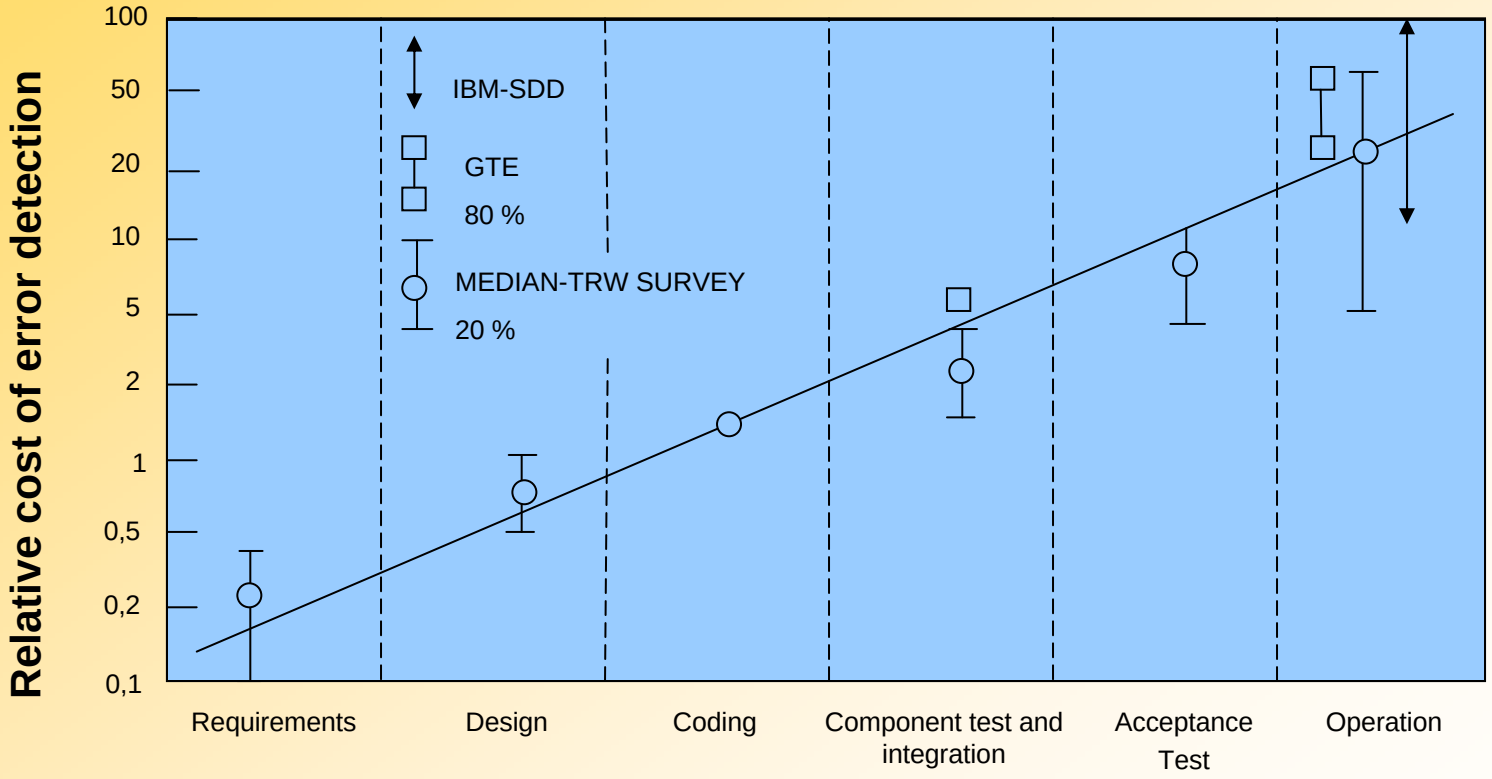
Reviews

Cost of delayed error detection



Phase where the error is detected

/Boehm 76 /

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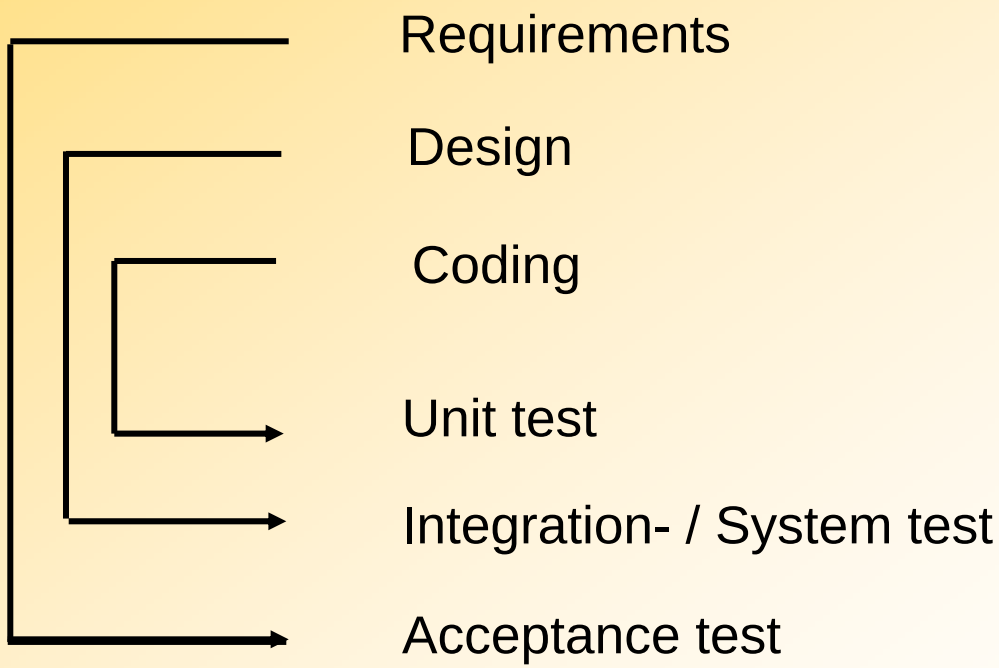
Early errors are detected lately



Reviews

- Goal
  - To **detect** errors in an intermediary result **at an early stage**, thus increasing productivity and product quality
- Approach
  - A review is a **formalized, critical** check of work results by **more than one** reviewer

Reviews are the most efficient and best method to reduce cost and improve quality

Capers Jones
4th World Congress for Software Quality 2008

GOOD QUALITY RESULTS > 90% SUCCESS RATE

- Formal Inspections (Requirements, Design, and Code)
- Joint Application Design (JAD)
- Software Six-Sigma methods (tailored for software projects)
- Quality Metrics using function points
- Quality Metrics using IBM's Orthogonal classification
- Defect Removal Efficiency Measurements
- Automated Defect tracking tools
- Active Quality Assurance (> 5% SQA staff)
- Utilization of TSP/PSP approaches
- => Level 3 on the SEI capability maturity model (CMM)
- Formal Test Plans for Major Projects
- Quality Estimation Tools
- Automated Test Support Tools
- Testing Specialists
- Root-Cause Analysis

SWQUAL08\21

Reviews in SEM process (Siemens)

- Reviews are mandatory (provided the respective documents are required for the project) for:
  - User Requirements Spec.
  - Tender
  - SW Requirements Spec.
  - Feasibility study
  - Project plan
  - QA plan
  - Architectural design spec.
  - Detailed design spec.
  - Adaptations specification
  - Test plan
  - Product documentation
- Reviews of other documents are useful and therefore recommended
- The review scope of a project is defined in the QA plan
- All other documents need to be submitted at least to an informal type of check

Intensive Inspection

- Elaborated by Michael Fagan
- Review method with best effectivity and efficiency
- Fagan varied and measured determining factors (number of participants, duration, roles, etc.)

