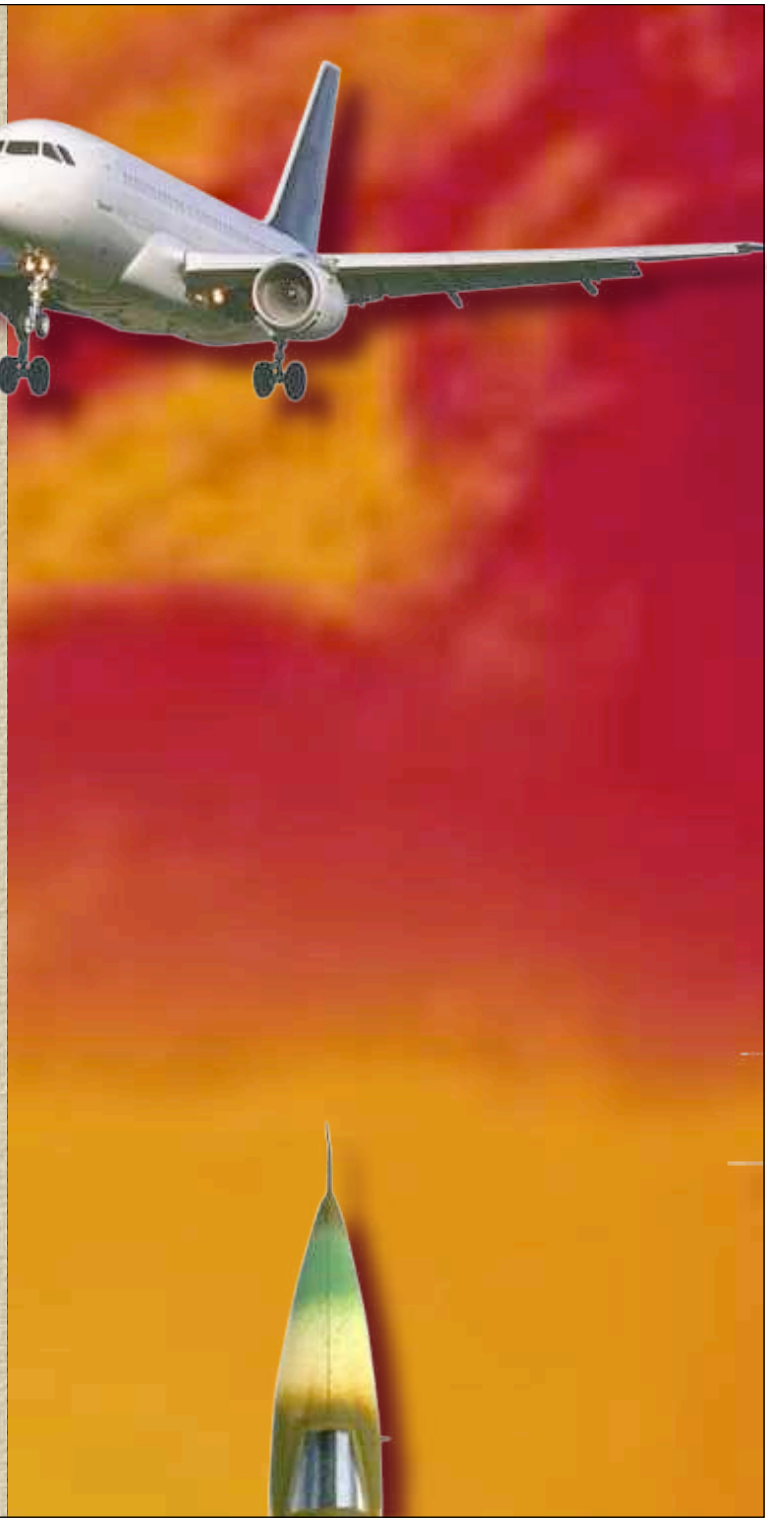
Case: Real Inspection

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

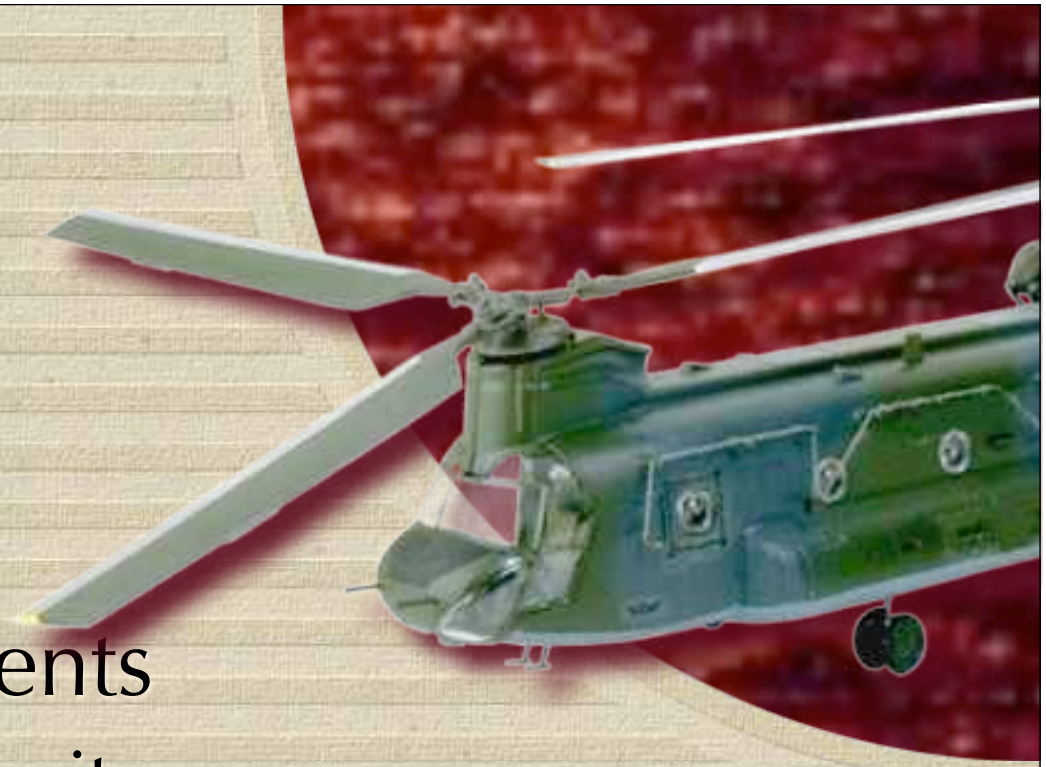
- This presentation shows
- how we carried out a short specification quality control process
- with senior/middle managers.



- 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

Introduced best practice **Rules**
for Requirements

1. **Unambiguous** to intended Readership

2. **Clear** enough to test.

3. **No** unintentional **Design**

(= ‘how to- be good’)

