

Page 1-35

30 Hour Construction Industry Outreach Study Guide



360training.comtm

Table of Contents

Course Description.....	20
Learning Objectives.....	20
Key Terms.....	21
Module 1: Introduction to OSHA.....	36
Module Description.....	36
Module Learning Objectives.....	36
Lesson 1: Introduction to OSHA.....	37
Lesson Focus.....	37
OSHA's Mission	37
Who is Covered by the OSH Act?	38
State Plans.....	40
OSHA's Impact.....	41
Employer Responsibilities	42
Workers' Rights & Responsibilities.....	44
Reporting Safety Hazards	49
Enforcing Standards.....	50
Whistleblower Protections	51
Worker Resources.....	51
Lesson Summary	52
Module 2: Managing Safety and Health	53
Module Description.....	53
Module Learning Objectives.....	53
Lesson 1: Accident Costs and Prevention.....	54
Lesson Focus.....	54
Accident Costs	54
Safety Programs	56
Management Leadership.....	57
Hazard Identification & Assessment.....	57
Education & Training	59
Program Evaluation & Improvement	59
What is a JHA?	66
Hazard Recognition.....	68
Lesson Summary	70

Lesson 2: Accident Causation and Investigation.....	72
Lesson Focus.....	72
Understanding Accident Causation	72
Types of Hazards	72
Accident Theories.....	75
Incident Investigation Techniques	79
Lesson Summary	80
Module 3: OSHA Focus Four Hazards.....	82
Module Description.....	82
Module Learning Objectives.....	82
Lesson 1: Fall Protection.....	83
Lesson Focus.....	83
Case Study.....	83
Falls.....	83
Leading Edge Work.....	85
Ramps, Runways, and Walkways	86
Dangerous Equipment.....	86
Protection from Falling Objects	87
Guardrails.....	88
Safety Net Systems.....	89
Types of Fall Protection—Active Systems.....	90
Lesson Summary	91
Lesson 2: Inspection and Safety Monitoring Systems.....	93
Lesson Focus.....	93
Inspecting Fall Protection Equipment.....	93
Lifelines, Safety Belts, and Lanyard (PPE).....	94
Positioning Device Systems	95
Safety Monitoring System	96
Falling Objects	97
Fall Protection Plan	98
Training	99
Case Study.....	99
Lesson Summary	100
Lesson 3: Electrocution	101

Lesson Focus	101
Introduction	101
Electricity—The Dangers.....	101
Electricity—How It Works	102
Electrical Injuries	102
Electrical Shock.....	103
Burns and Arc Flash.....	104
Falls.....	104
Electrical Hazards and How to Control Them.....	104
Hazard—Overhead Power Lines.....	105
Hazard—Inadequate Wiring	106
Hazard—Defective Cords and Wires.....	107
Hazard—Damaged Cords	107
Arc Flash Hazard	108
Lesson Summary	109
Lesson 4: Electrical Hazards—Other Preventive Measures.....	110
Lesson Focus	110
Grounding	110
Hazard—Overloaded Circuits	111
Power Tool Requirements.....	112
Clues that Electrical Hazards Exist	113
Safety-Related Work Practices	114
Avoiding Wet Conditions	115
Energized Work.....	115
Examples of the Infeasibility to De-Energize	115
Energized Electrical Work Permit.....	116
Approach Boundaries to Energized Parts	117
Preventing Electrical Hazards—Personal Protective Equipment (PPE)	117
Type of PPE for Arc Flash Protection.....	118
Batteries and Battery Charging	119
Lesson Summary	120
Lesson 5: Struck by Hazards	121
Lesson Focus.....	121
What is the Struck-By Hazard?	121

The Danger from Heavy Vehicles	121
Internal Traffic Control Plans for Work Zones	122
Traffic Control Devices	124
Flagger Safety	128
Safety Controls.....	130
Danger from Being Struck by Falling or Flying Objects	131
Ways to Avoid Being Struck by Falling or Flying Objects	131
Properly Use and Inspect Power Tools and Equipment	132
PPE for Power Tools and Equipment.....	132
Working Around Cranes and Hoists	137
Danger from Constructing Masonry Walls.....	138
Abrasive Wheels and Tools.....	138
The Impact of an Accident on the Employer.....	140
Direct Cost of an Accident.....	140
Indirect Cost of an Accident	141
Lesson Summary	142
Lesson 6: Caught in Between Hazards	144
Lesson Focus.....	144
What is the 'Caught in Between' Hazard?	144
General Construction Site Caught-in-Between Hazards	144
Material handling.....	146
Preventing Caught in Between Hazards.....	148
Fall Protection	149
Common Human Performance Snares	149
Multitasking	151
Vague Guidance	152
Peer Pressure	153
Physical Environment.....	155
Mental Stress	155
Lesson Summary	156
Module 4: Personal Protective Equipment	158
Module Description.....	158
Module Learning Objectives.....	158
Lesson 1: Introduction to Personal Protective Equipment.....	159