Defined roles

Defined procedure

Best success

Roles in an intensive inspection

Author

- Releases work result for review
- Gives overview
- Corrects errors

Facilitator

- Organises and moderates inspection
- Writes the report
- Verifies error correction
- Is responsible for effectivity of session

Reader

- Guides through the document in the session
- Presents the content with his own words

Tester

- Checks review object from the point of view of a tester

Phantom inspector

Intensive Inspection in 7 steps

▪ Planning	Documents, participants, location, roles, date	
▪ Overview	Introductory information for the team (10 min.)	
▪ Preparation	Individual preparation for the role	
▪ Inspection	Detecting errors (max. 2 hours)	Session
▪ Analysis	Failure cause, process errors, systematic errors	
▪ Rework	Clear all faults	
▪ Verification	Have all faults been cleared?	

Review vs. development meeting

Development meeting

- Work product is in process, design idea, …
- Goal: find an agreed solution
- Ideas, suggestions, opinions

Review

- Review object is ready from the point of view if the author
- Goal: detect errors
- Reference document to decide what is an error

Expenditure of time

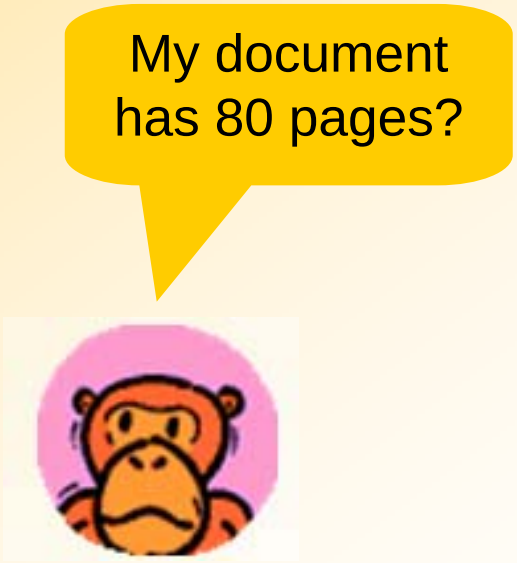
Preparation

- Code: 100 LOC / hour
- Document: max. 10 pages / hour

Inspection

- Code: 125 LOC / hour
- Document: max. 12 pages / hour

- Duration of a meeting:
- 2 (max. 3) hours per meeting



Review techniques

- Reviews in comment technique
  - General reviews in comment technique
  - Document Development Control
- Reviews in session technique
  - General reviews in session technique (walkthrough..)
  - Intensive inspection
- Project-specific selction of methods in the QA plan

Selection of review team members

- Members of the project team

  (have to understand the review object but need not necessarily be as good as the author)

- Experts from other projects

  (mutuality, be prepared to review in other projects)

- External experts

- For requirements documents: representative of the customer or user

Plan in time - else nobody has time

Intensive Inspection

- Elaborated by Michael Fagan
- Roles
  - Facilitator
  - Author
  - Reader
  - Tester
- Language specific checklists
- Time required
  - Preparation: 100 LOC/h, document max. 10 pages/h
  - Inspection : 125 LOC/h, document max. 10 pages/h
- Error review
  - in the product
  - in the process

Utilities

- Templates for documents
- Index of contents
- Checklist for documents

- Language specific checklist for code

- Checklists from former reviews (result of analysis)

- Net meeting
- Video conference

Not like this !

Comment technique

Pro

- No session
- No limit of participants
- No traveling cost
- No appointment problem

Contra

- No immediate clearance of misunderstandings
- No immediate feed back to participants
- No phantom inspector

