

Preface

The movement of people, goods, and services between urban settlements and production facilities is the essential circulation that keeps regional and national economies running. Bridges are the vital connectors that ensure that transportation systems function safely and economically as intended by those who have planned and conceptualized them. Bridge engineering is a special discipline within structural engineering that focuses on the design, construction, erection, assessment, and maintenance of these connectors for the benefit of society. Bridges are often durable symbols of technical prowess, economic power, and esthetic refinement. Just as many ancient bridges that have become landmarks evoke in us a sense of amazement at the creative skills of the old masters who built them, so do their younger counterparts that display the flair of more recent builders who have combined advanced analysis techniques with modern, high-performance materials to craft structures that defy the heretofore unchallenged limits in terms of span, height, or frugal use of material resources. Its many counterexamples notwithstanding, bridge engineering is indeed a uniquely singular parade arena to display technical experience and artistic maturity. It is sometimes a shared responsibility among engineers and the special breed of architects who have the craftsmanship to improve the technical attributes of the finished product. We hope that this book will serve to give its readers an overview of the many problems that must be resolved to produce bridge structures that will meet the challenges they will face during their service lifetime.

The Turkish Group of the International Association for Bridge and Structural Engineering (IABSE), in collaboration with Middle East Technical University (METU), the Turkish General Directorate for State Highways (KGM), the General Directorate for State Railways (TCDD), the Turkish Contractors Association, the Turkish Association for Structural Steel (TUCSA), the Turkish National Committee for Roads (YTMK), the Turkish Association for Seismic Isolation, the International Association for Earthquake Engineering (IAEE), the Transportation Research Board (TRB), American Concrete Institute (ACI), the Bridge Engineering Association, and SIBERC served as host for the Istanbul Bridge Conference during August 11–13, 2014. The conference was generously supported by many sponsors, AGM, Arsan

Kaucuk, Aydiner Inc. Company (Aybet), BERD, Besmak, Cengiz Nurol, Chodai Co., Computers and Structures, Inc. (CSI), DOKA, DUYGU Engineering, EMAY International Engineering and Consultancy Inc, EM-KE, Endem Construction, EPO Construction Chemicals, FIP Industriale, FREYSAŞ, IC İçtaş Construction Co, Ilgaz İnşaat, INPRO, JOTUN, KMG Project, KOBİ Engineering and Consulting Co. Ltd, LARSA, MAGEBA, Mapa İnşaat ve Ticaret A.Ş., Maurer Söhne GmbH & Co., MEGA Engineering Consulting Co., Mistras Group, MOOG GmbH, Otoyol Yatırım ve İşletme A.Ş., Özdekan Rubber Company, PERİ, Pitchmastic Pmb Ltd, Sismolab, Straininstall, TEMELSU International Engineering Services, TESTART, TNO Diana, TTS International Engineering and Architecture, WireCo Structures, Wowjoint, Wuhan HIRUN Engineering Equipment Co., YAPIFEN Engineering, and Yüksel Proje.

iBridge was attended by **250** participants representing **30** different countries. The conference program included **96** papers. It was complemented by a visit to the construction site for the third Istanbul Strait crossing, a major project that will place the bridge among the top five long-span bridges in the world in several categories when it has been completed.

The 19 papers selected for this book represent a cross section of the breadth of the topics that were taken up in the conference. The selection has been made on the basis of scientific and technical relevance, timeliness, and expected added value for practitioners. A few authors who were invited to finalize their papers for inclusion in the book failed to do so on time, and a few others were eliminated because they had been submitted elsewhere for publication. The papers represent current concerns in bridge engineering as they exist in many countries and the solutions for those issues that have been arrived at under codified constraints that have echoes in other locations. Theory, experiment, and practice are presented in balanced proportions in the texts that follow.

We have grouped them under four broadly defined thematic areas as follows:

- “Modeling and Analysis” (7 papers)
- “Construction and Erection Techniques” (3 papers)
- “Design for Extreme Events” (4 papers)
- “Condition Assessment and Structural Health Monitoring” (5 papers)

The book has been divided into four principal sections along these themes.

The editors would like to acknowledge the excellent cooperation that they have received from the authors in revising their papers according to reviewer comments and the tens of reviewers, from the Scientific Committee as well as externally named experts (many in multiple assignments), who willingly gave much of their time in examining the papers for their content to ensure that this would be a printed source with a positive impact, and provide guidance for their colleagues in the broader engineering community. The editorial staff at Springer Publishers has been unfailingly helpful in guiding us toward producing a book in their style.

We have received invaluable support from the staff at INTERCON that served as the Conference Secretariat and doubled as providers for the initial screening process of the written contributions.

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