlate with later statistics on quality and productivity of projects.

The EI Process (Extreme Inspection):!

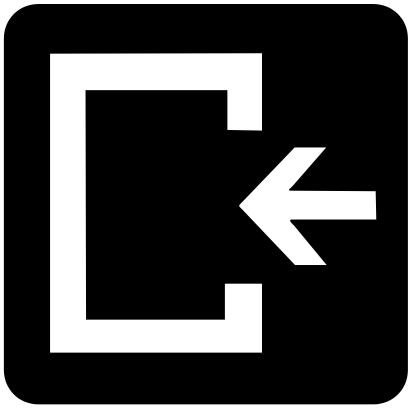
Version:August 20, 2008, Owner: Tom@Gilb.com!

- This is the formal process definition!
- You should be able to print it all on a single page!

EI Entry Conditions

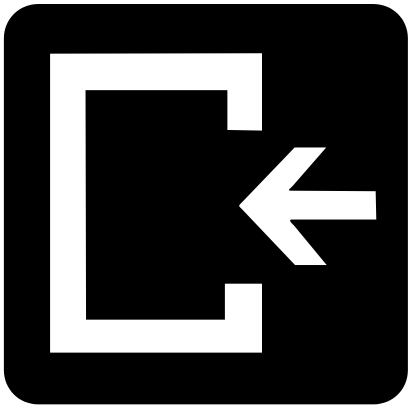


EI.E1: !



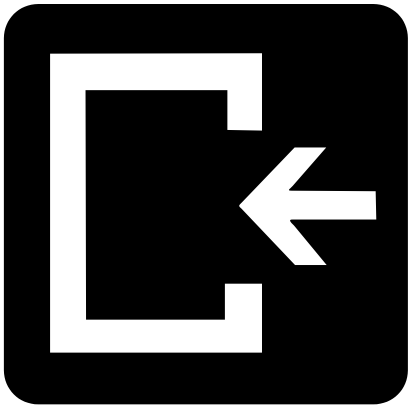
- " At least one of the participants!
  - –" has done a well conducted successful inspection once before, !
  - –"or been briefed by a competent practitioner, !
  - –"or will be guided through the process by a competent guide (ideally an expert in this process).!
- " *Rationale: people need to have some reasonable sense of how to do this process, otherwise it can become corrupted. We believe we can avoid formal training in the method, but we need some knowledge and experience of it in place.*

EI.E2: !



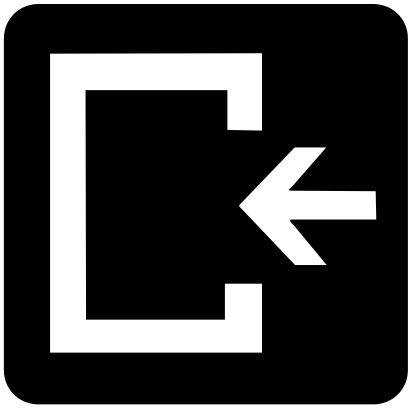
- "The specification writer sincerely believes that !
  - –"the defect level is low enough to exit.!
  - –" They have done personal checking against the rules themselves and find no defects.!
- "*Rationale: the writer should*
  - –" *take the trouble to make sure the spec is as clean as possible before inspections*.
  - –"*They should not misuse people and time to compensate for sloppy work*.

EI.E3: !



