

Software Technical Reviews: A Practical Guide

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Overview

The purpose of the proposed book is to concisely present effective techniques for software technical reviews (STRs) from a practical perspective that can benefit any organization. STRs are both one of the great success stories and one of the disappointments of software engineering. Inspections (a specific type of formal STR) are an established software industry best practice and have ranked among the most effective quality practices available for nearly 25 years. However, most of the software development community does not yet perform STRs routinely and effectively. A minority of attendees at the author's seminars are even familiar with inspections, let alone actually practice them.

This gap between known industry best practice and actual performance may be due partly to the absence of straightforward, readable books on the topic. Most available books on inspection have taken a formal and rigorous approach that can be intimidating to readers trying to get started. The short, flexible, nondogmatic, and clearly written approach is likely to be better received.

Besides presenting the specific technique of inspection, the book will describe several less formal peer review methods. The objective is to give the reader a flexible set of review approaches that they can use to meet their quality improvement goals. The material will be presented in a way that is usable by any practicing software development, quality, or management professional, and by undergraduate or graduate students in a computer science, software engineering, or a related curriculum.

There are many published articles on software reviews. However, most practitioners are not acquainted with this literature, which contributes to the gap between the available body of knowledge and current industrial practice. Many articles demonstrate the benefits of inspections; they are one of the few software quality practices for which extensive quantitative data is available. Highlights of this data will be presented in the proposed book to justify the business value of performing reviews.

Synopsis of Topics Covered

The book will define the general practice of peer review and will succinctly describe several review methods that cover a spectrum of process formality and rigor. The important social, cultural, and psychological issues of asking someone to find errors in your work are also addressed. These topics include desired and inappropriate participant behaviors, and a discussion of the risks of a manager using review data to evaluate an individual's performance.

Several chapters will describe inspection. Various inspection methods have been published; this book will emphasize the Fagan method, but will relate it to other approaches. It will not present Yet Another Inspection Method, but will summarize the current wisdom in this

area in a highly practical fashion. The inspection stages are treated in chapters that address: inspection planning; overview meeting and individual preparation; inspection meeting; rework, follow-up, and causal analysis.

Other chapters describe the process assets that an organization should develop to support peer reviews, keeping records of review data, and leading edge inspection experiences from the recent literature. Key success factors for a technical review program are also discussed, including human factors and attitudes, necessary support elements, and recommendations on how to implement STRs in an organization successfully.

Outstanding Features

- The author has an established reputation in the software industry for providing practical solutions for process improvement, quality engineering, requirements engineering, and project management.
- The techniques presented in the book can help improve the quality of any software-containing product or system.
- The book is unique in being much shorter, easier to read, and more practical than any of the existing books in this niche.
- Many examples and anecdotes of STR experience, drawn from the author's personal experience or contributed by colleagues and reviewers, will be included to make the material more pertinent and lively.
- Various work aids will be included to help the reader get started with STRs. Many of these items are already available for public downloading on the author's website (www.processimpact.com). These work aids include:
 - ✓ forms for recording review results
 - ✓ inspection checklists listing typical defects found in various software work products
 - ✓ a sample peer review process description
 - ✓ lists of entry and exit criteria for inspecting different types of work products
 - ✓ a set of spreadsheets for storing and manipulating metrics data from reviews

Marketing Information

Marketing Hooks

The appeal of this book will be in its emphasis on immediately applicable, practical approaches to STRs, and a conversational, easy-to-understand writing style similar to that found in the author's previous books and articles. This readability is in contrast to most of the current offerings in this field. Extensive references will be provided to the original literature on STRs. The book is structured such that the reader can read just those portions of immediate interest, rather than having to start at the beginning and read the chapters sequentially.

The three major current books in this field average 425 pages and are priced in the \$40-\$50 range. This book should be made attractive to a broad audience of software developers and managers, by keeping the length to 225 pages or fewer and the price under \$35 in paperback.