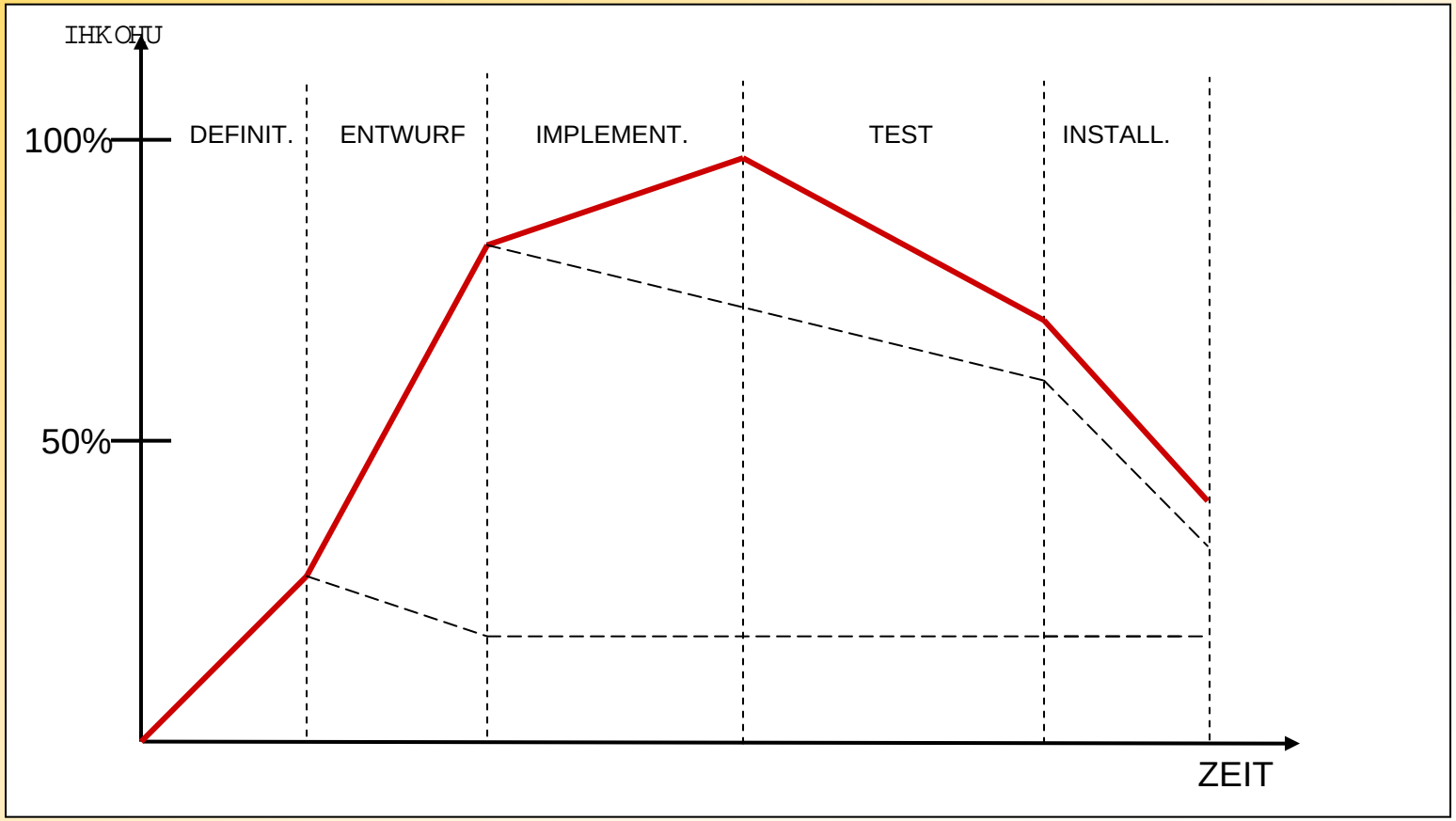
Commentary list with response from the author is very important

Procedure of review in comment technique

- Author starts review
- Organizer distributes review object and reference documents
- Participants check and write comment list
- Organizer collects comments (at best in an overall comment list)
- Author responses (will be corrected, is no error, enquiry,..)
- Discussion of open questions or controversial comments in a session if necessary
- Author reworks
- Verification of corrections by QA Manager or organizer