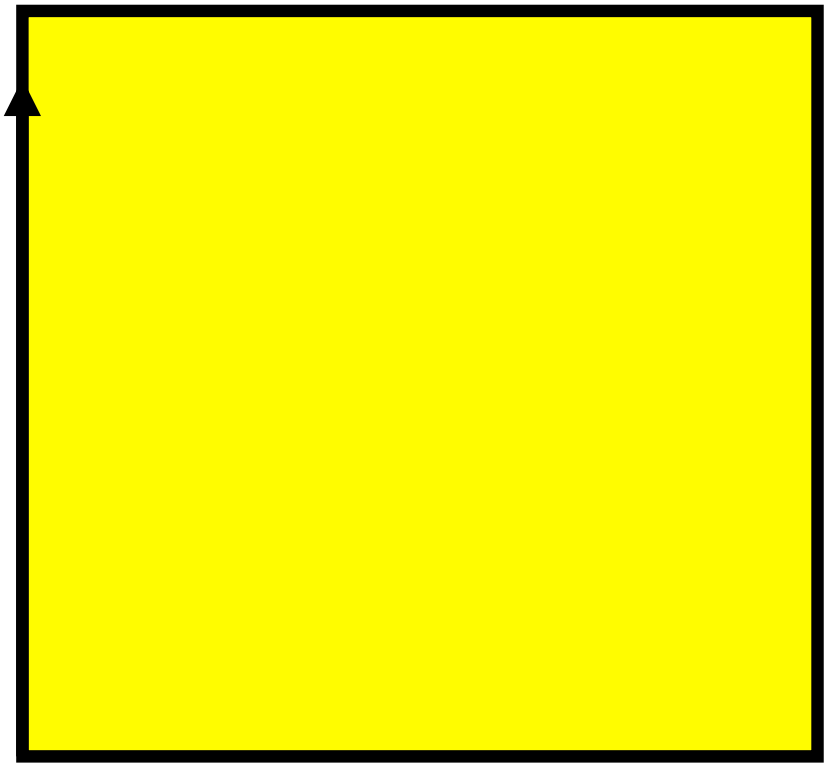
- "Exited copies of all source specifications are available.!
  - "*Rationale: there is little point in checking consistency against highly polluted source specifications.*
  - "*(example by using bad Business Requirements to check new System Requirements).*

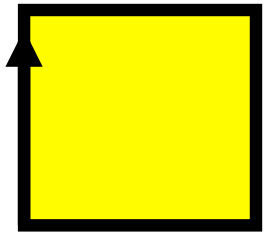
EI.E4: !



- An updated ‘Inspection Toolkit’ (with specification Rules, Checklists (for learning to apply the rules in practice), Process descriptions, forms, electronic support, intended readership role information) is available and is understood by the participants.!
  - *Rationale: This tool kit is the real definition of the Inspection process. This really determines correct use of the method.*

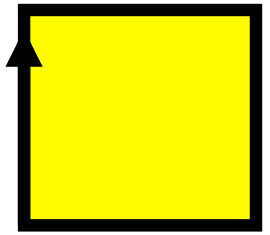
Ex In Procedure





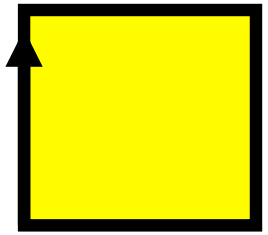
EI.P1:

- "The specification writer ('writer')
  - 'finds one other person (called a Checker)
  - "to (help) carry out the QC (Quality Control) of their specification.



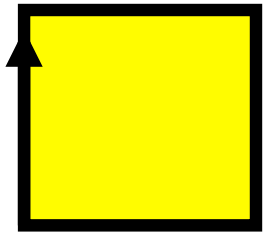
EI.P2:

- " a meeting time, with maximum duration 1.0 hour is agreed.
- " (if the Checker is experienced, they can in fact do their checking at any time, alone, and report their results to the writer.)



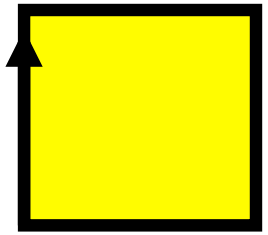
EI.P3:

- The writer makes sure the checker is knowledgeable about the following:
- the spec's intended readership and their uses of the spec.
- the specification Rules that apply (and their practical interpretation)
- The definition of Major defect, and how to spot them
- the purpose of the Spec QC process (to help the writer get to real exit-able level of defect density).



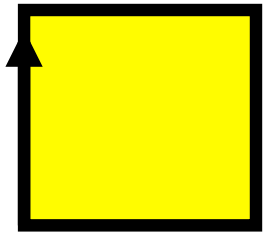
EI.P4:

- The writer and the checker will each select the same one logical page ‘at random’ (300 Non-commentary words) sample to check.
- The writer is now performing the role of a ‘checker’ on their own work.
- They should agree that the page selected is representative of the quality of the rest of the document.



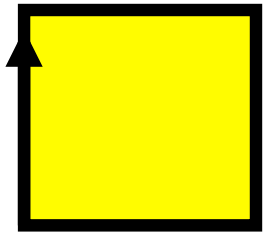
EI.P5:

- "checking will be done individually
  - "(but maybe in same room)



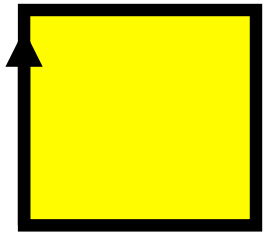
EI.P6:

- "the initial checking time will be 10 minutes.
- " If NO Major defects are found by either checker.
- "The checking process will continue for another 30 minutes.
- "Even if no further Majors are found.



