Second Edition

Guidelines for Forensic Engineering Practice

Edited by
Joshua B. Kardon, Ph.D., S.E.

ASCE

GUIDELINES FOR FORENSIC ENGINEERING PRACTICE

SECOND EDITION

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Preface

Engineering investigation of buildings, bridges, and other constructed facilities that fail or do not perform as intended, rendering opinions as to the causes of failure or underperformance, and giving testimony in judicial proceedings are fields of professional practice often referred to as forensic engineering. Forensic engineering practices also are applied in circumstances involving defects, failures, and accidents involving manufactured products, consumer products, machinery, and vehicles of all types; however this publication principally addresses forensic engineering for the civil built environment.

The Technical Council on Forensic Engineering (TCFE) of the American Society of Civil Engineers (ASCE) was established in 1985, and its Forensic Practices Committee (FPC) was charged with developing guidelines for forensic engineering practice. Work on the document was started in 1994 and resulted, in 2003, in the publication of the First Edition of the Committee Report, *Guidelines for Forensic Engineering Practice.*

Design codes and standards, construction safety regulations, tools of investigation and analysis, and dispute resolution rules and procedures have evolved since 2003, when the first edition of the *Guidelines* was published. More importantly, forensic engineering has matured, becoming a more accepted, organized, and active field of practice. In recognition of these changes, the FPC reviewed the *Guidelines* and concluded that an update and revision were in order. The result of that review, update, and revision is this 2012 publication of the *Guidelines for Forensic Engineering Practice, Second Edition.*

Acknowledgments

Gary L. Lewis served as the editor for the first edition of the *Guidelines for Forensic Engineering Practice*, published by ASCE in 2003. Then and now, the *Guidelines* represent the work of the Forensic Practice Committee members and others who authored each chapter of each edition. All interested members of the Technical Council of Forensic Engineering (TCFE) reviewed these *Guidelines*. The contents of this Second Edition represent TCFE's current perspective on all aspects of these *Guidelines*, and each chapter differs from its predecessor. We owe a great debt to the committee members and authors who contributed to that earlier work, and especially to Gary Lewis for his oversight as editor of the First Edition, and for his persistence in shepherding the First Edition to print.

The editor, authors, contributors, and reviewers of the *Guidelines* wish to express their sincere thanks to all the exceptional professionals who have given selflessly over an extended period of time toward this publication. We wish to express our appreciation for the support of the TCFE Executive Committee, and of the ASCE staff. Thank you.

A NOTE ABOUT THE COVER PHOTOGRAPHS

The photographs of the I35-W Bridge (Bridge 9340) in Minneapolis, Minnesota, on the cover of this edition of the *Guidelines for Forensic Engineering Practice* have been used with the permission of the photographers. The photograph on the front cover depicts the bridge prior to its collapse on August 1, 2007, and was taken by John Weeks; the photograph on the back cover shows a portion of the collapsed bridge on that day and was taken by Tim Davis.

These photographs were selected because forensic engineering practices were applied by consultants to the State of Minnesota before the bridge collapsed to aid the State in defining and scheduling maintenance and repair work, and again after the collapse to aid many parties in their understanding of the causes and sequence of the failure.

Although the photographs both depict a bridge, the *Guidelines for Forensic Engineering Practice* is intended to address forensic practice relating to other facilities in addition to bridges, such as buildings. The photographs also are intended to provide a clear, graphic example of the importance of forensic engineering practice on the lives and safety of the general public, most of whom have only the highest expectation of the competency of the engineers responsible for the built environment and of the safety and durability of the built works.

It is for the benefit of the people who daily use the artifacts of civilization that civil engineers and forensic engineers involved in the investigation and evaluation of the built environment provide their services.