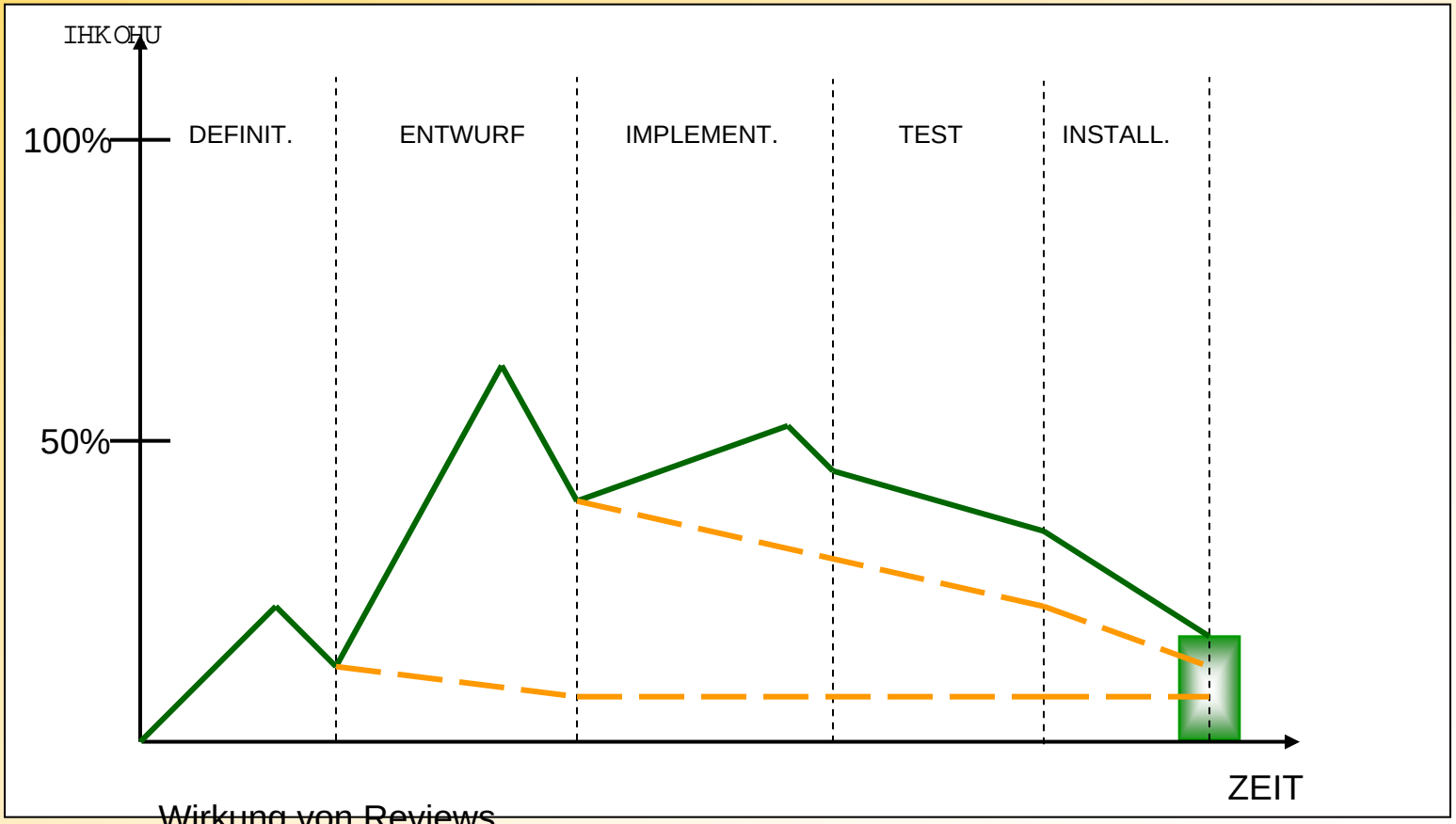
Accumulated errors (I)

without checks in early phases



Accumulated errors (II)

