



# Case Histories in Vibration Analysis and Metal Fatigue for the Practicing Engineer

By Anthony Sofronas



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This highly accessible book provides analytical methods and guidelines for solving vibration problems in industrial plants and demonstrates their practical use through case histories from the author's personal experience in the mechanical engineering industry. It takes a simple, analytical approach to the subject, placing emphasis on practical applicability over theory, and covers both fixed and rotating equipment, as well as pressure vessels. It is an ideal guide for readers with diverse experience, ranging from undergraduate students to mechanics and professional engineers.



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### Editorial Review

#### Review

“The guide should be valuable in many sectors of industry, particularly to those new to industry or new to vibration analysis.” (*Chemical Engineering Progress*, 1 May 2013)

“In all, this most recent Sofronas text is readable, practical and valuable throughout.” (*Process Machinery Consulting*, 1 April 2013)

#### From the Back Cover

### **Detailed case studies demonstrate the steps needed to solve industrial vibration and metal fatigue problems**

Emphasizing simple practical approaches, this book sets forth the analytical methods and guidelines needed to both detect and solve a broad range of vibration and metal fatigue problems that arise in industrial plants. In addition to clear explanations of the underlying theory and techniques, the book features more than seventy detailed case histories based on the author's forty-five years of industrial experience. These case histories help readers better understand how vibration and metal fatigue problems arise as well as how they are solved by using the analytical methods and techniques set forth in the book.

*Case Histories in Vibration and Metal Fatigue for the Practicing Engineer* examines both fixed and rotating equipment as well as pressure vessels. It not only presents the tools needed to accurately measure vibration, it also provides the information needed to eliminate the problem permanently. Key areas of coverage include:

- Frequency, amplitude, and off-resonant calculations
- Linear, torsional, and fluid-induced vibrations
- Measurement methods and interpretation
- Rotor dynamics
- Metal fatigue and cyclic vibrational forces
- Nonlinear, transient, and self-excited vibrations
- Acoustically induced vibrations
- Metal fatigue failures and their impact

Written for the practicing engineer, this book provides the core tools needed to detect and troubleshoot industrial vibration and metal fatigue problems as effectively and efficiently as possible, all based on the latest research and industry standards and practices. Moreover, the book provides the guidance needed to ensure that once the problem is solved, it does not recur.

#### About the Author

**ANTHONY SOFRONAS, DEng, PE**, has spent the past forty-five years troubleshooting field failures and

designing machinery for ExxonMobil, General Electric, and the Bendix Corporation. He is currently a consultant to industry, presenting seminars worldwide under the aegis of his company Engineered Products. Dr. Sofronas has published many technical papers and articles, including a bimonthly column for *Hydrocarbon Processing* dedicated to engineering case histories. He is also the author of *Analytical Troubleshooting of Process Machinery and Pressure Vessels* (Wiley).

## **Users Review**

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#### **Steven Cruce:**

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#### **Ross Fletcher:**

A lot of people always spent their very own free time to vacation or go to the outside with them friends and family or their friend. Do you realize? Many a lot of people spent these people free time just watching TV, or perhaps playing video games all day long. If you wish to try to find a new activity that's look different you can read a new book. It is really fun to suit your needs. If you enjoy the book that you just read you can spent 24 hours a day to reading a reserve. The book Case Histories in Vibration Analysis and Metal Fatigue for the Practicing Engineer it is very good to read. There are a lot of people that recommended this book. These people were enjoying reading this book. In case you did not have enough space to create this book you can buy often the e-book. You can m0ore quickly to read this book from your smart phone. The price is not too expensive but this book provides high quality.

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