Traffic Engineering

Fifth Edition

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Cover Designer: Black Horse Designs
Cover Illustration/Photo(s): JG Photography/Alamy Stock Photo
Full-Service Project Management: Integra Software Services Pvt. Ltd./Ashwina Ragunath
Printer/Binder: LSC Communications, Inc.

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Library of Congress Cataloging-in-Publication Data

Names: Roess, Roger P., author. | Prassas, Elena S., author. | McShane, William R., author.
Title: Traffic engineering/Roger P. Roess, Elena S. Prassas, William R. McShane.
Description: Fifth edition. | Hoboken, NJ : Pearson Education, 2019. | Includes bibliographical references.
Identifiers: LCCN 2017054076| ISBN 9780134599717 | ISBN 0134599713
Subjects: LCSH: Traffic engineering—United States.
Classification: LCC HE355 .M43 2018 | DDC 388.3/120973—dc23 LC record available at https://lccn.loc.gov/2017054076

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Pearson

ISBN-10: 0-13-459971-3
ISBN-13: 978-0-13-459971-7

Contents

Preface

The transportation system is the nation's lifeblood circulation system. Our complex system of roads and highways, railroads, airports and airlines, waterways, and urban transit systems provides for the movement of people and goods to and from the most remote outposts of the nation. It is the transportation network which allows for the concentrated production of food, goods, energy, and other material in an economically optimal manner, knowing that the systems needed to collect raw materials, and distribute final products throughout the nation are in place.

Traffic engineering deals with several critical elements of the transportation system: our streets and highways, and the transportation services they support. Because the transportation system is such a critical part of our infrastructure, the traffic engineer is involved in a wide range of issues, often in a very public setting, and must bring a broad range of skills to the table. Traffic engineers must have an appreciation for and understanding of planning, design, management, construction, operation, control, and system optimization. All of these functions involve traffic engineers at some level.

This text focuses on the key engineering skills required to practice traffic engineering in a broad setting. This is the fifth edition of the textbook, and it includes the latest standards and criteria of the *Manual on Uniform Traffic Control Devices* (2009, as updated through May 2012), the *Policy on Geometric Design of Highways and Streets* (2011), the *Highway Capacity Manual* (2016), the *Highway Safety Manual* (2010, with 2014 Supplement), and other critical documents. While this edition uses the latest versions of basic references, students must be aware that all of these are periodically updated, and (at some point), versions not available at this writing will become available, and should be used.

The text is organized into four major functional parts:

Part I – Basic Concepts and Characteristics
Part II – Traffic Studies and Programs
Part III – Interrupted Flow Facilities: Design, Control, and Level of Service
Part IV – Uninterrupted Flow Facilities: Design, Control, and Level of Service

The text is appropriate for an undergraduate survey course in traffic engineering, or for more detailed graduate (or undergraduate) courses focusing on specific aspects of the profession. A survey course might include all of Part I, a selection of chapters from Part II, and a few chapters focusing on signal design and/or capacity and level of service analysis. Over the years, the authors have used the text for graduate courses on Traffic Studies and Characteristics, Traffic Control and Operations, and Highway Capacity and Level of Service Analysis. Special courses on highway traffic safety and geometric design have also used this text.

Some chapters, particularly Traffic Impact and Mitigation Studies, are organized around case studies. These should only be used in a more advanced course with an instructor who is familiar with the many tools referenced.

What's New in This Edition

This edition of the textbook adds a significant amount of material, including, but not limited to:

1. More than 50% of the homework problems (and an available solutions manual) are new for most chapters.

2. New material on unsignalized intersections, roundabouts, alternative intersections, interchanges, operation and analysis of facilities, and more.
3. Material on signalized intersections, signal design and timing, and signal hardware has been updated and extended.
4. Material from the latest editions of key traffic engineering references is included, as noted previously.
5. Links to a number of new Web sites which students and instructors will find valuable.

There are some additional revisions. There is no overview chapter on statistics; undergraduate engineering degrees now require coursework in statistics. We have included supporting material on statistical analyses within the applications in which they are used. An overview chapter can't cover everything, and it should be expected that modern engineering students have been exposed to this material. The text still provides details on a number of capacity and level of service applications. The *2016 HCM*, however, has over 3,000 pages of printed and electronic material, and many complicated analyses can only be presented in outline or overview form. There is material from the *Highway Safety Manual*, but complete analysis material is included for only one type of application. Again, there is simply too much material to include more than an example of its procedures and applications.

We hope that students and instructors will continue to find this text useful in learning about the profession of traffic engineering, and about many of its key components. As in the past, comments are always welcome.

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Configure traffic engineering properties for IS-IS. IS-IS always performs shortest-path-first (SPF) calculations to determine next hops. For prefixes reachable through a particular next hop, IS-IS places that next hop for that prefix in the inet.0 routing table.Â The inet.3 table, which is present on the ingress router, contains the host address of each MPLS label-switched path (LSP) egress router. BGP uses this routing table to resolve next-hop addresses.

Traffic engineering of IP networks is an important problem in operational IP networks. While protocols such as OSPF and ISâ€“IS define how routers communicate among themselves to update information such as link weights, they are also silent on how to pick good link weights. Thus, mechanisms are needed to determine good link weights. To do so, a critical component is to recognize that this leads to first identifying how to estimate traffic in the network, as well as what performance measures might be of interest in IP networks. Transport Planning and Traffic Engineering. Edited by. CA O'Flaherty. Contributing authors. MGH ...Â Internet Traffic Engineering 1 Guest Editorial; Terje Jensen Section I: Introduction/Overview 3 Side_1_360 Chapter 1 Introduction to Highway Engineering and Traffic Analysis. 350 PagesÂ·2014Â·15.25 MBÂ·1,408 Downloads. Chapter 5 presents the fundamentals of traffic flow and queuing theory, which provide the basic Traffic & Highway Engineering , Fouth Edition. /interface traffic-eng monitor 0. tunnel-id: 12 primary-path-state: established. primary-path: dyn secondary-path-state: not-necessary.Â Whenever the link comes back, TE tunnel will use the same path even it is not the best path (unless reoptimize-interval is configured). To fix it we can manually reoptimize the tunnel path. /interface traffic-eng reoptimize 0. /interface traffic-eng monitor 0. tunnel-id: 12 primary-path-state: established. primary-path: dyn secondary-path-state: not-necessary.