

Material and Structure of Eco-friendly Pavements

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The appearance of roads is to meet the need of quick and easy move of people and today roads are indispensable for the development of modern society. The connotation of "quick and easy" has continuously evolved more profoundly and inclusively. The relationship between road and people becomes more and more inseparable. As the result cities and towns are connected with highways, urban roads, access roads, airports, squares, and parking lots. Pavement is no longer just serving as a road or pedestrians walking ways, it has become an environment that people have to work and live in.

As a part of road structures that directly takes vehicle loads and bears with natural environment, traditional pavement calls for bearing capacity, smoothness, safety, durability. In addition to the basic requirements the modern pavement is required to be more permeable, less noisy, less sensitive to temperature, easier for snow and ice removal, convenient for automobile exhaust pollution reduction, visually esthetic, and from the point of view of new environment friendly functions.

The functions of pavements have been undertaking changes, from transport infrastructure to comprehensive environment. These changes have resulted from not only the needs for pavement functions, but also the improved road technologies. This will lead to the change of the design philosophy of pavement materials and structures, and the development of a new generation of pavement design theory and the construction technology, for example, design theory for porous pavements, material preparation methods, construction and maintenance technologies.

This book is titled eco-friendly pavement in order to advocate constructing environment-friendly road technology systems; update pavement design philosophies and methods; enrich road engineering knowledge; and adapt to the social development demands.

The book is a collection of the author's research achievements on environment-friendly pavements. It contains 15 chapters. Chapter 1 introduces the technical background and state of the art of eco-friendly pavements; chapters 2 and 3 are on permeable pavements, permeable asphalt pavement materials, and the characteristics of permeable asphalt pavements; chapters 4, 5 and 6 are on low-noise pavements including low noise porous asphalt pavements, low noise porous cement pavements, and asphalt pavement absorption characteristics; chapter 7, 8, 9 and 10 are on low heat-absorbing pavements including water retentive pavements, heat reflective pavements, thermal resistant pavements, and thermal effects of asphalt pavements; chapters 11, 12 and 13 are on snow and ice melting pavements covering granular crumb rubber pavements, pavements that melt snow and ice by microwave, and pavements that melts snow and ice by energy transform; chapter 14 is on glass asphalt pavements that give visual esthetics and utilize wastes; and chapter 15 is on pavements that can absorb and decompose automobile exhaust.

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