Explain the definition of **Defect**

- A Specification Defect is a **violation of a Rule**
  - 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 **cost more**
  - to find and fix
  - **later** in the development process
  - **than** it would cost **now**.

Agree with Management on Exit level

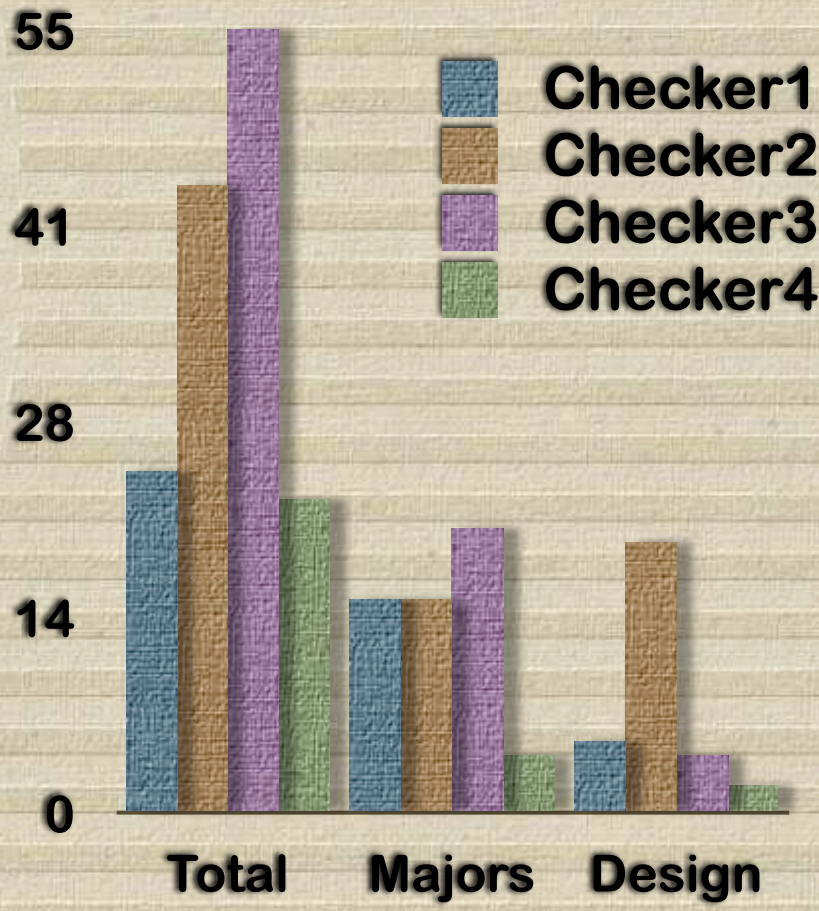
- **Exit Conditions:** (when Requirements can go to Design, Test etc. with little risk)
  - **Maximum 1 Major Defect / Logical Page**
  - Logical Page = 300 Non commentary words.

