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Standard Guide to Walkway Auditor Qualifications[1]

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1. Scope

1.1 This guide outlines basic knowledge topics that walkway auditors should consider (where applicable) when conducting audits of pedestrian walkways.

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:*[2]

F2508 Practice for Validation, Calibration, and Certification of Walkway Tribometers Using Reference Surfaces

3. Terminology

3.1 *Definitions:*

3.1.1 *walkway tribometer, n*—any apparatus used to measure the frictional forces acting at an interface between a walkway surface and shoe material. **F2508**

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *walkway auditor, n*—a person competent to offer reliable observations and opinions regarding the conformance of an audited walkway to relevant safety guidelines or requirements.

3.2.2 *guiding document, n*—a standard, regulation, law, code, directive, statute, ordinance, or similar document that nominally limits, requires, or otherwise guides certain activities or conditions; the specific relevance or applicability of the document may vary.

4. Significance and Use

4.1 Characterizing the safety of a pedestrian walkway is a significant task, whether as a proactive effort or in response to an

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

incident. In addition to experience, the qualifications for a walkway auditor should include reasonable familiarity with guiding documents, sources for research, walkway tribometry, and walkway safety. This guide outlines topics for a walkway auditor training course intended to facilitate that familiarity.

4.2 As certain countries have codified requirements for the methods to be used in walkway auditing, it would be impractical to keep this guide current with those requirements. Though elements of practice in other countries may be similar, the focus of this guide is on the practice of walkway auditing in the United States.

4.3 Additional information is provided in Appendix X1.

5. Basic Knowledge Topics

5.1 *Goals and Terminology of Walkway Auditing:*

5.1.1 Use of terminology.

5.1.2 Pedestrian safety.

5.1.3 Incident investigation.

5.2 *Selected Information Sources:*

NOTE 1—Inclusion in this section does not imply applicability or relevance to a particular audit.

5.2.1 *Standards Development Organization Accrediting*—ANSI: American National Standards Institute (http://www.ansi.org).

5.2.2 *Standards Development Organizations:*

5.2.2.1 ASSP/ANSI: American Society of Safety Professionals (http://www.assp.org), A1264 Subgroup – Standards for Walking/Working Surfaces.

5.2.2.2 ASTM International (http://www.astm.org), D21 Polishes Technical Committee.

5.2.2.3 ASTM International (http://www.astm.org), F13 Pedestrian/Walkway Safety & Footwear Technical Committee.

5.2.2.4 ASTM International (http://www.astm.org), F15 Consumer Products Technical Committee.

5.2.2.5 ICC/ANSI: International Code Council (http://www.iccsafe.org), A117 Committee: Architectural Features and Site Design of Public Buildings and Residential Structures for Persons with Disabilities.

5.2.2.6 ICC: International Code Commission (http://www.iccsafe.org), Building Code Action Committee.

5.2.2.7 IESNA: Illuminating Engineering Society of North America (http://www.iesna.org).

5.2.2.8 NEMA/ANSI: National Electrical Manufacturing Association (http://www.nema.org), Accredited Standards Committee Z535 on Safety Signs and Colors.

5.2.2.9 NFPA: National Fire Protection Association (http://www.nfpa.org), Technical Committee on Fire Protection Features.

5.2.2.10 TCNA/ANSI: Tile Council of North America (http://www.tcnatile.com), ASC 108 for Ceramic/Glass Tile and Hard Surface Flooring.

5.2.2.11 UL: Underwriters Laboratories (http://www.ul.com).

5.2.3 *State, County, and Local Guiding Documents:*

5.2.3.1 State, county, and local websites.

5.2.3.2 Municipal code publishers.

5.2.4 *U.S. Federal Government Guiding Documents:*

5.2.4.1 OSHA: Occupational Safety & Health Administration (http://www.osha.gov).

5.2.4.2 ADA: Americans with Disabilities Act (http://www.ada.gov).

5.2.4.3 Code of Federal Regulations (http://www.gpo.gov/fdsys).

5.2.4.4 Federal Register (http://www.gpo.gov/fdsys).

5.2.4.5 United States Code (http://www.gpo.gov/fdsys).

5.2.5 *Guiding Document Preambles and Archives.*

5.2.6 *Legal Resources and Case Law*—LexisNexis (http://www.lexis.com).

