Structural Health Monitoring of Composite Structures

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With 12 Chapters, 479 pages (plus a 10-page index), and 27 international contributors, this is a serious book with some serious value and it is worth briefly reviewing every chapter.

1. *Introduction to Composite Materials and Smart Structures* is exactly what one would expect it to be: a very clear presentation of fundamentals with tables, photographs and simple explanations of manufacturing processes, followed by a brief overview of applications and a fine bibliography.
2. *Structural Health Monitoring Methods for Composite Materials* is a nice review of various approaches to the topic (elastic waves, acoustic emission, EM impedance, vibration, etc.) that uses clear graphs and photographs. A very extensive reference section completes a clear chapter.
3. *Introduction to Optical Fiber Sensors* offers a fine review of modulation methods including schematics, equations and practical applications. The classification of the sensors is very clear and the reference section is good, albeit a little bit dated (the most current reference is from 2012).
4. *Structural Health Monitoring of Composite Materials Using Fiber Bragg Gratings* ought to be considered a book by itself. The specialized FBG topics and methods are covered in exquisite depth and detail, from fundamental equations to practical implementation methods and techniques. It has 153 references!
5. *Structural Health Monitoring of Composite Materials Using Distributed Fiber-Optic Sensors* starts with an excellent introduction and overview, followed by some detailed and focused examples. The chapter offers a lot of visual information including many detailed graphics in color. The organization and the references are excellent.
6. *Importance of Strain Transfer Effects for Embedded Multiaxial Strain Sensing and Optical Fiber Coating Optimization* is a long title written by the same authors as Chapter 4 and it shows. It is very detailed, very complete, supported by clear graphs (many in colors), illustrations, well-presented equations and a fine bibliography.
7. *Monitoring Process Parameters Using Optical Fiber Sensors in Composite Production* is focused on practical applications. There is some repetition of previous fundamental material but some of it is welcome in terms of ease-of-reading. The chapter is an appropriate blend of theory and applications.
8. *FBG-Based Structural Performance Monitoring and Safety Evaluation of a Composite Arch Bridge* is a much focused example of a practical application. There is some repeat of FBG fundamental material that could be edited-out without hurting clarity in the context of this book. The illustrations are clear and some of the conclusions are very interesting.
9. *Smart Composite Textiles with Embedded Optical Fibers* is another focused chapter presenting a relatively new application in a clear and effective fashion. Theory is kept to a minimum and the reading is very easy, supported by excellent graphics and photographs. The references are very current.
10. *Smart Aerospace Composite Structures* is another application-focused chapter. As before, it is very clear in terms of combining text and graphs, although I had to wonder why a figure (10.19) showed six (6) different data sets (in colors) without a legend. The authors' argument was to demonstrate that some situations are just too complex to yield predictable models.
11. *Advances in FRB-Based Smart Components and Structures* is a good chapter, offering very clear explanations supported with graphs, photographs and selected equations. The references are somewhat current (2014) considering the title of the chapter.
12. *Fiber-Optic Structural Health Monitoring Systems for Marine Composite Structures* may be the most specialized chapter in the book (it is co-authored by one of the editors) and it is heavy on details. Still, it makes for interesting reading, thanks to a good balance of text, tables, graphs and images.

If I had to describe this book in a single sentence it would be "A well-edited and well-titled text that offers the reader a solid and detailed reference perspective of the topics using the appropriate tools at the appropriate locations." Now, I am wondering why I did not choose the single-sentence option.

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