the Job

- You have up to 30 minutes
  - checking 1 requirements page (from an 82 page document)
- **Count all potential Rule Violations**

  = Defects
- Classify Defects as Major or minor

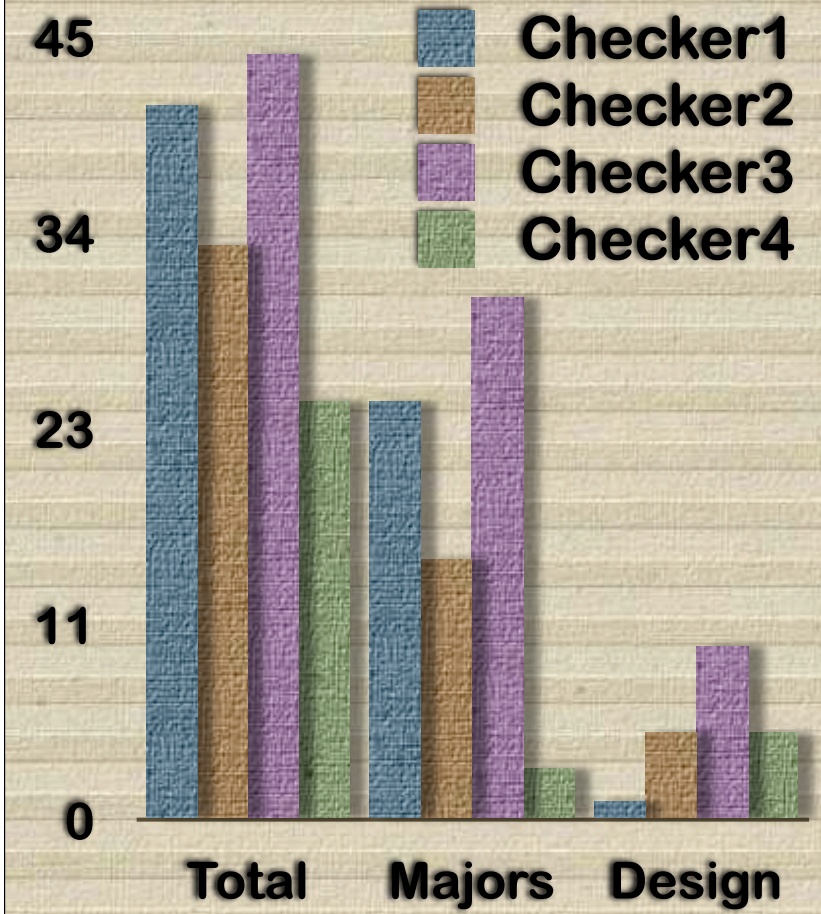
Report Page 81

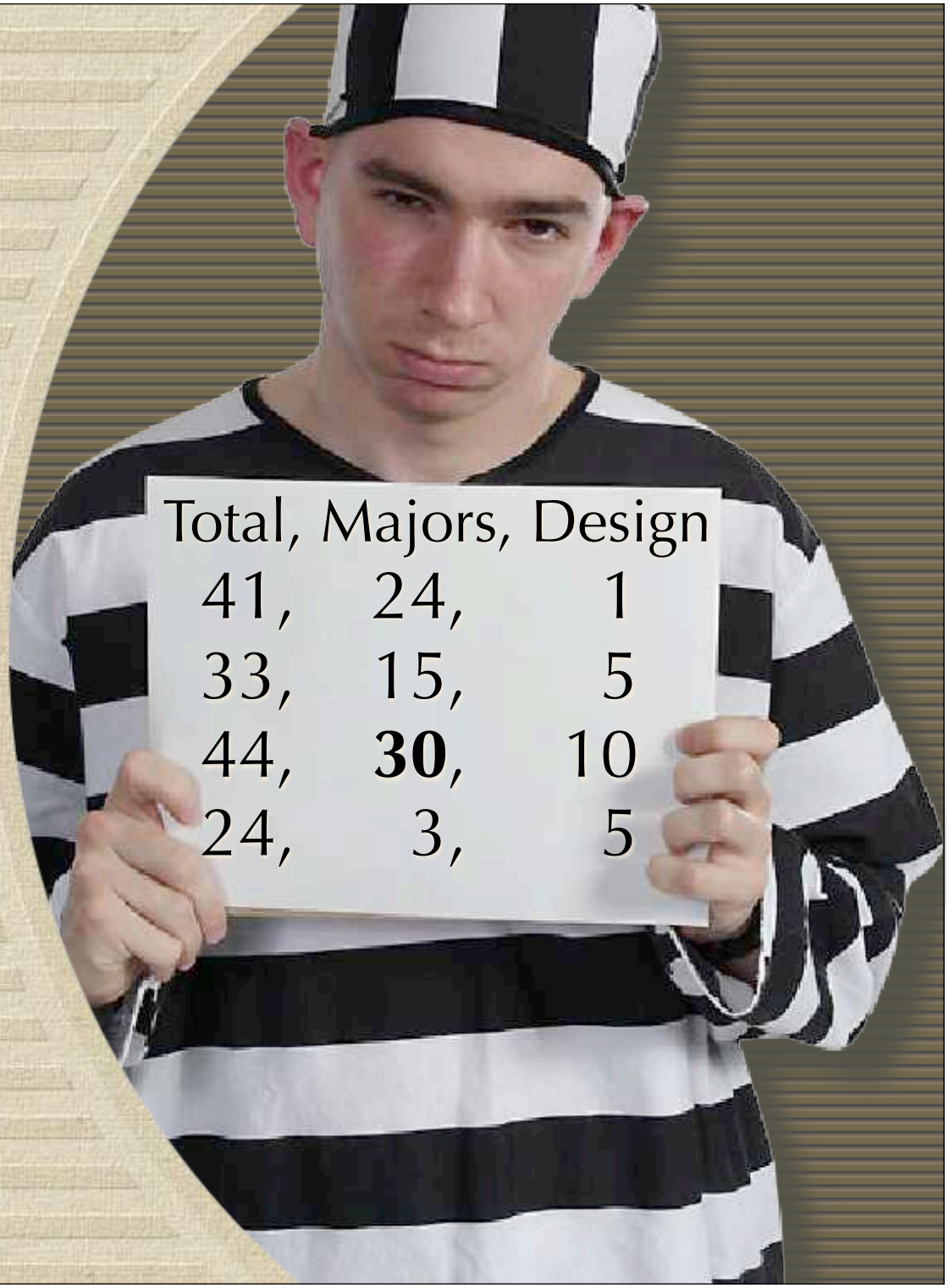


Defect Density Estimation

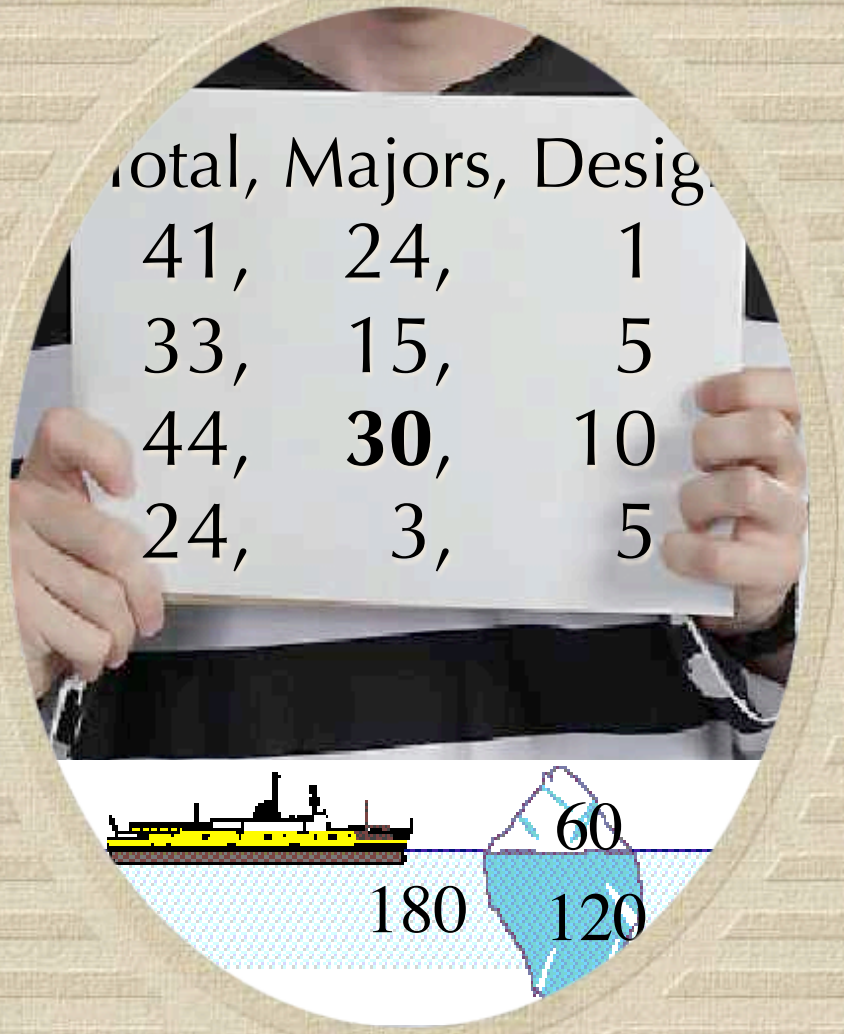
- Total for group (page 81)
  20 x 2 = 40 Majors
  assume are