5.2.7 *Technical Publications and Journals.*

5.3 *Development Process for U.S. Standards.*

5.4 *Gait Mechanics and Traction Demand.*

5.5 *Fall Mechanics.*

5.6 *Walkway Design Characteristics:*

5.6.1 Facility design elements.

5.6.2 Means of egress.

5.6.3 Accessible routes.

5.6.4 Stairs.

5.6.5 Curbs.

5.6.6 Ramps.

5.6.7 Doorways.

5.6.8 Landings.

5.6.9 Walkway furnishings.

5.6.10 Contaminants.

5.6.11 Illumination.

5.6.12 Use of color and contrast.

5.7 *Walkway Material Characteristics.*

5.8 *Walkway Material Types:*

5.8.1 Manufactured.

5.8.2 Fabricated-in-place.

5.8.3 Natural.

5.8.4 Coatings.

5.9 *Carpet, Rugs, and Mats.*

5.10 *Maintenance.*

5.11 *Footwear.*

5.12 *Walkway ~~Tribometry.~~Tribometry:*

5.12.1 Periodic performance evaluation of tribometers.

5.12.2 Interlaboratory studies, precision, and bias.

5.13 *Correlation of Walkway Tribometer Testing to Human Subject Research.*

5.14 *Validation, Calibration, and Certification of Walkway Tribometers.*

5.15 *Conducting the Walkway Audit.*

6. Keywords

6.1 audit; pedestrians; slip resistance; tribometer; walkways

APPENDIX

(Nonmandatory Information)

X1. BASIC KNOWLEDGE TOPICS

X1.1 Goals and Terminology of Walkway Auditing

X1.1.1 *Use of Terminology*—Coefficient of friction, slip resistance, traction.

X1.1.2 *Pedestrian Safety*—Proactive audits, research.

X1.1.3 Incident investigation.

X1.2 Selected Information Sources

NOTE X1.1—Inclusion in this section does not imply applicability or relevance to a particular audit.

X1.2.1 *Guiding Documents from Standards Development Organizations:*

X1.2.1.1 *ASSP/ANSI:* [3]

(1) A1264.1 Safety Requirements for Workplace Walking/Working Surfaces and Their Access; Workplace Floor, Wall and Roof Openings; Stairs and Guardrails Systems

(2) A1264.2 Standard for the Provision of Slip Resistance on Walking/Working Surfaces

(3) TR-A1264.3 Technical Report: Using Variable Angle Tribometers (VAT) for Measurement of the Slip Resistance of Walkway Surfaces

X1.2.1.2 *ASTM D21*[2]—D2047 Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine

X1.2.1.3 *ASTM F13:* [2]

(1) F609 Standard Test Method for Using a Horizontal Pull Slipmeter (HPS)

(2) F1637 Standard Practice for Safe Walking Surfaces

(3) F1646 Standard Terminology Relating to Safety and Traction for Footwear

(4) F1694 Standard Guide for Composing Walkway Surface Investigation, Evaluation and Incident Report Forms for Slips, Stumbles, Trips, and Falls

(5) F2048 Standard Practice for Reporting Slip Resistance Test Results

(6) F2508 Standard Practice for Validation, Calibration, and Certification of Walkway Tribometers Using Reference Surfaces

(7) F2913 Standard Test Method for Measuring the Coefficient of Friction (Slip Resistance) of Footwear and Test Surfaces/Flooring Using a Whole Shoe Tester

(8) F2965 Guide for Selection of Walkway Surfaces and Treatments When Considering Aggressive Contaminant Conditions in Commercial and Industrial (Not Including Construction) Environments

(9) F2966 Guide for Snow and Ice Control for Walkway Surfaces

X1.2.1.4 *ASTM F15*[2]—F462 Standard Consumer Safety Specification for Slip-Resistant Bathing Facilities (withdrawn)

X1.2.1.5 *ICC/ANSI*[3]—A117.1 Accessible and Useable Buildings and Facilities

X1.2.1.6 *ICC*[4]—International Building Code

X1.2.1.7 *IES*[5]—LM-64 Photometric Measurements of Parking Areas

X1.2.1.8 *NEMA/ANSI:* [3]

(1) Z535.1 Safety Colors

(2) Z535.2 Environmental and Facility Safety Signs

(3) Z535.3 Criteria for Safety Symbols

(4) Z535.4 Product Safety Signs and Labels

(5) Z535.5 Safety Tags and Barricade Tapes (for Temporary Hazards)

(6) Z535.6 Product Safety Information in Product Manuals, Instructions, and Other Collateral Materials

[3] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.
[4] Available from International Code Council (ICC), 500 New Jersey Ave., NW, 6th Floor, Washington, DC 20001, http://www.iccsafe.org.
[5] Available from Illuminating Engineering Society (IES), 120 Wall Street, Floor 17, New York, NY 10005, http://www.iesna.org.