Lesson Focus.....	159
Overview	159
Personal Protective Equipment Standard.....	159
Payment for PPE.....	160
Employer Responsibilities	160
Selection of PPE	161
Training	161
Maintenance.....	162
Recordkeeping	162
Employee Responsibilities	162
Case Study.....	162
Lesson Summary	163
Lesson 2: Eye, Face, and Respiratory Protection	164
Lesson Focus.....	164
Eye and Face Protection	164
How can eye injuries be prevented?	165
Safe Work Practices.....	166
Respiratory Protection.....	166
Selecting the Correct Respirator	168
Case Study.....	169
Lesson Summary	170
Lesson 3: Head, Hand, Face, and Foot Protection	171
Lesson Focus.....	171
Why Head Protection Is Important	171
Potential Hazards.....	171
How Hard Hats Protect an Employee's Head.....	171
Occupational Noise	172
Caring for Hearing Protection Devices	173
Why Hand Protection Is Important	173
Potential Hazards to the Hand	173
Foot Protection Is Important.....	175
Potential Hazards to the Foot.....	175
Preventative Measures for Foot Safety	176
Lesson Summary	177

Module 5: Health Hazards in Construction	178
Module Description.....	178
Module Learning Objectives.....	178
Lesson 1: Introduction to Hazard Communication Standard	179
Lesson Focus	179
The Hazard Communication Standard (HCS)	179
Hazardous Materials	179
Important Definitions	180
Lesson Summary	182
Lesson 2: Labels, SDSs, Symbols, Hazards, and Training	183
Lesson Focus	183
Labels.....	183
Safety Data Sheet (SDS)	184
Symbols	185
Hazards.....	186
Routes of Exposure-Health Hazards	187
Basic First Aid	188
Blood-borne Pathogens.....	189
Temperature Stress.....	189
Controlling Physical and Health Hazards	190
Hazard Communication Program	191
Training	192
Lesson Summary	192
Lesson 3: Hazardous Materials	193
Lesson Focus.....	193
Introduction	193
Silica.....	193
Asbestos	194
PEL—Permissible Exposure Limit.....	195
MDA—Methylenedianiline	197
Permissible Exposure Limit.....	197
Emergency Situations	198
Medical Surveillance	199
Control Methods.....	200

Lead	201
Worker Protection.....	202
Lesson Summary	204
Module 6: Stairways and Ladders	206
Module Description.....	206
Module Learning Objectives.....	206
Lesson 1: OSHA Standards and Stairways.....	207
Lesson Focus.....	207
OSHA Standards.....	207
Stairways.....	207
Stair rails and Handrails	208
Case Study.....	209
Lesson Summary	209
Lesson 2: Ladders and Training.....	210
Lesson Focus.....	210
About Ladders.....	210
Case Study.....	210
Portable Ladders	211
Damaged and Defective Ladders.....	213
Case Study.....	213
Double-Cleated Ladders	214
Structural Defects.....	214
Training	216
Lesson Summary	217
Lesson 3: Safety Measures.....	218
Lesson Focus.....	218
General Requirements	218
Design, Construction, Maintenance, and Inspection	219
Ladder Rungs.....	221
Toe Clearance.....	221
Fixed Ladders: Safety Devices.....	222
Lesson Summary	223
Module 7: Concrete and Masonry Construction	224
Module Description.....	224

Module Learning Objectives.....	224
Lesson 1: Concrete and Masonry Construction (Part 1).....	225
Lesson Focus.....	225
General Requirements	225
Post-Tensioning Operations.....	225
Concrete Buckets	225
Personal Protective Equipment.....	226
Bulk Concrete Storage	226
Lesson Summary	228
Lesson 2: Concrete and Masonry Construction (Part 2).....	229
Lesson Focus.....	229
Lockout/Tagout Procedures	229
General Requirements for Formwork	229
Shoring and Re-Shoring.....	230
Vertical Slip Forms	230
Reinforcing Steel.....	231
Removal of Form Work	231
Lift-Slab Operations.....	232
Limited Access Zone for Masonry Construction	232
Lesson Summary	233
Module 8: Confined Spaces	234
Module Description.....	234
Module Learning Objectives.....	234
Lesson 1: Overview of Confined Spaces.....	235
Lesson Focus.....	235
Introduction	235
Employer Responsibilities	236
Summary of OSHA's New Confined Spaces Standard	237
Examples of Characteristics of Confined Spaces.....	239
Hazards.....	240
Atmospheric Conditions	240
Safe Work Practices.....	244
Flammable Atmospheres	244
Physical Hazards	245