with checks in early phases



Wirkung von Reviews

Review Metrics

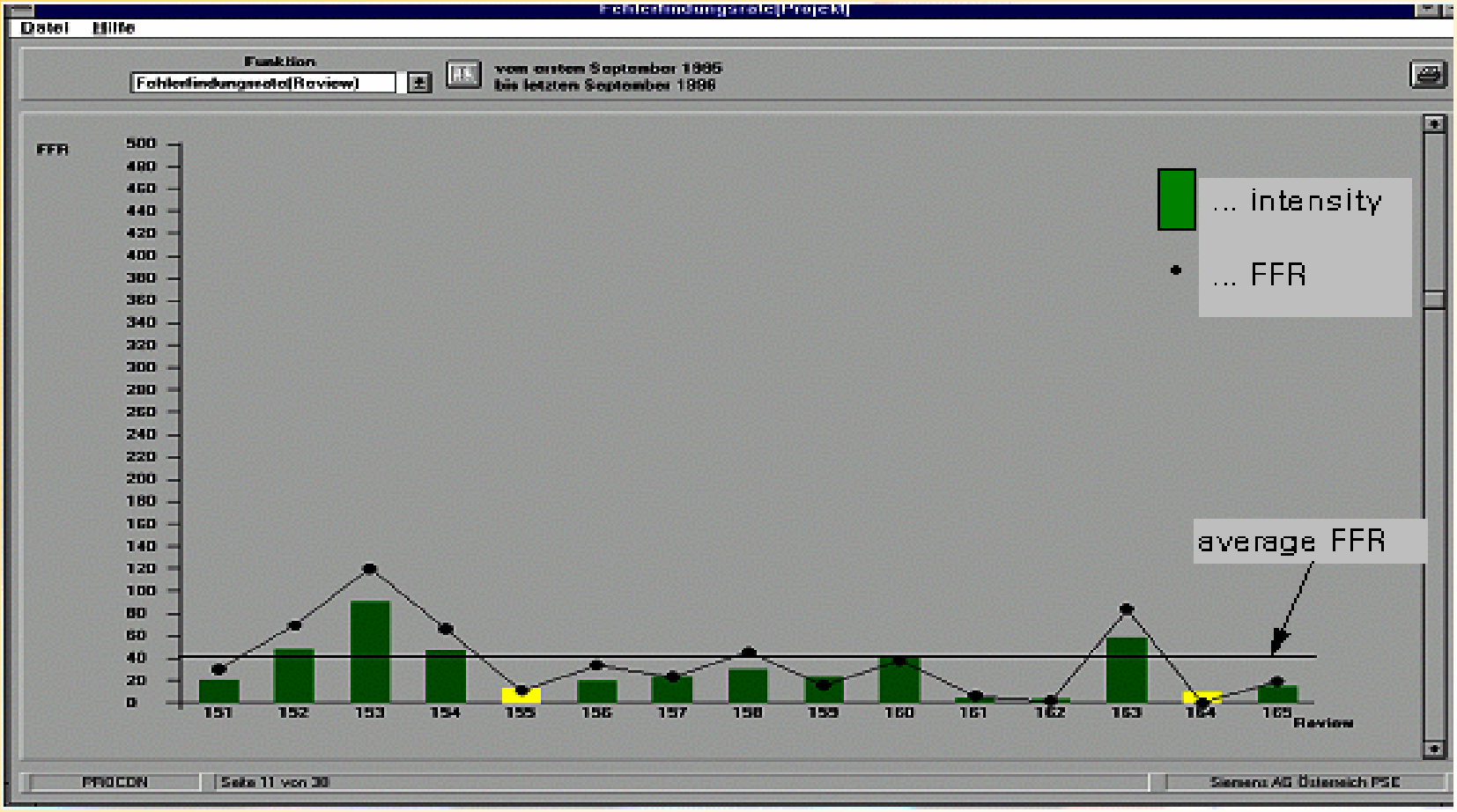
Error detection rate	[Errors / 100 pages]
Intensity	[h / 100 pages]
Efficiency	[h / errors]
Effectivity	[errors detected / total errors]

Error detection rate EDR

$$EDR = \frac{\text{Errors detected}}{\text{Reviewed pages}} \; 100$$

EDR = 17 ???

EDR Diagram


Datei Hilfe
Funktion
Fehlerfindungsrate(Review)
vom ersten September 1995
bis letzten September 1996
FFR
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400
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Review
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Seite 11 von 30
Siemens AG Österreich PSE

Early Findings

General observations

- Average EDR is independent from development platform and application domain
- EDR and intensity is high for small documents (<4 pages)
- Strong correlation between intensity and EDR
- Efficiency is about one hour per defect
- Variation is large