  unique .
- If 33% effective,
  total in page = 3x 40=
  120 Majors .
- Of which 2/3 or 80 were not yet
  found.
  .
- If we fix all we found (40), then the estimated remainder of Majors would be 80 (not found) +8 not fixed for real = 88 Majors remaining.

Report Page 82





Defect Density Estimation



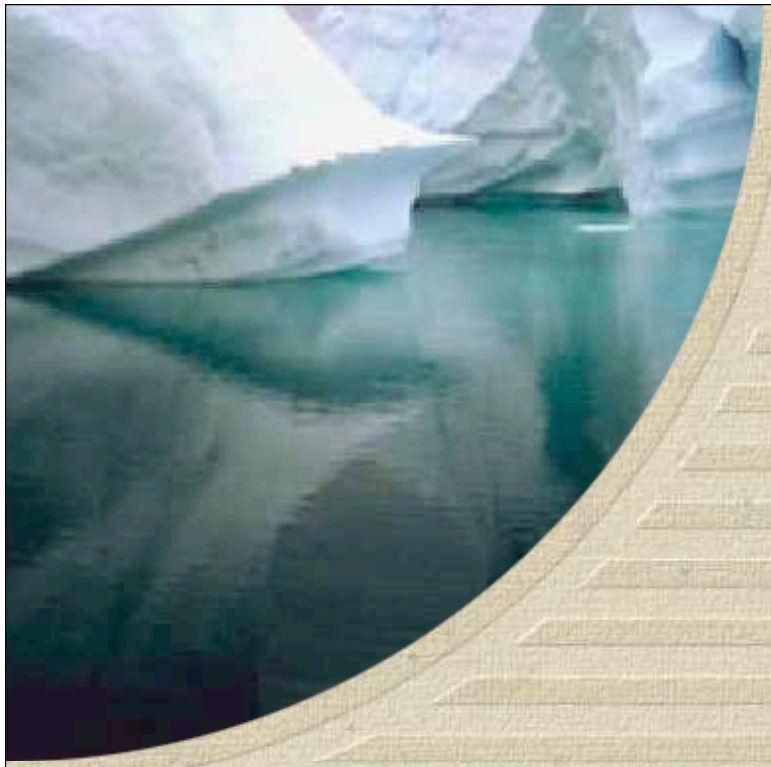
- Total for group (page 82)
  30 x 2 = **60** Majors
  assume are unique.
- If 33% effective,
  total in page = 3x 60 = **180**
- Of which 2/3 or **120** were not yet found.
- If we fix all we found (60), then the estimated remainder of Majors would be 120 (not found) +10 not fixed for real = 130 Majors 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 per page.
- 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 < 1.0 Major/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.