Other Physical Hazards.....	246
Prevention Program	247
Confined Space Entry Procedures	247
Safety Equipment and Protective Clothing	248
Training	248
Safety Meetings	248
Lesson Summary	249
Lesson 2: Safety and Training Education.....	250
Lesson Focus.....	250
Duties of Employers and Employees.....	250
Rescue and Emergency Services	251
Duties of Authorized Entrants.....	252
Rescue and Emergency Services	253
Testing Protocol	254
Lesson Summary	254
Module 9: Cranes, Derricks, Hoists, Elevators and Conveyors	255
Module Description.....	255
Module Learning Objectives.....	255
Lesson 1: General Standards.....	256
Lesson Focus.....	256
Definition of Competent Person	256
Hazards Associated with Crane Operations.....	256
Accidents.....	257
Lesson Summary	258
Lesson 2: Cranes	259
Lesson Focus.....	259
Types of Cranes.....	259
Load	260
Guarding	261
Sheaves	262
Inspection.....	262
Training	263
Lesson Summary	263
Lesson 3: Cranes and Rigging	265

Lesson Focus	265
Cranes and Derricks	265
Floating Cranes and Derricks	265
Personnel Platforms	266
Platform Specifications	267
Rigging	268
Platform-Related Work Practices	268
Lesson Summary	269
Module 10: Ergonomics	270
Module Description	270
Module Learning Objectives	270
Lesson 1: Ergonomics in the Workplace	271
Lesson Focus	271
Introduction	271
Musculoskeletal Disorders (MSDs)	271
Risk Factors	272
Forceful Exertions	274
Repetitive Tasks or Motions	274
Environmental Factors	275
Noise	276
Lighting	276
Lesson Summary	276
Lesson 2: Improving the Workplace	278
Lesson Focus	278
Introduction	278
Engineering Controls	278
Administrative Controls	280
Modifying Work Practices	281
Regular Housekeeping and Maintenance	281
Use of Protective Equipment	282
Training	283
General Training	284
Lesson Summary	285
Module 11: Excavations	287

Module Description.....	287
Module Learning Objectives.....	287
Lesson 1: Standards and Protection	288
Lesson Focus.....	288
OSHA Standards.....	288
The Dangers of Excavations	289
Protection of Employees	289
Choosing a Protective System	291
Warning System for Mobile Equipment	291
Case Study.....	292
Lesson Summary	293
Lesson 2: Essentials of Excavations	294
Lesson Focus.....	294
Hazardous Conditions	294
Water Accumulation	294
Emergency Rescue Equipment.....	295
Access and Egress.....	296
Falls and Equipment.....	297
Planning	297
Competent Person	298
Lesson Summary	298
Lesson 3: Soil Classification Systems.....	300
Lesson Focus.....	300
Soil Classification	300
Classification of Soil and Rock Deposits	302
Manual Tests.....	303
Lesson Summary	304
Module 12: Fire Protection and Prevention	305
Module Description.....	305
Module Learning Objectives.....	305
Lesson 1: Fire Safety Essentials	306
Lesson Focus.....	306
Fires	306
Types of Fire	307

Fire Extinguishers.....	308
Fire Safety Alarms.....	310
Injuries and First Aid.....	311
Burns.....	312
Lesson Summary	312
Lesson 2: Fire Prevention and Safety Measures.....	314
Lesson Focus.....	314
Ignition Hazards	314
Temporary Buildings	314
Open Yard Storage	315
Indoor Storage	315
Emergency Planning	315
Portable Firefighting Equipment.....	316
Fixed Firefighting Equipment.....	317
Lesson Summary	318
Module 13: Materials Handling, Use and Disposal.....	319
Module Description.....	319
Module Learning Objectives.....	319
Lesson 1: The Hazards and Methods of Prevention (Manual Handling)	320
Lesson Focus.....	320
Introduction	320
Body Movement	320
Methods of Prevention	321
Lesson Summary	323
Lesson 2: Materials Handling Equipment.....	324
Lesson Focus.....	324
Conveyors	324
Cranes.....	325
Safety Inspections.....	325
Slings	326
Powered Industrial Trucks.....	326
Lesson Summary	328
Lesson 3: Ergonomics, Training and Education	329
Lesson Focus.....	329

Ergonomics Safety and Health Principles	329
Fire Safety Precautions	329
Aisles and Passageways.....	330
Training and Education	330
Safety and Health Program Management Guidelines	331
Material Storage	331
Lesson Summary	332
Module 14: Motor Vehicles, Mechanized Equipment and Marine Operations; Rollover Protective Structures and Overhead Protection; and Signs, Signals and Barricades..	333
Module Description.....	333
Module Learning Objectives.....	333
Lesson 1: Subpart O-Motor Vehicles.....	334
Lesson Focus.....	334
General Requirements	334
Transporting Tools and Materials.....	335
Vehicle Inspection	336
Material Handling Equipment	336
Lesson Summary	337
Lesson 2: Subpart W-Rollover Protective Structures for Material Handling (ROPS)...	339
Lesson Focus.....	339
Introduction	339
Design of ROPS.....	339
Labeling.....	340
Lesson Summary	340
Lesson 3: Subpart G-Signs, Signals, and Barricades.....	341
Lesson Focus.....	341
Accident Prevention Signs and Tags.....	341
Danger Signs	341
Caution Signs.....	341
Exit Signs	342
Safety Instruction Signs.....	342
Directional Signs	342
Traffic Signs	342
Lesson Summary	342
Module 15: Safety and Health Programs.....	343