X1.2.1.9 *NFPA 101*[6]—Life Safety Code

X1.2.1.10 *TCNA/ANSI A137.1*[3]—Specifications for Ceramic Tile

X1.2.1.11 *TCNA/ANSI A326.3*[3]—Test Method for Measuring Dynamic Coefficient of Friction of Hard Surface Flooring Materials

X1.2.1.12 *UL 410*[7]—Slip Resistance of Floor Surface Materials

X1.2.2 *State, County, and Local Guiding Documents:*

X1.2.2.1 *Municipal Code Publishers:*
(1) Municipal Code Corporation (http://www.municode.com)
(2) Walter H. Drane Company (http://www.walterdrane.com)
(3) American Legal Publishing Company (http://www.amlegal.com)
(4) General Code (http://www.generalcode.com)
(5) Coded Systems LLC (http://www.codedsystems.com)

X1.2.3 *Selected U.S. Federal Government Guiding Documents:*

X1.2.3.1 *OSHA*[8]—29 CFR 1910 Subpart D, Subpart E

X1.2.3.2 *ADA:* [9]
(1) Standards for Accessible Design: 28 CFR 36
(2) Standards for Transportation Facilities: 49 CFR 37
(3) Standards for Transportation Vehicles: 49 CFR 38
(4) Standards for Passenger Vessels: 49 CFR 39

X1.2.4 *Guiding Document Preambles and Archives:*

X1.2.4.1 U.S. Federal Government guiding documents: notices of proposed rulemaking, public comment periods, directives.

X1.2.4.2 State, county, and local guiding documents: jurisdictional variations, multi-entity control.

X1.2.4.3 Consensus standards: access to deliberation documents, ballots, minutes, correspondence.

X1.2.5 *Technical Publications and Journals:*

[6] Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471, http://www.nfpa.org.
[7] Available from Underwriters Laboratories (UL), 2600 N.W. Lake Rd., Camas, WA 98607-8542, http://www.ul.com.
[8] Available from Occupational Safety and Health Administration (OSHA), 200 Constitution Ave., Washington, DC 20210, http://www.osha.gov.
[9] Available from U.S. Department of Justice, Disability Rights Section, 950 Pennsylvania Ave. NW, Washington, DC 20530, http://www.ada.gov.

X1.2.5.1 Applied Ergonomics: Elsevier (http://www.elsevier.com).

X1.2.5.2 Ergonomics: Taylor & Francis (http://www.tandf.co.uk).

X1.2.5.3 Journal of Forensic Sciences: Wiley (http://onlinelibrary.wiley.com).

X1.2.5.4 Gait & Posture: Elsevier (http://www.elsevier.com).

X1.2.5.5 Human Factors - The Journal of the Human Factors and Ergonomics Society: Sage Publications (hfs.sagepub.com).

X1.2.5.6 International Journal of Industrial Ergonomics: Elsevier (http://www.elsevier.com).

X1.2.5.7 Journal of the National Academy of Forensic Engineers: National Academy of Forensic Engineers (http://www.nafe.org).

X1.2.5.8 Professional Safety: ASSE (http://www.asse.org).

X1.2.5.9 Safety Science: Elsevier (http://www.elsevier.com).

X1.2.5.10 Journal of Biomechanics: Elsevier (http://www.elsevier.com).

X1.2.5.11 Clinical Biomechanics: Elsevier (http://www.elsevier.com).

X1.3 Development Process for U.S. Standards

X1.3.1 Consensus development process: committee membership, balance, balloting, negative resolution.

X1.3.2 Selected types of standards: Guides, Practices, Specifications, Safety Standards, Technical Reports.

X1.3.3 Codification and incorporation by reference.

X1.4 Gait Mechanics and Traction Demand

X1.4.1 Locomotion, swing and stance phases.

X1.4.2 Traction demand, forces applied to walkway, utilized/required traction, available traction.