Defining the Decision Factors for Managing Defects: A Technical Debt Perspective

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Power and automation are all around us
You will find ABB technology…

Orbiting the earth and working beneath it,

Crossing oceans and on the sea bed,

In the fields that grow our crops and packing the food we eat,

On the trains we ride and in the facilities that process our water,

In the plants that generate our power and throughout our homes.
Outline

- Background
- Focus and Methodology
- Findings
- Conclusion
Objective

- Evaluate how do Change Control Boards (CCB) make decisions on when to fix a defect
- Does technical debt apply to the decision making process?
Defects as Technical Debt

- When is a defect technical debt?
- Classifications of technical debt
  - Intentional
    - Sort term
    - Long term
  - Unintentional
Change Control Boards (CCB)

Meets regularly to approve work that makes changes to a product (features and defects)

Decisions regarding defects:
- Fix in current release
- Defer fixing
- Do not fix
Methodology

1. Select subject matter experts
2. Construct interview questionnaire
3. Study defect history data
4. Conduct interviews via telephone
5. Confirm interview responses
6. Qualitative data analysis
7. Review conclusions with all participants
Interviews of Change Control Board (CCB) Subject Matter Experts

CCB participants in 2 products

CCB Participants:
• Technical Product Manager
• Product Manager
• Test Manager
• Project Manager.

Average 7 years experience per participant

Products > 500k SLOC each
Open questions to participants:

- Decision factors?
- Cost Categories?
- Actual costs?
- How do costs change with different decisions?
- Were there positive/negative consequences of each decision?
Findings: Decision Factors for CCB’s

Decision factors for when to fix a defect:

- **Severity**
  - Existence of a workaround
  - Urgency of fix required by customer
  - Effort to implement the fix
  - Risk of the proposed fix
  - Scope of testing required

CCB teams make complex decisions with mostly qualitative criteria.
Findings: Cost Categories and Decisions

- **Fix**
- Investigation
- Modification
- Validation

Fix in the current release for a discovered defect
Findings: Cost Categories and Decisions

- Fix
  - Investigation
  - Modification
  - Validation

- Defer Fix
  - Workaround
  - Validation
  - Customer support
Findings: Cost Categories and Decisions

Fix
- Investigation
- Modification
- Validation

Defer Fix
- Workaround
- Validation
- Customer support
Findings: Cost Categories and Decisions

- **Fix**
  - Investigation
  - Modification
  - Validation

- **Defer Fix**
  - Workaround
  - Validation
  - Customer support

- **If Must Patch**
  - Investigation
  - Patch
  - Validation
Findings: Costs in relative terms
Findings: Costs in relative terms

Fix

Defer Fix

Principal + Interest
Findings: Costs in relative terms

- **Fix**
- **Defer Fix**
- **If Must Patch**

1. **Principal**
2. **Interest**
3. **Penalty**
Findings and Opportunities

- **Findings:**
  - Severity of impact to the customer’s operation is the key factor
  - Deferring a defect introduces interest cost and risk of penalty

- **Opportunities**
  - Apply cost-benefit analysis for decision support
Conclusions

CCB’s:

- Manage current and future cost
- Use customer oriented decision criteria
- Balance Risk
- Fix/Defer decision can use cost-benefit analysis