Module Description.....	343
Module Learning Objectives.....	343
Lesson 1: Effective Program Elements	344
Lesson Focus.....	344
Importance of Effective Safety and Health Programs.....	344
Common Characteristics of Exemplary Workplaces.....	344
The Guidelines—General.....	344
Major Elements	345
Lesson Summary	348
Lesson 2: OSHA Safety and Health Programs.....	349
Lesson Focus.....	349
State Programs	349
Consultation Services.....	349
Voluntary Protection Programs (VPPs)	350
Strategic Partnership Program	350
Training and Education	351
Electronic Information.....	352
Lesson Summary	352
Module 16: Scaffolds.....	353
Module Description.....	353
Module Learning Objectives.....	353
Lesson 1: Introduction to Scaffolds	354
Lesson Focus.....	354
What is a Scaffold?	354
Types of Scaffolds.....	354
Lesson Summary	363
Lesson 2: Overview of OSHA Directives for the Construction of Scaffolds	364
Lesson Focus.....	364
Suspension Scaffolds.....	364
Two-Point (Swing Stage).....	364
Single-Point Adjustable	366
Catenary.....	366
Multi-Point Adjustable.....	367
Interior Hung	367

Needle Beam	368
Float (Ship).....	368
Supported Scaffolds.....	368
Fabricated Frame or Tubular Welded Frame	369
Mobile.....	371
Pump Jack	372
Ladder Jack.....	373
Lesson Summary	374
Lesson 3: Scaffold Safety Measures.....	375
Lesson Focus.....	375
Introduction	375
How Do You Minimize the Risks?	375
Guardrails.....	375
Guardrails.....	377
Personal Fall Arrest Systems	378
Types and Components of Personal Fall Arrest Systems	378
PFAS Use Requirements	380
Case Study.....	380
Lesson Summary	381
Module 17: Tools - Hand and Power	382
Module Description.....	382
Module Learning Objectives.....	382
Lesson 1: Safe Use of Hand and Power Tools.....	383
Lesson Focus.....	383
Introduction	383
General Requirements	383
Hazards of Hand and Power Tools	384
Switches.....	385
Power Tools—Precautions.....	385
Lesson Summary	386
Lesson 2: Classification of Tools.....	387
Lesson Focus.....	387
Types of Tools.....	387
Abrasive Wheels and Tools.....	387

Guarding	388
Pneumatic Tools	389
Compressed Air Cleaning	390
Liquid Fuel Tools	390
Jacks	391
General Safety Precautions	392
Case Study	392
Lesson Summary	393
Lesson 3: Mechanical Power-Transmission Apparatus	394
Lesson Focus	394
Introduction	394
Mechanical Power-Transmission Apparatus	394
Prime-Mover Guards	395
Cranks and Connecting Rods	395
Tail Rods or Extension Piston Rods	396
Shafting	396
Guarding Horizontal Shafting	396
Guarding Vertical and Inclined Shafting	397
Projecting Shaft Ends	397
Pulleys	397
Location of Pulleys	398
Belt, Rope, and Chain Drives	398
Horizontal Belts and Ropes	398
Overhead Horizontal Belts	398
Vertical and Inclined Belts	399
Vertical Belts	399
Cone-Pulley Belts	399
Belt Tighteners	399
Gears, Sprockets, and Chains	400
Gears	400
Hand-Operated Gears	400
Sprockets and Chains	400
Openings for Oiling	400
Guarding Friction Drives	401

Keys, Setscrews, and Other Projections	401
Collars and Couplings	401
Collars	401
Couplings	401
Guarding of Clutches, Cutoff Couplings, and Clutch Pulleys.....	402
Guards	402
Belt Shifters, Clutches, Shippers, Poles, Perches, and Fasteners	402
Belt Shifters.....	402
Belt Shippers and Shipper Poles.....	402
Lesson Summary	403
Module 18: Welding and Cutting	404
Module Description.....	404
Module Learning Objectives.....	404
Lesson 1: General Requirements.....	405
Lesson Focus.....	405
Introduction	405
Fire Prevention and Protection.....	406
Case Study.....	407
Welding in Confined Spaces	408
Personnel Protection	408
Health Protection and Ventilation	409
Lesson Summary	409
Lesson 2: Oxygen-fuel Gas Welding and Cutting.....	411
Lesson Focus.....	411
Introduction	411
Cylinders and Containers.....	411
Storage of Cylinders.....	412
Manifolding of Cylinders	414
Service Piping Systems.....	415
Piping Protective Equipment	416
Lesson Summary	417
Lesson 3: ARC Welding and Resistance Welding.....	419
Lesson Focus.....	419
ARC Welding and Cutting	419

