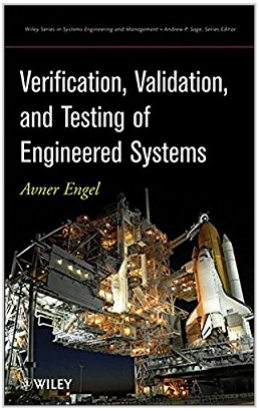


# Verification, Validation, and Testing of Engineered Systems

*By Avner Engel*



**Verification, Validation, and Testing of Engineered Systems** By Avner Engel

Systems' Verification Validation and Testing (VVT) are carried out throughout systems' lifetimes. Notably, *quality-cost* expended on performing VVT activities and correcting system defects consumes about half of the overall engineering cost. ***Verification, Validation and Testing of Engineered Systems*** provides a comprehensive compendium of VVT activities and corresponding VVT methods for implementation throughout the entire lifecycle of an engineered system. In addition, the book strives to alleviate the fundamental testing conundrum, namely: What should be tested? How should one test? When should one test? And, when should one stop testing? In other words, how should one select a VVT strategy and how it be optimized?

The book is organized in three parts: The first part provides introductory material about systems and VVT concepts. This part presents a comprehensive explanation of the role of VVT in the process of engineered systems (Chapter-1). The second part describes 40 systems' development VVT activities (Chapter-2) and 27 systems' post-development activities (Chapter-3). Corresponding to these activities, this part also describes 17 non-testing systems' VVT methods (Chapter-4) and 33 testing systems' methods (Chapter-5). The third part of the book describes ways to model systems’ quality cost, time and risk (Chapter-6), as well as ways to acquire quality data and optimize the VVT strategy in the face of funding, time and other resource limitations as well as different business objectives (Chapter-7). Finally, this part describes the methodology used to validate the quality model along with a case study describing a system’s quality improvements (Chapter-8).

Fundamentally, this book is written with two categories of audience in mind. The first category is composed of VVT practitioners, including Systems, Test, Production and Maintenance engineers as well as first and second line managers. The second category is composed of students and faculties of Systems, Electrical, Aerospace, Mechanical and Industrial Engineering schools. This book may be fully covered in two to three graduate level semesters; although parts of the book may be covered in one semester. University instructors will most likely use the book to provide engineering students with knowledge about VVT, as well as to give students an introduction to formal modeling and optimization of VVT strategy.

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**Verification, Validation, and Testing of Engineered Systems By Avner Engel Bibliography**

- Sales Rank: #138282 in Books
- Published on: 2010-06-15
- Original language: English
- Number of items: 1
- Dimensions: 9.70" h x 1.80" w x 6.40" l, 2.45 pounds
- Binding: Hardcover
- 712 pages

## Editorial Review

From the Back Cover
**A comprehensive collection of VVT activities and methods for system-wide implementation**

Verification, Validation, and Testing (VVT) is of extreme importance to systems engineering, where up to 60 percent of systems development cost is expended on VVT activities or correcting system defects. *Verification, Validation, and Testing of Engineered Systems* is the first resource to explain this process in a comprehensive, implementable manner. Through a practical approach, the text presents VVT activities performable throughout a system's lifetime, from system definition and design to system use and disposal.

Beginning with a thorough explanation of the role of VVT in the process of engineered systems, the book provides a much-needed quantitative, credible model that answers the key questions of what, how, and when one should test, as well as when to stop testing. It equips both new and experienced readers with statistical and fuzzy logic paradigms for quantitative VVT cost, time, and risk models to minimize uncertainties and risks in systems development.

- Explains the essence of systems' VVT and the linkage between VVT and systems development, manufacturing, use/maintenance and retirement
- Includes systems' development and post-development VVT activities, as well as non-testing and testing systems' methods for engineered systems
- Reveals how to acquire quality data and optimize the VVT strategy in the face of limitations and in accordance with different business objectives
- Describes the methodology used to validate the quality model along with examples outlining a system's quality improvements
- Presents actual quality data related to engineered systems as measured in various industries

*Verification, Validation, and Testing of Engineered Systems* aids systems and test engineers as well as first- and second-line managers working in systems development and manufacturing industries, civilian agencies, or the military. It can be used as a textbook in graduate-level courses in systems, electrical, aerospace, mechanical, and industrial engineering.

About the Author
**Dr. Avner Engel** holds a PhD from the Industrial Engineering Department of Tel-Aviv University. For the past twenty years, he has worked for Israel Aerospace Industries, where he has managed large software projects. Dr. Engel was involved with several research projects funded by the European Commission. He is currently teaching systems engineering courses at the Holon Institute of Technology in Holon, Israel.

## Users Review

**From reader reviews:**

**Timmy Gallegos:**

Do you one of people who can't read pleasurable if the sentence chained inside straightway, hold on guys this aren't like that. This Verification, Validation, and Testing of Engineered Systems book is readable

through you who hate those straight word style. You will find the facts here are arrange for enjoyable studying experience without leaving even decrease the knowledge that want to deliver to you. The writer associated with Verification, Validation, and Testing of Engineered Systems content conveys the thought easily to understand by lots of people. The printed and e-book are not different in the articles but it just different available as it. So , do you continue to thinking Verification, Validation, and Testing of Engineered Systems is not loveable to be your top collection reading book?

**Raymond Murray:**

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