

Book review

Public Infrastructure Asset Management

W. Uddin, W. R. Hudson and R. Hass. McGraw-Hill Education, 2013, Columbus, Ohio, USA, ISBN 0071820116/9780071820110, \$103, 522 pp.

Public Infrastructure Asset Management, the second edition, written by distinguished experts Waheed Uddin, W. Ronald Hudson and Ralf Hass, is an important addition to the limited list of infrastructure textbooks available for entry-level engineering and management courses. This book comprises five parts, with a total of 21 chapters (522 pages total). The three chapters of Part 1 provide a general survey of the challenges faced by infrastructure asset (IA) management (IAM). Chapter 1 provides a detailed illustration of the effects of infrastructure on the economic growth and development of society with supportive historical examples. This chapter also anticipates future challenges for IAM in the twenty-first century. Chapter 2 provides key terminology and clear technical definitions for IAM that are very important for harmonising literature and scientific texts. This chapter is thought to be consistent with International Organization for Standardization (ISO) 55000, which provides an overview of terminology for all of the different types of assets. Chapter 3 clearly discusses the necessary components for planning, including modelling and simulation, space-use planning, demand forecasting, environment-related assessment, safety and security, and regulations for accommodating individuals with disabilities.

Part 2, which consists of five chapters, discusses information management and decision support systems. The data collection process for IAM is very time consuming and expensive. The issues of data acquisition methods and database management are discussed in chapters 4 and 5. Chapter 4 begins with a review of data management and related technologies and systems. Chapter 5 explores the different types of data required for IAM, including a brief discussion of the details required for a decision support system (DSS). This chapter contains a table specifying data collection frequency, which can be used as a guide to develop databases for DSS of IAM.

In-service monitoring and data evaluation of the current condition of IAs are discussed in chapter 6. In chapter 7, data monitoring, survey and rating serviceability conditions for highway and airport pavements, railroads and building serviceability are discussed. The chapter concludes with a land-use evaluation for investigating heat-island effects and assessment of flood risk. A summary of IA performance modelling and the corresponding failure analysis with various performance indices for different IAs are presented in chapter 8.

Part 3, which consists of four chapters, discusses IAM quality management. Chapter 9 presents design and related constraints of IAs associated with the required information for IA design based on IA types with illustrating examples.

Chapter 10 discusses the construction phase and the concept of constructability, presenting significant corresponding factors. Chapter 11 focuses on maintenance, rehabilitation and reconstruction, beginning with an introduction to the terminology commonly used for maintenance and rehabilitation (M&R) for IAs. In addition, the role of ISO standards on total quality management is briefly discussed.

Chapter 12 discusses new and alternative substitute construction and building materials used for IAs and introduces several examples of new construction and building materials used in various IAs. This chapter also discusses the necessity for a subsystem for the application and evaluation of waste and reclaimed materials in construction and rehabilitation of IAs with respect to 4R policies (reclaim, reuse, recycle and reduce waste).

Part 4 contains four chapters on life-cycle analysis and maintenance, rehabilitation and reconstruction programming. Chapter 13 introduces a maintenance management system with some examples, which is critical as economic analysis is an inherent part of IA design, construction and M&R.

Chapter 14 focuses on and analyses the life cycle and benefits of IAs. This chapter explains the basics of life cycle analysis and the factors influencing both cost and benefits. Chapter 15 presents different methodologies for prioritisation and optimisation in IA(s) and discusses different types of priority analysis methods.

Part 5 consists of five chapters, which present examples of development and implementation of various IAM systems (IAMS). Chapter 16 explains the common features of IAMS for municipal application and utilities. Chapter 17 presents the capabilities, applications and components of a software program for IAMS, the visual infrastructure management system, developed at the University of Texas at Austin.

Chapter 18 reviews the application of asset management system (AMS) software. A list of various types of IAMS presents useful details about the providers and further information. Issues that may be a source of concern regarding the costs and benefits of implementing an AMS are expanded in chapter 19, including a comparison of different methodologies for analysis. Chapter 20 discusses sustainability and environmental stewardship in terms of issues related to climate change and sustainability-rating-system leadership in energy and environmental design in IAMS. The book concludes with chapter 21, which portrays the future of IAM in four detailed categories. However, the book requires more numerical examples to present the effects of IAMS. More practical examples are also needed to show the effects of sustainable design and their consequences in IAM. Moreover, some problems related to the presented subjects should be included at the end of each chapter. It is very useful for students and researchers to practise the materials that are discussed. A detailed description of ISO 55000 is also recommended to be added in chapter 2 to make this chapter a reference for sources of terminology in IAM. It is suggested that these additions be included in future editions.

IAMS, which represents an interface between engineering, economy and management, is highly dependent on well-trained personnel; hence, scientific literature plays a vital role in the development of IAMS. To meet this requirement, the authors used various fields of engineering knowledge, including civil, environment, computer, material and industrial, and basic science, such as physics, chemistry, mathematics and statistics. Meanwhile, principles of human sciences including economy, management, law and history were used for discussion and examples that support different topics in the chapters. Furthermore, interesting strategies such as private-public partnership (3P) and 4R policies were discussed. As a result, the topics covered in the book span the requirements of both private and public sectors in IAMS. Moreover, various types of IAM projects in different countries were introduced. Short- and long-term performances were also discussed. Consequently, the experiences gained in such projects associated with the engineering, management and economy theories can provide a better understanding of the national and international IAM projects. In conclusion, the book can be considered one of the most important scientific materials in the field of IAMS.

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