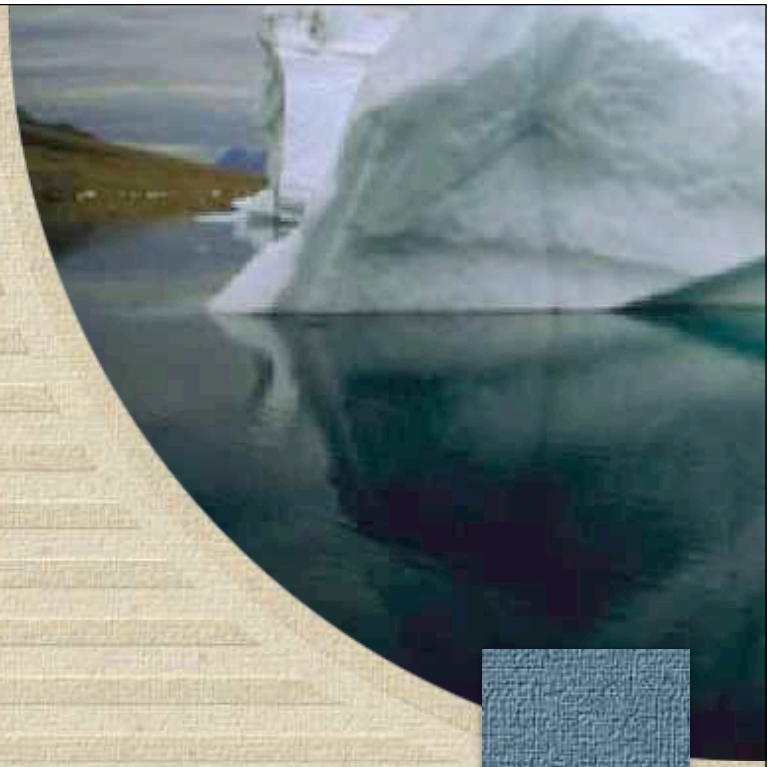


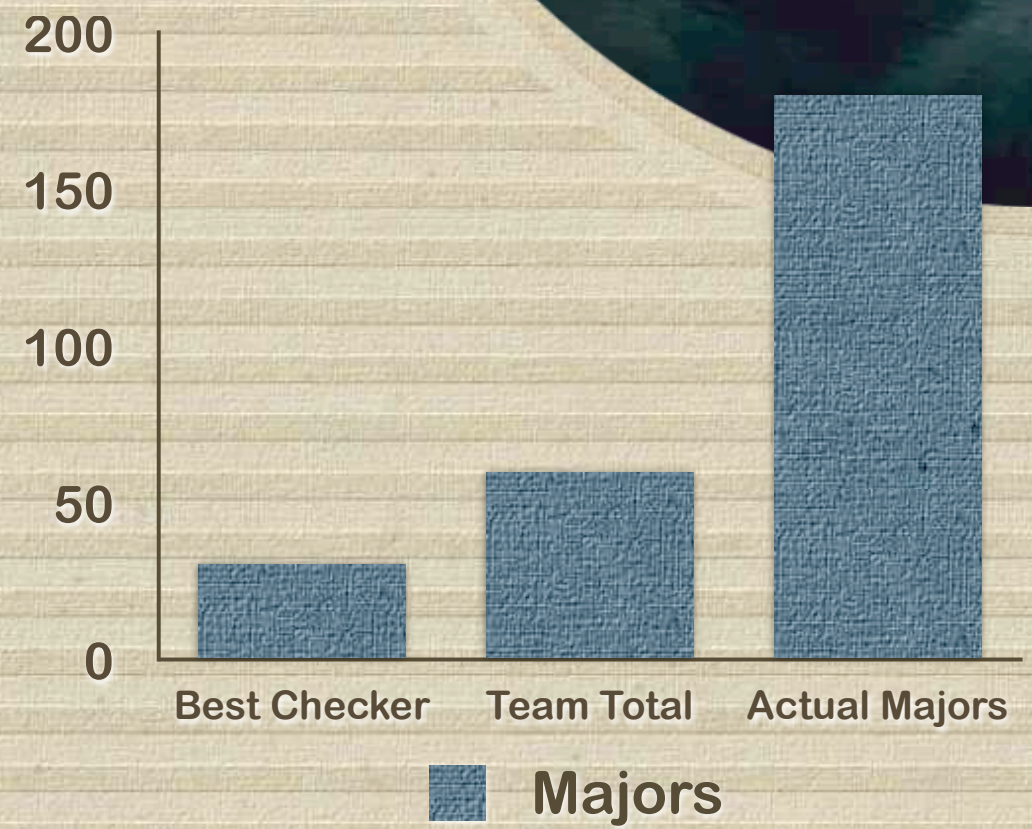
Estimated Project Loss

- 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 was over one year late)
  - 1 year = 2,000 hour x 10 people

Assumptions

- Small teams will find double that of a single person.
  - So, double the Majors found by the best checker to get a good estimate of total unique Majors found by the team
- Team is 30% Effective (unexperienced team checking for 30 min.)
  - So, multiply what the team found by 3.
  - 60 x 3 = 180 Majors/page





Letter to your boss

Boss!

Our sample shows that **we have 180 Majors/Page**.

You have **3 options** for the 82 page Requirements document.

1. **Remove by Inspection**: We can remove the defects using inspection at a cost of 180 hours per page, **14760 hours total**.

   ((180 * 1 hour) * 82 pages = 14760 hours)

2. **Rewrite**: We can rewrite the document from scratch at a cost of 10 hours per page, **820 hours total**.

3. **Ignore**: Do nothing and suffer 30% of these bugs and faults at test and in the field. The **cost will be approximately 49200 hours**.

   ((1/3 of 180 Majors) x 10 hours) = 600 hours per page * 82 pages = 49200 hours delay.)

We suggest rewrite (changing the process of writing to avoid defect injection rate).

But **you have said you are against this**. **So we have to tell you that your option will delay our project by 49,200 hours.**

Our project has 10 people on it, and they can do about 2,000 hours per year. So that is 20,000 work hours per year for our team. The approximate delay for your decision not to rewrite is about **2.5 years worse Time To Market.**

We will of course do what you say, but we wanted to be sure that **you understood what your boss will blame you for later.**

Your Loyal Servant, Tom

Feedback on this “simple “formula

Tom,

Since returning from the QAI Conference in Orlando, I've been attempting to lay the foundation for our product team to develop clear requirements and implement productive inspections as opposed to just going through empty motions. It's definitely been an uphill effort.

