



# Cases in Engineering Economy

SECOND EDITION

William Peterson  
Ted Eschenbach

*With Cases Contributed By*

Kate Abel  
E.R. "Bear" Baker, IV  
Michael Dunn  
Daniel Franchi  
Joseph Hartman  
Paul Kauffmann  
Neal Lewis  
M. Lee McFarland  
Donald Merino  
Karen Schmahl  
Herb Schroeder  
Andrés Sousa-Poza  
William Truran

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**CASES IN  
ENGINEERING  
ECONOMY  
2<sup>nd</sup>**



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**William R. Peterson**

Minnesota State University, Mankato

**Ted G. Eschenbach**

University of Alaska Anchorage

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Kate Abel

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Karen Schmahl

Herb Schroeder

Andrés Sousa-Poza

William Truran

Stevens Institute of Technology

University of Alaska Anchorage

Petrotechnical Resources of Alaska

California Polytechnic State University –

San Luis Obispo

University of Florida

East Carolina University

University of Bridgeport

Stevens Institute of Technology

California Polytechnic State University –

San Luis Obispo

Miami University

University of Alaska Anchorage

Old Dominion University

Stevens Institute of Technology

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*to*

*My wife Patricia,  
Whose support and forbearance makes it all possible*

*Bill*

*My family,  
Which models sensitivity, economy, teamwork, and engineering for me*

*Ted*

---

## ABOUT THE AUTHORS

**William R. Peterson** is an associate professor and chair of automotive and manufacturing engineering technology at Minnesota State University, Mankato. He received his PhD degree in industrial and systems engineering from The Ohio State University in 1995. He also holds an MBA from the Kearney State College (now the University of Nebraska-Kearney) and BIE from Auburn University in 1970.

Dr. Peterson has served on the faculties of Florida International University, Western Michigan University, Old Dominion University, and Arizona State University. He was the 3M-McKnight Distinguished Visiting Professor in Technology Development at the University of Minnesota Duluth. Prior to his doctorate, he worked in a wide variety of industries as an engineering and operations manager.

He is a past president of the American Society for Engineering Management; the Society for Engineering and Management Systems (of IIE); and Epsilon Mu Eta, the Engineering Management Honor Society; and a past chair of the Engineering Management Division of the American Society for Engineering Education. He serves on the editorial board of *The Engineering Economist*.

**Ted G. Eschenbach, P.E.** is a consultant and an emeritus professor of engineering management. He received his PhD degree in industrial engineering from Stanford University in 1975 and his MCE degree from the University of Alaska Anchorage in 1999.

Dr. Eschenbach developed the first edition of this casebook at the University of Alaska Anchorage, and he has authored or coauthored more than 10 engineering economy texts.

He is the founding editor emeritus of the *Engineering Management Journal*. He is a fellow and has served on the board of directors nationally for ASEM. He is a member of PMI and served for 20 years on the board of directors for the Anchorage chapter. He has served on the editorial board of *The Engineering Economist*, and he is now the area editor for case study analysis.



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## PREFACE

The case approach has long been a part of business, law, and medical education. Similarly, most engineering programs include design projects intended to bring real-world complexity into the classroom. Despite these traditions, many courses in engineering economy rely exclusively on end-of-chapter problems. Casebooks in engineering economy have not played the same role as similar books in finance, operations research, production, marketing, strategic management, etc.

End-of-chapter problems cannot illustrate the reality of economic analysis and managerial decision-making. They must simplify to explain basic techniques and principles. Once this foundation is understood, the student still faces the difficult transition to the chaotic, complex messes that characterize the real world. These cases step closer to reality. They also can be fun and motivating, as well as providing the opportunity for honing analytical, logical, and communicative skills.

While the casebook may be used to supplement *any* engineering economy textbook, it is available on the student and instructor CDs for engineering economy texts published by Oxford University Press.

Because it is designed as a supplemental case book, it does not explain the theory underlying the examples. It does provide an introductory chapter on case analysis, since this may be new to many students. A solved case is present in Chapter 2. Chapter 3 provides an overview of working in teams, since case analysis is often done in teams and many engineering programs do not include team training. Chapter 4 introduces sensitivity analysis because of its importance to case analysis and the weak coverage in some texts. Numerous cases have hints to the student. The solutions manual is available as an Excel file to adopters. The solutions manual includes tables identifying each case's topical coverage and corresponding chapters of leading textbooks.

The variety of cases and the options within them provide flexibility in the use of the casebook. It can be used at both undergraduate and graduate levels, as well as in professional seminars. It can be an integral part of a first course in engineering economy or of a course in capital budgeting, or it can be the text for an advanced case course.

For a first course in engineering economy this use can include both classroom examples and homework assignments. Reading of the cases outside of class can be efficiently combined with classroom discussion of difficulties, assumptions, relevant principles, and recommended approaches. Simple written assignments can include lists of assumptions and development of a basic cash-flow equation. Case usage can extend to detailed numerical solutions, comparisons of the results of different approaches, and complete written case reports. This option requires substantially more time, and it should probably be used on only a few cases per term. Courses in capital budgeting can use the casebook in a similar manner.

For subsequent courses the casebook could be used as the sole text with complete numerical analysis being supplemented with reading from the professional literature. At this level we suggest that the course organization should be case oriented.

For those that are familiar with casebooks for “capstone” courses we would like to emphasize that these cases are focused on applying the analytical techniques of engineering economy. Thus choices of quantitative data, assumptions, and tools play a larger role than the qualitative elements of more general business decisions. However, these qualitative elements are an essential part of case analysis, and they are included here.

We hope that this casebook is valuable to our colleagues in engineering economy, as we have relied heavily on their texts, their articles, and their ideas. We also hope that readers will help us improve later editions, by writing us with corrections, suggestions, complaints, or even encouragement.

We also hope that faculty will contribute class-tested cases of their own that can be considered for the next edition. Ted at [aftge@uaa.alaska.edu](mailto:aftge@uaa.alaska.edu) will be the lead contact for this.

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Daniel Franchi of California Polytechnic State University – San Luis Obispo  
Joseph Hartman of the University of Florida  
Paul Kauffmann of East Carolina University  
Neil Lewis of the University of Bridgeport  
Lee McFarland of California Polytechnic State University – San Luis Obispo  
Donald Merino of Stevens Institute of Technology  
Karen Schmahl of Miami University  
Herb Schroeder of the University of Alaska Anchorage  
Andrés Sousa-Poza of Old Dominion University  
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