

# Modeling and Design of Flexible Pavements and Materials

Dallas N. Little · David H. Allen  
Amit Bhasin

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Dallas N. Little  
Texas A&M University  
College Station, TX  
USA

Amit Bhasin  
The University of Texas at Austin  
Austin, TX  
USA

David H. Allen  
Texas A&M University  
College Station, TX  
USA

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# Preface

There is no denying the profound changes that our planet has seen since the advent of the twentieth century. Chief among these are the dramatic developments in all things derived from electromagnetism—television, computers, cell phones, just to name a few. But where materials and mechanics are concerned, the developments are less obvious. Though aircraft, automobiles, buildings, and bridges have also undergone development over the past half-century and more, these changes are less apparent to the consumer. And so it is with roadways—we seem to be traveling on the same types of surfaces as our grandparents did. Some might even say we are still copying the roadway designs developed by the Romans. Unfortunately, roadway traffic worldwide has skyrocketed within the last century, thereby leading to rapid decay of these transportation facilities. Indeed, within the USA alone it has become an annual struggle by local, state, and federal governments to allocate sufficient resources to fund roadway construction and maintenance.

There are examples within the field of transportation of cost containment and even cost decreases per passenger mile traveled, including the costs of both automobiles and air transport. However, so long as the antiquated design procedures of the past continue to be utilized to design, build, and maintain roadways, the cost of these facilities will likely continue to increase. Given that the cost of other transportation facilities is becoming more cost-effective, it would seem that such cost containments should be attainable with roadways as well.

The authors have undertaken this text with the intent of demonstrating that while developments in roadways are not as apparent as they may be in other fields, there has nevertheless been substantial headway made in roadway design since the days of the construction of the US Interstate Highway System. Indeed, one may even say that these innovations are revolutionary. Hopefully, this text will serve our purpose—to demonstrate these new developments for the practicing engineer in a clear, concise, and useful way. If so, then we would hope that the enormous cost to societies worldwide of roadway design, construction, and maintenance should decrease substantially as a result of the technologies elucidated within this text. And if that is indeed the result of our labor, we will have accomplished our intent.

Chapters 4 and 5 of this text were written by the first author. In addition, Chaps. 1 and 9–15 were written by the second author. Finally, Chaps. 2, 3, and 6–8 were written by the third author. And while we have each written on disparate topics, we have taken every effort to ensure that the subject of roadway design is treated herein in a contiguous manner.

And so, we who have spent our lives studying the subject within these pages, wish you a happy and enlightening read.

College Station, USA  
College Station, USA  
Austin, USA

Dallas N. Little  
David H. Allen  
Amit Bhasin

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## About the Authors

**Dallas N. Little** is the E. B. Snead Chair Professor and Regents Professor in the Zachry Department of Civil Engineering at Texas A&M University, where he has been a faculty member since completing his Ph.D. in 1979. Dr. Little holds an M.S. from the University of Illinois at Urbana-Champaign (1973) and a B.S.C.E. from the United States Air Force Academy in 1970. He has been a registered professional engineer since 1976.

**David H. Allen** is currently Director of the Center for Railway Research within the Texas A&M Transportation Institute. Prior to that, he was a faculty member at Virginia Tech (1980–81), Texas A&M University (1981–2002), The University of Nebraska-Lincoln (2002–10), and The University of Texas-Pan American (2010–13). He obtained his B.S., M. Eng., and Ph.D. degrees from Texas A&M University.

**Amit Bhasin** is a faculty member in the Department of Civil, Architectural, and Environmental Engineering at The University of Texas at Austin. He has been in this position since 2008. He received his B. Tech. in Civil Engineering from IIT Varanasi, India, and his M.S. and Ph.D. from Texas A&M University (2003, 2006).



## **D.H. Allen's Other Publications**

Introduction to the Mechanics of Deformable Solids—Springer (2013)

How Mechanics Shaped the Modern World—Springer (2014)

Introduction to Aerospace Structural Analysis (with W.E. Haisler)—Wiley (1985).