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Civil Engineering Materials

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Synopsis

Civil Engineering Materials explains why construction materials behave the way they do. It covers the construction materials content for undergraduate courses in Civil Engineering and related subjects and serves as a valuable reference for professionals working in the construction industry. The book concentrates on demonstrating methods to obtain, analyse and use information rather than focusing on presenting large amounts of data. The topics are relevant to all the different stages of the course, starting with basic properties of materials and leading to more complex areas such as the theory of concrete durability and corrosion of steel. The text is supported by a large number of worked examples of exam-style questions in both MKS and US customary units.

- * Discusses the broad scope of traditional, emerging and non-structural materials
- * Rather than packing the book with facts that assume a prior knowledge of material properties like other texts do, this book starts from the beginning by explaining what specific heat, thermal conductivity and electrical resistivity are and how they can be used to calculate the performance of construction materials.
- * Contains numerous worked examples with detailed solutions that provide precise references to the relevant equations in the text.
- * Includes a detailed section on how to write reports as well as a full section on how to use and interpret publications, giving students and early career professionals valuable practical guidance.
- * Based on over 20 years of experience by the author teaching Civil Engineering Materials to undergraduates.

Contents

1. Units; 2. Strength of Materials; 3. Failure of Real Construction Materials; 4. Thermal Properties; 5. Pressure; 6. Electrical Properties; 7. Chemistry of Construction Materials; 8. Properties of Fluids in Solids; 9. Transport of Fluids in Solids; 10. Transport of Ions in Fluids; 11. Ionising Radiation; 12. Variability and Statistics; 13. Use of Test Results; 14. Specifications and Standards; 15. Reporting Results; 16. Testing Construction Materials; 17. Introduction to Cement and Concrete; 18. Cements and Cement Replacement Materials; 19. Aggregates for Concrete and Mortar; 20. Hydration of Cement; 21. Concrete Mix Design; 22. Testing Wet and Hardened Concrete; 23. Creep, Shrinkage, and Cracking of Concrete; 24. Admixtures for Concrete; 25. Durability of Concrete Structures; 26. Production of Durable Concrete; 27. Assessment of Concrete Structures; 28. Mortars and Grouts; 29. Special Concretes; 30. Steel; 31. Corrosion; 32. Alloys and Nonferrous Metals; 33. Timber; 34. Masonry; 35. Plastics; 36. Glass; 37. Bituminous Materials; 38. Composites; 39. Adhesives and Sealants; 40. Comparison of Different Materials; 41. New Technologies; Tutorial Questions; Index.

About the Author

Peter A. Claisse is an emeritus professor at Coventry University and the author of more than 100 [publications](#) construction materials. He graduated with a degree in Physics from Oxford University and then spent the next 9 years working as a Civil Engineer on major UK construction sites including four years on the Torness nuclear power station. He has been at Coventry University for the last 20 years teaching Civil Engineering Materials and researching transport processes in concrete and the use of secondary materials in cement. He is a Fellow of the Institution of Civil Engineers.

By the same author: Transport Properties of Concrete [Synopsis 2nd ed.pdf](#)