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HAZARD-RESILIENT INFRASTRUCTURE

ANALYSIS AND DESIGN

Sponsored by the Infrastructure Resilience Division
Edited by Bilal M. Ayyub, Ph.D., P.E.

ASCE

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DEDICATION

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May 17, 1932 to May 31, 2019

Dr. Wright was a research professor of civil and environmental engineering at the University of Maryland, College Park, the past chair of ASCE's Committee on Adaptation to a Changing Climate, a member of the ExCom of the Infrastructure Resilience Division, and a member of the ASCE Committee on Sustainability, as well as the chair of its Sustainable Infrastructure Education Subcommittee. He was a distinguished member of ASCE and a member of the National Academy of Engineering.

He received his bachelor's and master's degrees from Syracuse University and his doctorate from the University of Illinois at Urbana-Champaign, all in civil engineering. He worked as the director of the Building and Fire Research Laboratory of the National Institute of Standards and Technology (NIST) and a professor of civil engineering at the University of Illinois at Urbana-Champaign. He was the president of the International Council for Research and Innovation in Building and Construction (CIB) and the president of the Liaison Committee of International Civil Engineering Organizations.

Dr. Wright's professional honors include the Gold Medal of the Department of Commerce (1982); Federal Engineer of the Year from the National Society of Professional Engineers (1988); Mahaffey Award from the National Conference of States on Building Codes and Standards (1998); Michel Award for Industry Advancement of Research from the Civil

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FOREWORD

ASCE has established the Grand Challenge as a way of recognizing the need for increasing investment in the infrastructure on which our society is built. The systems on which we rely to provide safe transportation, clean water, secure structures, and reliable energy and telecommunications are increasingly frail as they reach the end of their design lives.

However, it is not enough to simply replace old with similar. Limitations on natural and fiscal resources, a changing climate, and expectations of modern infrastructure to have a low life-cycle cost and increased longevity are making the ways of the past obsolete. Today's civil engineers need to consider new design and construction approaches incorporating new materials and emerging technologies. We must ensure that the next generation of infrastructure systems not only meets nominal expectations but also has the resilience to perform during and recover rapidly after exposure to hazardous conditions.

Recognizing this, ASCE has established roughly two dozen policy statements (PS) related to infrastructure development and disaster mitigation. PS 500, *Resilient Infrastructure Initiatives*, was adopted to

> … support initiatives that increase resilience of infrastructure against man-made and natural hazards through education, research, planning, design, construction, operation and maintenance. Development of performance criteria and uniform national standards that address interdependencies and establish minimum performance goals for infrastructure is imperative.

This policy goes on to note that

> … an all-hazard, comprehensive risk assessment that considers event likelihood and consequence, encourages mitigation strategies,