Design	420
Installation	420
Supply Connections and Conductors	421
Operation and Maintenance	421
Lesson Summary	423
Module 19: Silica Exposure	424
Module Description.....	424
Module Learning Objectives.....	424
Lesson 1: The Issue	425
Lesson Focus.....	425
Silica.....	425
Over Exposure of Silica.....	426
Silica Exposure Limits	427
Exposure Assessment Options	433
Scheduling Monitoring Option	434
Exposure Control Options	435
Hazard Communication.....	437
Lesson Summary	438
Module 20: Lead Exposure	439
Module Description.....	439
Module Learning Objectives.....	439
Lesson 1: Lead in the Workplace	440
Lesson Focus.....	440
Introduction	440
Lead in the Construction Industry.....	440
Routes of Exposure to Lead.....	441
Activities That Can Cause Lead Exposure	441
Signs and Symptoms of Lead Poisoning.....	442
Medical Monitoring	443
Exposure Assessment.....	443
Lesson Summary	445
Lesson 2: Exposure Reduction & Employee Protection	446
Lesson Focus.....	446
Lead Control Measures	446

Personal Hygiene and Housekeeping Practices	448
Protective Clothing	450
Respiratory Protection.....	451
Record Keeping	452
Lesson Summary	453
Module 21: Asbestos Exposure.....	454
Module Description.....	454
Module Learning Objectives.....	454
Lesson 1: Asbestos in the Workplace	455
Lesson Topics	455
What is Asbestos?.....	455
Why is Asbestos a Hazard?	456
Uses of Asbestos	456
Health Hazards of Exposure to Asbestos.....	457
The Respiratory System.....	457
Asbestos-related Diseases.....	458
Lesson Summary	460
Lesson 2: Protection Against Asbestos	461
Lesson Topics	461
Introduction	461
Sign Specifications	462
Engineering Controls and Safe Work Procedures.....	463
Low-risk Work Activities	463
Decontaminating Workers	467
Controlling Airborne Asbestos Fibers	467
Personal Protective Equipment	469
Respiratory Protection.....	470
Employee Notification of Monitoring Results	471
Lesson Summary	471
Course Summary	473

Course Description

The OSHA 30 Hour Construction Industry Outreach Training course is a comprehensive safety program designed for anyone involved in the construction industry. Specifically devised for safety directors, foremen, and field supervisors; the program provides information on OSHA compliance issues. OSHA recommends Outreach Training Programs as an orientation to occupational safety and health for workers, covered by OSHA 29 CFR 1926. Construction workers must receive additional training, when required by OSHA standards, on specific hazards of the job.

Learning Objectives

At the conclusion of this course, the student will be able to:

- Explain the importance of OSHA in providing a safe and healthful workplace to workers
- Locate OSHA Standards references applicable to specific hazardous conditions and practices (Introduction to OSHA Standards)
- Recognize the aspects of 1926 Subpart C (General Safety and Health Provisions)
- Implement preventative measures for accidents in their workplace (Subpart D - Occupational health and Environmental Controls)
- Describe types of personal protective equipment (PPE), and the requirements for its use in OSHA standards (Subpart E - Personal Protective Equipment)
- Understand the requirements for fire protection in the workplace (Subpart F - Fire Protection and Prevention)
- Identify the various types of rigging equipment used to protect employees (Subpart H - Rigging; Subpart N - Cranes and Rigging)
- Identify the critical health and safety hazards of welding and cutting in the construction industry (Subpart J - Welding and Cutting)
- Identify common electrical hazards and related OSHA standards (Subpart K - Electrical Standards)
- Understand the importance of scaffolding for workers in elevated workplaces (Subpart L - Scaffolding)
- Implement measures for protecting workers and equipment from dangerous falls (Subpart M - Fall Protection)
- Recognize the hazards associated with working in or around excavation sites (Subpart P - Excavations)
- Understand the safety requirements necessary to protect workers around concrete and masonry jobs (Subpart Q - Concrete and Masonry)

- Protect workers who perform jobs on or around stairways or ladders at worksites (Subpart X - Stairways and Ladders)
- List and describe the hazards and prevention required for confined spaces

Key Terms

Acceptable Entry Conditions: Conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required, confined space entry can safely enter into, and work within, the space.

Accident: Harmful event that is unexpected or without apparent cause.

Acetylene: Acetylene forms explosive mixtures with oxygen or air. When dissolved in acetone, it is non-explosive and so is stored as such; however, the acetone is under pressure in steel cylinders for commercial use.

Act: As a statute, decree, or enactment resulting from a decision by a legislative body.

Action Level: The level of lead particulates present in the air that signifies close monitoring is required so that the PEL is not approached. The action level for lead is 30 micrograms per cubic meter (ug/m³) for eight hours.

Administer: Manage or have jurisdiction over, as in federal jurisdiction in Federal Plan States, or state jurisdiction in State Plan States.

Amperes or Amps: The volume of the current flow.

Anchorage: A secure point of attachment for lifelines, lanyards, or deceleration devices.

ANSI: American National Standards Institute

Approved: For the purpose of this course, the word "approved" means equipment that has been listed or approved by a nationally recognized testing laboratory or by federal agencies.