One bright moment was my use of the formula that you provided me to estimate the # of high-severity bugs still in a software product. I applied it to our product's Test Pass 1 and then forwarded the estimated number of remaining bugs after Test Pass 1 to the count estimated to still be in the product when we began Test Pass 2.

This provided me with a prediction of the number of high-severity bugs that would be found which was within 5% of the number actually found during Test Pass 2. :-)

I can't tell you how much that relatively simple activity buoyed my spirits. Thank you for the time you spent with me in Orlando.

Thanks,

Jeff Finn, CSTE, CQA
Microsoft SharePoint Portal Server
425-703-4213, jfinn@exchange.microsoft.com

May 22 2001

I also contacted James Tierney and Tom Gilchrist upon my return to Seattle. Both have been most complimentary about your consulting stints with their respective groups and the groups' resulting productivity improvements. Both of them also indicated, that over the time since you were here, the productivity gains have deteriorated similar to making Xeroxes of Xeroxes. James provided me some basic information on his team's implementation of inspections. I still need to follow up with him for more in-depth information about the current status of inspections with his original group.

I remember that you were due to be on the West coast (of North America) in near future and was wondering if your plans included being Seattle area. If yes, might you have some time available for some informal client prospecting with my group at Microsoft?

More feedback

Love the slides on in-process document review.

We are using this with requirements documents, and have been able to **double the quality** of the documents with only a **few hours of effort**.

Erik Simmons, Intel, Oregon
erik.simmons@intel.com

January 9th 2002

Thank you!

Tom Gilb

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