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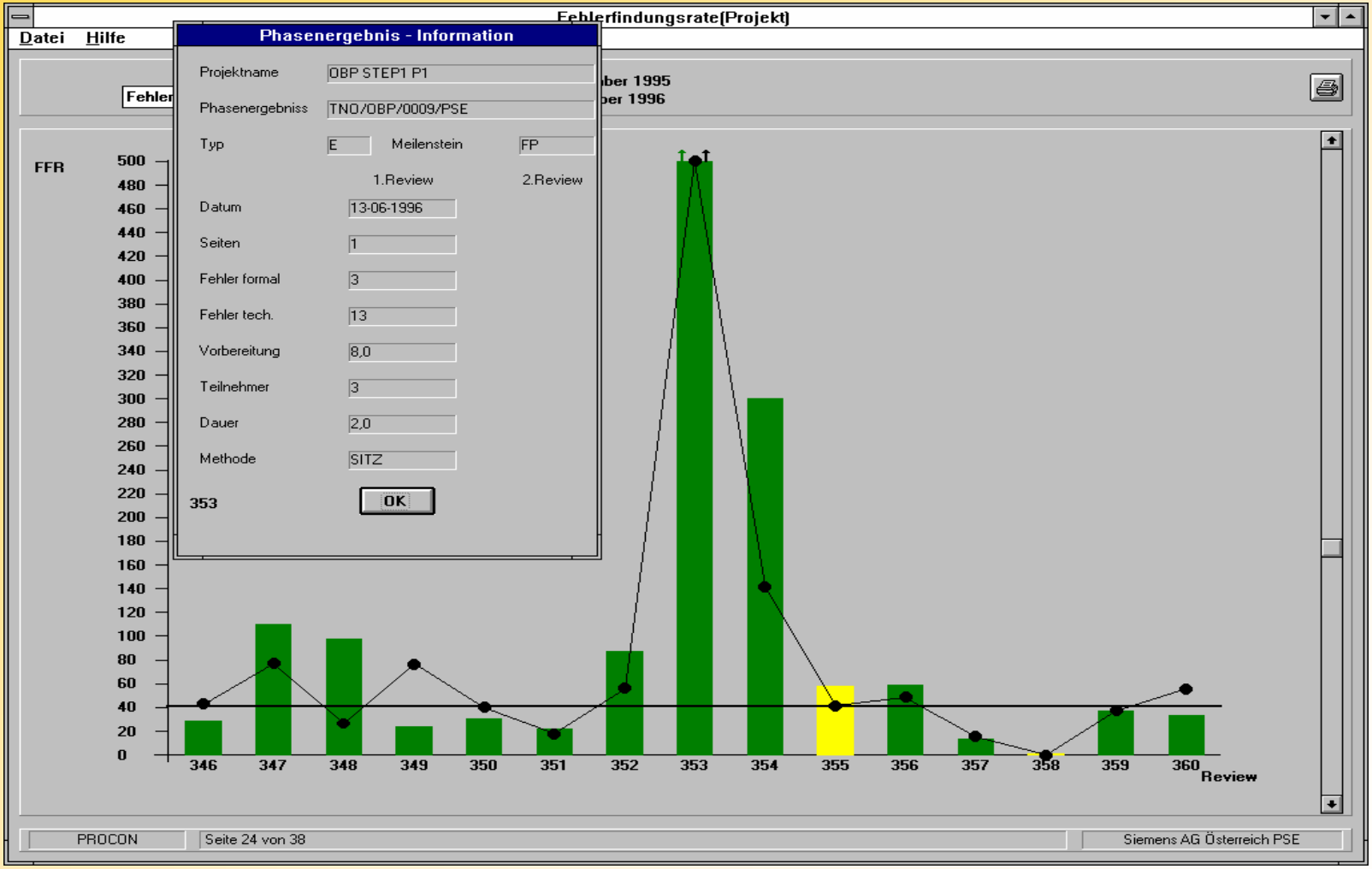
Error Detection Rate



Data Variation

Data from 1104 Reviews (1995)

Average EDR= 37 for all reviews (all methods)
Averages of the departments:

EDR = 19, 22	34, 36, 38, 43, 45, 47	72, 90
ignoring counting conventions		42 Reviews

Intensive Inspections: average EDR = 80

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Error detection rate (Organization)