Article: A manufactured item other than a fluid or particle:

- Which is formed to a specific shape or design during manufacture,

- Which has end use function(s) dependent in whole or in part upon its shape or design during end use, and
- Which under normal conditions of use does not release more than very small quantities, e.g., minute or trace amounts of a hazardous chemical and does not pose a physical hazard or health risk to employees.

Asbestosis: An incurable restrictive lung disease often linked to occupational exposure.

Atmospheric Tank: A storage tank which has been designed to operate at pressures from atmospheric through 0.5 psig (pounds per square inch gauge).

Attendant: An individual, stationed outside one or more permit spaces, who monitors the authorized entrants and performs all attendant's duties assigned in the employer's permit space program.

Audible Backup Alarms: These devices must be installed on heavy construction vehicles and maintained in proper working order. They sound an alarm to nearby workers that a dangerous vehicle is backing up.

Authorized Entrant: An employee who is authorized by the employer to enter a permit space.

Authorized Person: A person assigned by the employer to perform a duty or to be at a particular job site.

AWG: American wire gauge (AWG), which is one measurement standard used to size wire.

Barricade: An obstruction to deter the passage of persons or vehicles.

Bearer (Putlog): A horizontal transverse scaffold member (which may be supported by ledgers or runners) upon which the scaffold platform rests and which joins scaffold uprights, posts, poles, and similar members.

Beryllium: A steel-gray, light, strong, brittle, toxic, bivalent metallic element used chiefly as a hardening agent in alloys.

Blast Area: The area where explosives are loaded and blasting operations are carried out.

Blasting Agent: Any material or mixture that consists of a fuel and oxidizer used for blasting, but is not considered an explosive. The ingredients in the blasting agent are also not classified as explosives.

Blasting Cap: A metallic tube that is closed at one end and contains a charge of detonating compounds that can be detonated from the flame of a safety fuse placed into the open end of the tube.

Block: Sheaves or grooved pulleys in a frame with a hook, eye, and strap.

Bloodborne Pathogens: Infectious microorganisms found in human blood can cause diseases such as Hepatitis B and C and the Human Immunodeficiency Virus (HIV).

BLS: Bureau of Labor Statistics

Boatswains' Chair: A single-point adjustable suspension scaffold consisting of a seat or sling designed to support one employee in a sitting position.

Body Belt: A strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration device.

Body Harness: A design of straps which may be secured about the employee in a manner to distribute the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders, with means for attaching the harness to other components of a personal fall arrest system.

Boom: An inclined spar, strut, or other long member supporting the hoisting tackle.

Boom Angle Indicator: An accessory device that measures the angle of the boom base section centerline to horizontal load and the weight of the object being lifted which includes load blocks and hooks, wire ropes, rigging, boom attachments, and ancillary attachments.

Boom Stops: A device used to limit the angle of the boom at its highest position.

Brace: A rigid connection that holds one scaffold member in a fixed position with respect to another member or to a building or structure.

Brake: To slow or stop motion by friction or power.

Cadmium: A bluish-white malleable ductile toxic bivalent metallic element used especially in protective plating and in bearing metals.

Catastrophic Release: A major uncontrolled emission, fire, or explosion, involving one or more highly hazardous chemicals, that presents serious danger to employees in the workplace.

Chemical: Any element, compound, or mixture of elements and/or compounds.

Chimney Hoist: A multi-point adjustable suspension scaffold used to provide access to work inside chimneys.

Chock: A wedge or block used to keep a vehicle parked on an incline from rolling.

Chromium: A blue-white metallic element found naturally only in combination and used especially in alloys and electroplating.

Circuit: Completion of the path of the current; including a voltage source, conductors, and the load (such as a lamp, tool, or heater).

Closed Container: A container so sealed by means of a lid or other device that neither liquid nor vapor will escape from it at ordinary temperatures.

Combustible: A material having a flashpoint of 100 degrees Fahrenheit, or above.

Combustible Liquids: Any liquid having a flash point between 140°F and 200°F.

Combustion: Burning of a material, i.e., a chemical change accompanied by the production of heat and light.

Competent Person: A person who has authorization to take corrective action and is able to recognize existing and predictable hazards.

Concrete: A mixture of cement, sand, aggregate, and water in specific proportions that hardens to a strong stony consistency over varying lengths of time.

Conductors: Materials that contain free electrons that allow current to flow through the material.

Confined Space: A space that, by design and/or configuration, has limited openings for entry and exit, unfavorable natural ventilation, may contain or produce hazardous substances, and is not intended for continuous employee occupancy.

Connector: A device that is used to couple (connect) parts of a personal fall arrest system or positioning device system together.

Container: Any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like that contains a hazardous chemical.

Contaminant: Any material which by reason of its action upon, within, or to a person is likely to cause physical harm.

Controlled Access Zone: A work area designated and clearly marked in which certain types of work (such as overhand bricklaying) may take place without the use of conventional fall protection systems--guardrail, personal arrest or safety net--to protect the employees working in the zone.

