



# AMERICAN NATIONAL STANDARD

*ANSI/ASSE A10.16-1995  
(R2001)  
Safety Requirements for  
Tunnels, Shafts, and  
Caissons—American  
National Standard for  
Construction and  
Demolition Operations*

*ANSI/ASSE A10.16-1995 (R2001)*



AMERICAN SOCIETY OF  
SAFETY ENGINEERS

**ANSI®**

**A10.16-1995 (R2001)**

Revision of  
ANSI A10.16-1988

American National Standard  
for Construction and Demolition Operations

**Safety Requirements for  
Tunnels, Shafts, and Caissons**

Secretariat

**American Society of Safety Engineers**

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**Foreword** (This Foreword is not part of American National Standard A10.16-1995, R2001)

The development of this standard began in the early 1970s. The initial draft was considered by American National Standards Committee on Safety in Construction and Demolition Operations, A10, in 1977. A second addition was published in 1988. This revision of the 1988 edition was based on suggestions and changes from users and the committee.

This standard establishes safety requirements pertaining to the construction of tunnels, shafts, and caissons, and covers environmental control, related facilities, fire prevention, hoisting, haulage, electrical, drilling and blasting, and compressed-air work. It is not intended for application in mining or quarrying operations. It does not supersede legal requirements, nor does it include all of the regulations required by government agencies for this type of construction activity.

This standard is one in a series of safety standards formulated by the American National Standards Committee on Safety in Construction and Demolition Operations, A10. It is expected that the standards will find a major application in industry, serving as a guide to contractors, labor, and equipment manufacturers. For the convenience of the users, existing and proposed standards in the A10 series are listed below:

- A10.3 Powder-Actuated Fastening Systems
- A10.4 Personnel Hoists
- A10.5 Material Hoists
- A10.6 Demolition Operations
- A10.7 Blasting
- A10.8 Scaffolding
- A10.9 Concrete and Masonry Construction
- A10.10 Space Heating Devices
- A10.11 Safety Nets
- A10.12 Excavation (under development)
- A10.13 Steel Erection
- A10.14 Safety Belts and Life Lines
- A10.15 Marine Dredging
- A10.16 Tunnels, Shafts and Caissons
- A10.17 Asphalt/Pavement Construction (under development)
- A10.18 Temporary Floor and Wall Openings, Railings, and Toeboards
- A10.19 Pile Installation and Extraction Operations (under development)
- A10.20 Ceramic Tile, Terrazzo and Marble Work
- A10.22 Rope-Guided and Nonguided Hoists
- A10.24 Roofing (under development)
- A10.27 Asphalt Mixing Plants (under development)
- A10.28 Crane or Derrick Suspended Work Platforms
- A10.31 Digger Derricks
- A10.32 Fall Protection System for Construction Industry Users (under development)
- A10.33 Safety and Health Programs
- A10.34 Public Protection (under development)
- A10.35 High Pressure Hydro Blasting (under development)
- A10.37 Debris Nets (under development)
- A10.38 Safety Program Elements
- A10.39 Safety Audits (under development)
- A10.41 Equipment Operator and Supervisor Qualifications and Responsibilities (under development)
- A10.42 Rigging Supervisor, Riggers, Signalmen Qualifications and Responsibilities (under development)

One purpose of these standards is to serve as guides to governmental authorities having jurisdiction over subjects within the scope of the A10 Committee standards. If these standards are adopted for governmental use, the reference of other national codes or standards in individual volumes may be changed to refer to the corresponding regulations.

**Revisions:** The Committee welcomes proposals for revisions to this standard. Revisions are made periodically (usually 5 years from date of the standard) to the standard to incorporate changes that appear necessary or desirable, as demonstrated by experience gained from the application of the standard. Proposals should be as specific as possible, citing the relevant paragraph number(s), the proposed wording, and a description of the reason for the proposal. Pertinent documentation would enable the A10 Committee to process the changes in a more timely manner.

**Interpretations:** Upon a request in writing to the Secretariat, the A10 Committee will render an interpretation of any requirement of the standard. The request for interpretation should be clear, citing the relevant paragraph number(s) and phrased as a request for clarification of a specific requirement. Oral interpretations are not provided.

**No one but the A10 Committee (through the A10 Secretariat) is authorized to provide any interpretation of this standard.**

**Approval:** Neither the A10 Committee nor American National Standards Institute (ANSI) "approves," "certifies," "rates," or "endorses" any item, construction, proprietary device, or activity.

**Appendices:** Appendices are included in most standards, to provide the user with additional information related to the subject of the standard. Appendices are not part of the approved standard.

**Committee Meetings:** The A10 Committee meets twice a year. Persons wishing to attend a meeting should contact the Secretariat for information.

**Standard Approval:** This standard was processed and approved for submittal to ANSI by the American National Standards Committee on Safety in Construction and Demolition Operations, A10. Approval of the standard does not necessarily imply (nor is it required) that all committee members voted for its approval. At the time it approved this standard, the A10 Committee had the following members:

Matthew J. Burkart, Chairman  
Jim E. Lapping, Vice Chairman  
Phil Schmidt, Secretary

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American National Standard  
for Construction and Demolition —

Tunnels, Shafts, and  
Caissons — Safety  
Requirements

**1 Introduction**

**1.1 Scope**

This standard establishes safety requirements pertaining to the construction of tunnels, shafts, and caissons. The requirements set forth in this standard cover environmental control; related facilities; fire prevention; hoisting; haulage; and electrical, drilling and blasting, and compressed-air work. This standard is not intended for application to mining or quarrying operations.

**1.2 Purpose**

The purpose of this standard is to establish reasonable and practical safety requirements and practices for the construction of tunnels, shafts, and caissons.

**2 Referenced and Related Publications**

This standard is intended for use in conjunction with the following publications

**2.1 Referenced Publications**

Referenced standards shall be deemed to be the most recent date of publication.

ANSI A10.7-1989, Construction and Demolition — Commercial Explosives and Blasting Agents — Safety Requirements for Transportation, Storage, Handling, and Use

ANSI A10.18-1983, Construction and Demolition Operations — Temporary Floor and Wall Openings, Flat Roofs, Stairs, Railings, and Toeboards — Safety Requirements

ANSI A14.1-1990, Ladders — Portable Wood — Safety Requirements

ANSI A14.2-1990, Ladders — Portable Metal — Safety Requirements

ANSI A14.3-1992, Ladders — Fixed — Safety Requirements

ANSI A14.4-1992, Ladders — Job-Made — Safety Requirements

ANSI Z4.1-1986, Sanitation in Places of Employment — Minimum Requirements

ANSI Z41-1991, Personnel Protection — Protective Footwear

ANSI Z89.1-1986, Personnel Protection — Protective Headwear for Industrial Workers — Requirements

ANSI Z136.1-1993, Safe Use of Lasers

ANSI/NFPA 10-1990, Portable Fire Extinguishers

ANSI/NFPA 30-1993, Flammable and Combustible Liquids Code

ANSI/NFPA 70-1993, National Electrical Code

ANSI/ASME Boiler and Pressure Vessel Code — 1992 Edition, Sections VII and IX

**2.1.2 Other Standards**

NEMA WD1-1983, General Purpose Wiring Devices (available from National Electrical Manufacturers Association, 2101 L Street, NW, Washington, DC 20037)

NEMA WD6-1988, Wiring Devices, Dimensional Requirements (available from National Electrical Manufacturers Association, 2101 L Street, NW, Washington, DC 20037)

**2.3 Other Publications**

American Conference of Governmental Industrial Hygienists. Threshold Limit Values and Biological