THE STRUCTURE AND MECHANICS OF CORK

L. J. Gibson*, K.E. Easterling+ and M. F. Ashby#

*Dept. of Materials
Science and Eng.
MIT, Cambridge MA
USA 02139
ljgibson@mit.edu

+Dept. of Materials
University of Lulea
Lulea Sweden
(deceased)

#Engineering Department
Cambridge University
Cambridge UK CB2 1PZ

Cork has a remarkable combination of properties that are exploited in a wide range of applications. Its low stiffness and small Poisson's ratio, combined with its impermeability and chemical stability, make it an ideal material for stoppers for bottles and for gaskets in everything from woodwind instruments to automobile engines. Its resiliency and high coefficient of friction make it ideal for the soles of shoes and for flooring. It also is an outstanding thermal and acoustic insulator.

Cork is obtained from the bark of the cork oak tree in Mediterranean regions. Its cells are roughly hexagonal prisms with corrugated walls along the axis of the prism. The cell walls are covered with a layer of suberin, an unsaturated fatty acid, and waxes, which make them impervious to air and water, and resistant to acids. Here, we describe the cellular structure of cork and relate its mechanical properties to the mechanisms by which it deforms. We conclude with a discussion of the way in which the properties are exploited in a variety of applications.

Reference

L. J. Gibson, K. E. Easterling and M. F. Ashby "The Structure and Mechanics of Cork" Proc. Roy. Soc. Lond. **A377**, 99-117, 1981.

Keywords: cork, cellular solids