Conveyor: A mechanical apparatus for moving articles or bulk material from place to place, like an endless moving belt or a chain of receptacles.

Counterweight: Weights used for balancing loads and the weight of the crane in providing stability.

Coupler: A device for locking together the tubes of a tube and coupler scaffold.

Crane: A large, sometimes mobile machine that is used to transport workers and/or material from one point to another, usually in a vertical direction. These are commonly used in the construction of buildings and ships.

Crawling Board (Chicken Ladder): A supported scaffold consisting of a plank with cleats spaced and secured to provide footing for use on sloped surfaces such as roofs.

Current: Electron flow (measured in amperes).

dBA: Adjusted decibels

Deceleration Device: Any mechanism, such as rope, grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyards, automatic self-retracting/lanyards, which

serve to dissipate a substantial amount of energy during a fall arrest, or otherwise limits the energy imposed on an employee during fall arrest.

Deck: The revolving superstructure or turntable bed.

Department of Labor: The U.S. Federal Agency of which OSHA is a division.

Derrick: A derrick is an apparatus consisting of a mast or equivalent member held at the head by guys or braces, with or without a boom, for use with a hoisting mechanism and operating ropes.

Detonating Cord: A flexible cord that is filled with high explosives. When detonated, these explosives have enough strength to detonate other explosives they contact.

Detonator: Blasting caps, electric blasting caps, delay electric blasting caps, and non-electric delay blasting caps.

Double-Cleat Ladder: A ladder with a center rail to allow simultaneous two-way traffic for employees ascending or descending.

Drum: The spool or cylindrical member around which cables are wound for raising and lowering loads.

Electric Blasting Cap: A blasting cap designed for and capable of detonation by means of an electric current.

Electric Shock: The physical effect nerve stimulation and/or muscle contraction caused by the flow of current through the body.

Electrocution: Death caused by electrical shock.

Emergency: Any occurrence (including any failure of hazard control or monitoring equipment), or event, internal or external to the permit space that could endanger entrants.

Employer: A contractor or subcontractor.

Entry Permit: A written or printed document that is provided by the employer to allow and control entry into a permit space and that contains the information specified in section (f) of the standard.

Excavation: A man-made cut, cavity, trench, or depression formed by earth removal.

Excavation Work: Excavation-related work is a major cause of caught in between hazards. In 2005, the vast majority of caught in between hazard citations were related to excavation operations.

Explosive: A chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.

Facility: The buildings, containers, or equipment that contain a process.

Failure: Load refusal, breakage, or separation of components.

Federal: Being part of, or pertaining to, the United States government.

Fixed Ladder: A ladder that cannot be readily moved or carried because it is an integral part of a building or structure.

Flammable: A material having a flashpoint below 100 degrees Fahrenheit. Also, is capable of being easily ignited and of burning intensely, or having a rapid rate of flame spread.

Flammable Liquids: Means any liquid having a flash point below 140°F and having a vapor pressure not exceeding 40 pounds per square inch (absolute) at 100°F.

Flash Point: The lowest temperature at which the vapors of a liquid can catch fire.

Forklift: A type of powered industrial truck that is used to transport material, clearly identified by the large forks that are capable of vertical motion and are installed at the front.

GFCI: Ground-Fault Circuit Interrupter. A device that detects current imbalance between the circuit conductors and reference to the grounding conductor. If an imbalance or "leak" occurs as small as 5 milliamps (.005 amps) for as little as 1/40th of a second this device will interrupt the circuit, preventing a shock which most people would not feel.

Grounding: An intentional conductive connection to the earth that provides a path back to the source from any conductive portion of the load device or equipment for any fault current that may occur in a circuit.

Guardrail: A protective railing enclosing an elevated platform.

Guardrail System: A barrier erected to prevent employees from falling to lower levels.

Handrail: A rail used to provide employees with a handhold for support.

Hazardous Atmosphere: An atmosphere that may cause death, illness or injury to persons exposed to it because it may be explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen-deficient, toxic, or otherwise harmful.

Hazardous Chemical: Any chemical that poses a physical or health hazard.

Hazards: Sources of danger and risks to health.

HazCom: Hazard Communication Standard.

HCP: Health Care Professional.

Highly Hazardous Chemical: A substance possessing toxic, reactive, flammable, or explosive materials/chemicals.

Hoist: Used to lift and lower load.

Hole: A void or gap 2 inches (5.1 cm) or more in the least dimension in a floor, roof, or other walking/working surface.

Hot Work: Work involving electric or gas welding, cutting, brazing, or similar flame or spark-producing operations.

Hot Work Permit: The employer's written authorization to perform operations—for example: riveting, welding, cutting, burning, and heating—capable of providing a source of ignition.

Inerting: The displacement of the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is.

Inhalation: Breathing in an airborne substance that may be in the form of gases, fumes, mists, vapors, dusts, or aerosols.

Insulators: Materials with few free electrons. Current does not easily flow through insulators, if at all.