Audience Profile

This book has a potentially large readership drawn from any software development organization: commercial, management information systems, Internet, or contract. Every project team member, including the less technical team members, is a potential participant in a technical review and hence would benefit from the material presented in this book. Interest in peer reviews is also stimulated by the Capability Maturity Model for Software, which identifies peer reviews as one of the key process areas an organization must master to achieve CMM maturity level 3. The techniques described in the book are applicable not only to software projects and products; they can be applied to any type of interim or final technical work product. The book would be suitable as a text for classes on software quality at the undergraduate and graduate level.

The author has given many presentations on software technical reviews at conferences, companies, and public seminars. In addition to the predominant audience of software developers, audiences have included project managers, business analysts, quality engineers, testers, process improvement leaders, documentation writers, and end users. All of these potential readers will find the material easy to understand and apply.

Prerequisites

The reader requires no prior or specialized knowledge or previous experience with reviews to understand and apply the material in the book. The only prerequisite is a desire to improve the quality of the software-containing products that the reader's organization develops.

Reader Benefits

Readers will be able to accomplish the following by applying the contents of this book:

- Install an effective technical peer review program in their organizations.
- Develop higher quality software products that achieve greater customer satisfaction and have reduced maintenance and support costs.
- Reduce project rework, thereby improving productivity, by improving the quality of all software work products throughout the project's development cycle.
- Select appropriate reviewing techniques for various situations and work products.
- Implement a variety of peer review processes in their organizations.
- Keep records of review data that can assist with process and quality improvement activities.
- Share project knowledge among team members, thereby reducing the risk of a key team member departing with critical project information that exists only that one person's brain.

About the Competition

***Software Inspection Process*. Robert G. Ebenau and Susan H. Strauss. New York: McGraw-Hill, 1994; 362 pages; \$47.00.** This comprehensive text covers every aspect of formal (Fagan) inspections of software work products in considerable detail. Other types of technical reviews are treated only superficially. The core of the book is Chapter 8, a 46-page "Software Inspection Procedures Manual." Extensive sections are included on implementing and managing inspections in an organization, inspection data analysis, and education and support for inspections. Guidance is provided around the roles of each inspection participant during each step of the multi-stage inspection process. Another chapter addresses ways to inspect non-software work products, such as documentation, hardware, and training course materials. A 40-

page appendix describes a PC-based tool for the management of inspection data. This is probably the most useful current book on inspections, but it is rarely cited in the literature and its Amazon.com sales rank is extremely low, suggesting poor sales.

Overall, this is a thorough treatment of the mechanical details of software inspection, but the psychological, sociological, and cultural aspects of this highly interactive activity are neglected. The proposed book will devote considerable content on these essential aspects of reviews. It will be easier to read than Ebenau and Strauss and will not address only a single type of inspection activity, but a range of review methods and different inspection techniques. However, the dominant inspection approach described in detail in the proposed book is the same method as that in Ebenau and Strauss.

***Handbook of Walkthroughs, Inspections, and Technical Reviews, 3rd Ed.* Daniel P. Freedman and Gerald M. Weinberg. New York: Dorset House Publishing, 1990; 450 pages; \$49.95.** Employing an unusual question and answer dialog format, this book covers the technical, managerial, and personal aspects of software review activities. The presentation is easy to read, conversational, and nondogmatic. Specific formulations of review approaches, such as inspection, are downplayed, with the focus being more on technical reviews in general. The unconventional dialog approach is weaker than a more traditional architecture for presenting factual material, making it difficult to find information on a specific topic. It serves more as a reference or troubleshooting guide than a straightforward tutorial, as the proposed book will be.