EI.P7:

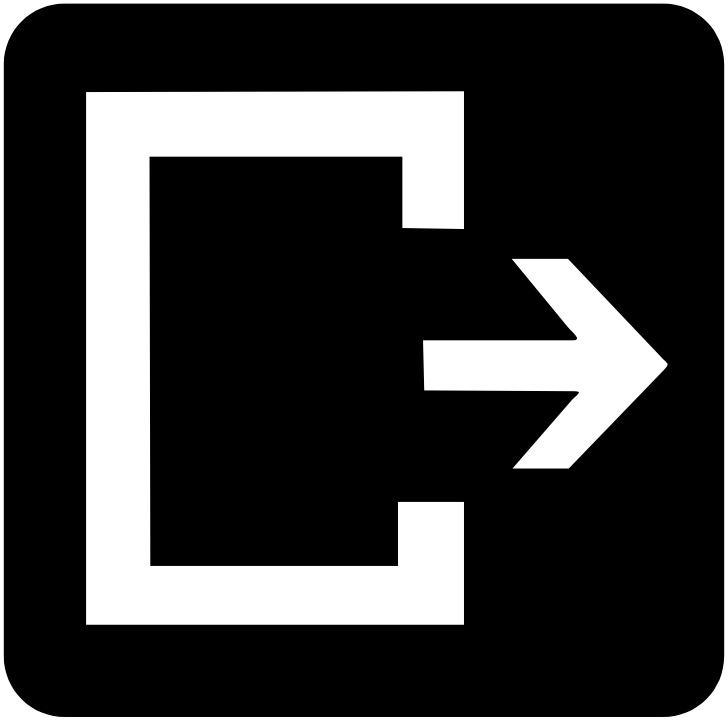
- If any Major defect is found
  - (and acknowledged by the writer as a real Major defect)
  - in the first 10 minutes of checking,
  - then this will be considered a sign that the spec contains many more major defects.
  - The writer will consider whether they want to stop the QC process and improve the spec,
    - or whether they want to continue for another 30 minutes to gather more Major defect cases
      - (to better signal what they need to rewrite).

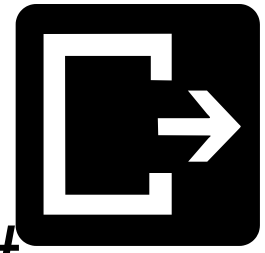


EI.P8:

- At the end of the checking time,
  - the writer
    - (or the checker if they decide to take reporting responsibility)
    - will calculate the estimated Majors/Page in the current document
    - (using formulas or tools supplied)
    - and will report (on a form or to a database)
      - all time used and results
      - (Majors found,
      - Majors/page estimated,
      - decision to Exit or not, etc.)

EI Exit Conditions



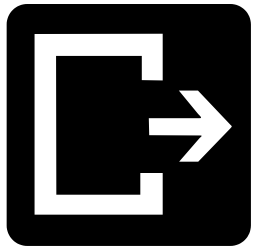


EI.X1: Defect Density Condition:#

- Estimated Major Defects remaining per page is less than 1 per 300 Non commentary words (initially until end 2003 10 Majors, to get a lenient start).#
- FORMULA FOR ESTIMATION:#
- Assume 33% effectiveness of the 2-checker checking-process.#
- Total Unique Majors acknowledged by writer, found in the sample logical page, times 3, gives a reasonable estimate of Majors/Page. This is before writer correction of known Majors.#
- Note: the effectiveness for a 3 checker group is slightly higher say about 40%. This figure needs to be determined by your own measurement.#

- OPTION: we might manage the exit level at an individual writer level to gradually motivate them to improve by about 50% (defect injection) less per iteration of the write and check cycle. <- KM idea – TG likes it!#

- NOTE: THE 33% effectiveness is based on experience, but it could vary, for example depending on the rate of checking used. The rate is controlled here because the time and the volume (a logical page) are controlled in the process.#



EI.X2:

- 'Writer Veto#
- 'The specification cannot exit if the spec writer wants more time to improve it.#

Last Slide!

- " !

  –"Tom!