



Designation: E3176 – 24

## Standard Guide for Forensic Engineering Expert Reports<sup>1</sup>

This standard is issued under the fixed designation E3176; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This document provides guidance on the purpose, content, and limitations of forensic engineering expert reports, and it discusses report representation in electronic form.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

### 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

**E2713 Guide to Forensic Engineering**

2.2 *Other Standards:*

**ISO 32000-2:2017 Document Management – Portable Document Format – Part 2: PDF 2.0**<sup>3</sup>

### 3. Terminology

3.1 *Definitions:*

3.1.1 *expert, n*—an individual with specialized knowledge, skills, and abilities acquired through appropriate education, training, and experience. **E2713**

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *author, n*—the individual(s) asserting responsibility for a report, along with an organizational unit (position or title, company affiliation, government agency, etc.).

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from International Organization for Standardization (ISO), ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <http://www.iso.org>.

3.2.1.1 *Discussion*—A report may incorporate contributions from multiple individuals. Usually one individual should be named as being responsible for the report as a whole. If the report is submitted into legal proceedings, that individual will likely become the initial focus of deposition or court testimony. Joint authorship may be asserted.

3.2.2 *incident, n*—generic term for a problematic occurrence or condition which is the subject of investigation and reporting.

3.2.2.1 *Discussion*—Typical incidents include vehicle crashes, structural failures, chemical spills, electrical or plumbing failures, uncontrolled fires, roofing defects, cosmetic features, natural disasters, and various human actions. An incident which underlies a forensic engineering report is not necessarily sudden and disastrous. It may be a statistical deviation over time such as a manufacturing process, the acknowledgement of a latent phenomenon such as an explosive mixture, a design option, an alleged civil tort or criminal act, a human error or administrative violation, or a sequence or collection of such occurrences.

3.2.3 *report, n*—a formal written document which communicates the result of an investigation.

3.2.3.1 *Discussion*—A report may be qualified, such as *draft*, *preliminary*, *final*, or *supplementary*. Updated versions of a report will modify, supplement, or supersede previous versions.

### 4. Summary of Guide

4.1 Forensic engineering reports are typically composed of elements such as: introduction, background, description of an incident, questions to be resolved, materials examined, inspections conducted, testing or experiments performed, data obtained, assertions offered, findings, alternative explanations, and conclusions or opinions, along with the scientific or technical rationale for the foregoing. The scope of the report should lie within the expertise of the author and be relevant to the incident under investigation. The scope should be agreed upon with the client or customer. The report may be subject to legal requirements peculiar to a jurisdiction, beyond the extent of this guide.

4.2 *Forensic engineering* reports have characteristics and constraints that differ from reports prepared in forensic science and other disciplines. A forensic engineering report commonly communicates findings and conclusions from an investigation

of a unique incident (as broadly defined above). In contrast, forensic science reports typically deal with rigorously prescribed and accepted procedures. Forensic engineering reports may exhibit more tutorial material and technical detail than forensic science reports. A given forensic engineering report may address only a subset of an overall investigation. Certain reports may go beyond conclusions and opinions to incorporate recommendations of a knowledgeable expert describing correction of deficiencies contributing to the incident, or discussing repair of damage.

4.3 Forensic engineering uses the knowledge, education, training, experience, and skill of the practitioner to interpret and apply existing science in evaluating the incident.

4.4 As with other ‘scientific or technical reports’, courts of law may treat forensic engineering reports as ‘expert opinions’ which may or may not be deemed admissible in a given legal proceeding. A forensic engineering report should be accurate and logical. Findings and conclusions must be based on valid evidence and acceptable references.

## 5. Significance and Use

5.1 This guide may be useful to forensic engineers, courts, jurists, attorneys, insurance adjusters, and clients of forensic engineers. Although this guide is directed to the practice of forensic engineering, its description of the elements of investigative reports may be useful to practitioners in other disciplines that embrace scientific laws and theories.

5.2 This guide is based on Guide E2713, which discusses elements of the practice of forensic engineering and provides suggested readings which may be of interest to those creating (or reading) forensic engineering reports.

5.3 *This guide is informational and not mandatory.* Not all items necessarily apply to all forensic engineering reports. Practitioners should adopt the requirements stated herein as appropriate to their individual situations. The author should verbally discuss findings with the client prior to the preparation of a written report. Not all clients will require a written report, and some may want a report with a focused scope or a report that follows a particular format.

## 6. Report Purpose

6.1 The purpose of a forensic engineering report is to elucidate and inform parties and decision-makers, and to facilitate resolution of issues that are, or may become, in litigation or legal proceeding. Forensic engineering is based in part on observation, analysis, and application of scientific principles, laws, and theories. Forensic engineering reports may also address design opinions, human factors, regulatory issues, facts pertinent to adjudication, and other considerations.

6.2 Forensic engineering reports are typically used for these purposes: (1) to define and address alleged defects or malfunctions, (2) to provide information relevant to the damages compensation part of insurance claims, (3) to impart technical information for use by administrative officials and courts of law, or (4) to submit recommendations for use by clients of forensic engineers.

6.3 Forensic engineering reports are a form of technical communication. The word forensic derives from forum, meaning a council or place of discussion. Forensic engineering reports are likely to be subjected to technical critique, adverse interpretation, and cross-examination in the legal forum.

6.4 **Appendix X1** discusses issues surrounding representation of forensic engineering reports in electronic form.

## 7. Report Content

7.1 Candidates for sections of a report are given below. In short reports, the text may flow without division into sections. Long reports may warrant section headings such as suggested here, and may also require subheadings to maintain continuity.

### 7.2 Identification:

7.2.1 At the beginning of the report, list the relevant identifying information by means of a cover sheet, a corporate letterhead, plain text, or a combination thereof. Identification and reference information may include: (1) author; (2) client or other entity who commissioned the report; (3) incident short title (for example, fire loss, crane malfunction, water damage, illicit transaction, electric shock, code violation, etc.); (4) date of incident; (5) geographic location (including street address and earth coordinates if appropriate); (6) affected parties (insured, plaintiff, claimant, defendant, etc.); (7) claim number or case number if assigned; (8) case caption and court docket number if filed; and (9) author’s file reference and report date.

### 7.3 Introduction:

7.3.1 An introductory section may be provided to relate the purpose or intent of the investigation, or to state the issue(s) being addressed, or to ask the question(s) to be resolved by the investigation.

7.3.2 The introduction may also define one’s assignment or the scope of work, along with expressing confidentiality restrictions or similar disclaimers if necessary.

7.3.3 For lengthy reports, an Introduction and Summary section, or an Executive Summary, may include a brief of the conclusions or opinions.

7.3.4 An early overview may be useful for long or complex reports, in order to provide context for the analysis that follows. A reader may appreciate learning in the Introduction that, “This report concludes that the cause of the incident was a defect in the cruise control while operating in the low-speed radar-following mode.” or a similarly terse extract.

### 7.4 Qualifications:

7.4.1 It may be opportune to condense the qualifications of the author. For instance, state relevant licensure or certification to differentiate the author’s expertise from that of lay witnesses.

7.4.2 If pertinent to the report, give the level of experience both in general (for example, forensic engineering) and specific to the subject of the report (for example, electrical incidents). Identify positions held, papers published, or testimony given.

7.4.3 The qualifications stated in the body of the report might be just enough to represent that the author is qualified to expound on the subject. When a lengthy CV (*curriculum vitae*) is necessary, move it to an appendix or enclosure. Reference to the author’s available CV may suffice, such as one posted on an