***Software Inspection.* Tom Gilb and Dorothy Graham. Reading, Mass.: Addison-Wesley, 1993; 471 pages; \$49.95.** In the most widely cited book on inspections, Gilb and Graham present a thorough treatment of the inspection method, including certain extensions and modifications to the method. They have changed the terminology used in Fagan's method substantially, for reasons that are not entirely clear. A short chapter is included on overcoming the difficulties with beginning an inspection program. Nearly 100 pages consist of chapters written by people from six companies, describing their experiences with inspection programs. These authors emphasize collecting and analyzing a wide variety of inspection metrics as a tool for quantifying products and processes. A 16-page glossary of inspection terms and metrics definitions is included. The terminology, rigor, and formalisms of the inspection method presented by Gilb and Graham do not make the material appealing to the majority of software engineers. For example, the authors describe more than 50 inspection metrics, which is overwhelming to most people. In contrast, the proposed book will be about half the length and will focus on practical and flexible application of a variety of technical review methods and a small set of basic metrics.

***Software Inspection: An Industry Best Practice.* David A. Wheeler, Bill Brykczynski, and Reginald N. Meeson, Jr., editors. Los Alamitos, Calif.: IEEE Computer Society Press, 1996; 325 pages; \$38.00.** Some of the key papers from the rich literature of articles on inspections and other peer reviews is available are collected here. In contrast to the proposed book, such anthologies don't serve as a useful, practical, complete tutorial for the beginning reader. However, they provide useful details for the more sophisticated reader who is ready to delve into the original literature.

Status of the Work

I am now researching the book and assembling notes for the chapters. The target date for delivering the first half of the manuscript is April 1, 2001. The complete manuscript will be delivered by July 15, 2001. Draft chapters will be posted on the author's web site at www.processimpact.com as they become available and public review will be invited.

Approximately 12-15 reviewers from different companies and backgrounds will be enlisted to review draft chapters. The planned editing and production schedule must include enough time for a final review and minor modification cycle between the initial manuscript editor/author review cycle and the final proofreading of composed pages.

I anticipate a final length of approximately 65,000 words (not including TOC and index). The book will include approximately 15 simple line-drawn figures and several relatively simple tables. I will render initial versions of the figures, but they would benefit from improvements by a graphic artist.

I will supply a comprehensive list of candidate index terms and will ask the publisher to generate the index, which I would like to proofread.

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Biography

Karl E. Wiegers is Principal Consultant with Process Impact, a software process consulting and education company. Previously, he spent 18 years at Eastman Kodak Company, where he held positions as a photographic research scientist (4 years), software applications developer (9 years), software manager (3 years), and software process and quality improvement leader (5 years). His writing and teaching are based largely on his experience in improving processes, technical practices, and quality practices in all of these situations. He has participated in or led dozens of technical reviews since 1988.

Karl received a B.S. degree in chemistry from Boise State College, and M.S. and Ph.D. degrees in organic chemistry from the University of Illinois. He is a member of the IEEE, IEEE Computer Society, and ACM. He presently serves on the Editorial Board for *IEEE Software* magazine. Previously he was a Contributing Editor for *Software Development* magazine.

Karl is the author of two previous books, and he has written more than 130 articles on many aspects of software engineering and management, chemistry, and military history over the past 25 years. He is a frequent speaker and invited keynoter at software conferences, public seminars, and professional society meetings. As an independent consultant, Karl presents training seminars and consulting engagements at companies worldwide on software technical reviews, requirements engineering, process improvement, risk management, and related topics. He has worked with more than 45 companies in many different industry sectors since 1997. A current list of clients is available at Karl's website at www.processimpact.com/consult.shtml

Karl has written several articles about STRs, and one chapter of his first book, *Creating a Software Engineering Culture*, addressed them. The topic also appeared in his second book, *Software Requirements*, specifically emphasizing how STRs apply to requirements documents. During the past six years he has presented more than 30 half- and full-day seminars on STRs at

many companies, conferences, and public seminars, as well as consulting with several companies on improving their technical review practices.

Previous Books

Software Requirements, Microsoft Press, 1999, 350 pages, ISBN 0-7356-0631-5; sales through June 2000 approx. XX; won Productivity Award from *Software Development* magazine.

Creating a Software Engineering Culture, Dorset House, 1996, 358 pages, ISBN 0-932633-33-1; sales through June 2000 approx. XX; won Productivity Award from *Software Development* magazine.

Recent Articles

1. "Just Too Much to Do," *Software Development*, vol. 8, no. 9 (September 2000), pp. 65-68.
2. "When Telepathy Won't Do: Requirements Engineering Key Practices," *Cutter IT Journal*, vol. 13, no. 5 (May 2000), pp. 9-15.
3. "Personal Process Improvement," *Software Development*, vol. 8, no. 5 (May 2000), pp. 65-69.
4. "Stop Promising Miracles," *Software Development*, vol. 8, no. 2 (February 2000), pp. 49-54.
5. "Karl Wiegers Describes Requirements Traps to Avoid," *Software Testing and Quality Engineering*, vol. 2, no. 1 (January/February 2000), pp. 34-40.
6. "A Modular Software Process Mini-Assessment Method" (with Doris Sturzenberger), *IEEE Software* vol. 16, no. 1 (January/February 2000), pp. 62-69.
7. "Requirements and the Software Customer," *Software Development*, vol. 7, no. 12 (December 1999), pp. 34-37.
8. "Secrets of Successful Project Management," *Software Development*, vol. 7, no. 11 (November 1999), pp. PM1-PM4.
9. "Process Improvement that Works," *Software Development*, vol. 7, no. 10 (October 1999), pp. 24-30.
10. "Lessons Learned from Tool Adoption," *Corporate Developer's Survival Guide in Software Development*, vol. 7, no. 10 (October 1999), pp. 12-14
11. "First Things First: Prioritizing Requirements," *Software Development*, vol. 7, no. 9 (September 1999), pp. 48-53.
12. "Software Process Improvement in Web Time," *IEEE Software*, vol. 15, no. 4 (July/August 1999), pp. 78-86.
13. "Automating Requirements Management," *Software Development*, vol. 7, no. 7 (July 1999), pp. S1-S5.
14. "A Software Metrics Primer," *Software Development*, vol. 7, no. 7 (July 1999), pp. 39-42.
15. "Writing Quality Requirements," *Software Development*, vol. 7, no. 5 (May, 1999).
16. "Why is Process Improvement So Hard?," *Software Development*, Web edition, (February, 1999).
17. "Improve Your Process With Online 'Good Practices'," *Software Development* (December, 1998).
18. "Read My Lips: No New Models!," *IEEE Software* (September/October, 1998).
19. "A Project Management Primer," *Software Development*, vol. 6, no. 6 (June 1998).
20. "Molding the CMM to Your Organization," *Software Development*, vol. 6, no. 5 (May 1998).
21. "The Seven Deadly Sins of Software Reviews," *Software Development*, vol. 6, no. 3 (March 1998).
22. "Software Process Improvement: 10 Traps to Avoid," *Software Development*, vol. 4, no. 5 (May 1996).
23. "Improving Quality through Software Inspections," *Software Development*, vol. 3, no. 4 (April 1995).

Recent Conference Speaking Engagements (keynotes, track sessions, tutorials, panels)

Inprise Developers Conference (1997-2000)
Rational Developers Conference (2000)
Software Development (1991-2000)
Practical Software Quality Techniques (1999)
Software Management (1999)
Software Engineering Process Group Conference (1997, 1999)
Cutter IT Summit (1998-1999)
Quality Week (1998)
Conference on Developing Strategic I/T Metrics (1998)
Pacific Northwest Software Quality Conference (1997)
International Conference on Software Quality (1997)

Recent Client Companies for Software Technical Reviews Seminars

West Group
Caterpillar
Sony Corporation
Epson Research and Development
Follett Software
Bankers Systems