Jack: A portable device that uses a mechanical or hydraulic lifting system to raise heavy objects, especially cars, a short distance.

Jib: Extension attached to the boom point to provide added boom length for lifting specified loads.

Job-Made Ladder: A ladder that is fabricated by employees, typically at the construction site and not commercially manufactured.

Lanyard: A flexible line of rope, wire rope, or strap that generally has a connector at each end for connecting the body belt or body harness to a deceleration device, lifeline, or anchorage.

Leading Edge: The edge of a floor, roof, or formwork for a floor or other walking/working surface (such as the deck) which changes location as additional floor, roof, decking, or formwork sections are placed, formed, or constructed.

Lifeline: A component consisting of a flexible line that connects to an anchorage at one end to hang vertically (vertical lifeline) or that connects to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

Limited Access Zone: The area adjacent to masonry wall construction that clearly limits access by all but essential employees.

Liquefied Petroleum Gases (LPG): A material which is composed primarily of any of the following hydrocarbons or their mixtures, such as propane, propylene, butane, and butylenes.

Low-Slope Roof: A roof having a slope less than or equal to 4 in 12 (vertical to horizontal).

Magazine: Any building or structure, other than an explosives manufacturing building, used for the storage of explosives.

Masonry: Stonework—the stone or brick parts of a building or other structure.

Maximum Intended Load: The total load of all persons, equipment, tools, materials, transmitted loads, and other loads reasonably anticipated to be applied to a scaffold or scaffold component at any one time.

Non-Permit Confined Space: A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

Normally Unoccupied Remote Facility: A facility which is operated, maintained, or serviced by employees who visit the facility only periodically to check its operation and to perform necessary operating or maintenance tasks.

Opening: A gap or void 30 inches (76 cm) or more high and 18 inches (46 cm) or more wide, in a wall or partition, through which employees can fall to a lower level.

OSHA: Occupational Safety and Health Administration

Outrigger: The structural member of a supported scaffold used to increase the base width of a scaffold in order to provide support for and increased stability to the scaffold.

Outrigger Beam (Thrustout): The structural member of a suspension scaffold or outrigger scaffold which provides support for the scaffold by extending the scaffold point of attachment to a point out and away from the structure or building.

Outriggers: Support members attached to the crane's carrier frame that are used to level and stabilize the crane.

Oxygen Deficient Atmosphere: An atmosphere containing less than 19.5 percent oxygen by volume.

Oxygen Enriched Atmosphere: An atmosphere containing more than 23.5 percent oxygen by volume.

PCSA: Power Crane and Shovel Association.

Pendants: Stationary wire ropes used to support the boom.

Permissible Exposure Limit (PEL): The maximum level of lead particles in air that can be considered acceptable for normal workplace exposure. The PEL for lead is 50 micrograms per cubic meter (ug/m3).

Permit-Required Confined Space Program (Permit Space Program): The employer's overall program for controlling, and, where appropriate, for protecting employees from, permit space hazards and for regulating employee entry into permit spaces.

Personal Fall Arrest System: A system including, but not limited to, an anchorage, connectors, and a body harness used to arrest an employee in a fall from a working level. As of January 1, 1998, the use of a body belt for fall arrest is prohibited.

Personal Protective Equipment (PPE): All types of protective equipment such as hard hats, gloves, boots, and eye protection, along with respiratory aids.

Physical Hazard: A chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive), or water-reactive.

PLHCP: Physician or other Licensed Health Care Professional.

Point of Access: All areas used by employees for work-related passage from one area or level to another.

Portable Ladder: A ladder that can be readily moved or carried.

Portable Tank: Means a closed container having a liquid capacity of more than 60 U.S. gallons and not intended for fixed installation.

Positioning Device System: A body belt or body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning backwards.

Powered Industrial Trucks: Trucks that are used for the transport of material. They may be modified to operate in hazardous conditions.

Primary Blasting: The blasting operation by which an original rock formation is dislodged from its natural location.

PSI/P.S.I.: Pounds per square inch is the common unit of measurement for pressure. (Example: compressed air.)

Qualified: One who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project.

Radiant Energy: A kind of energy that travels outward in all directions from its sources.

Radius: The horizontal distance from the axis of the rotation of the crane's superstructure to the center of the suspended load.

Reinforcing: Strengthen something; to make something stronger by providing additional external support or internal stiffening for it.

Resistance: Opposition to current flow.

Retrieval System: The equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

Rope Grab: A deceleration device that travels on a lifeline and automatically, by friction, engages the lifeline and locks to arrest a fall.

ROPS: Rollover Protective Structures.

Safety Can: Means an approved closed container of not more than five gallons capacity, having a flash-arresting screen, spring-closing lid and spout cover, and so designed that it will safely relieve internal pressure when subjected to fire exposure.

Safety Fuse: A flexible cord that contains combustible matter that is used to convey fire to blasting caps.

Safety-Monitoring System: A safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

Scaffolds: Framework to support workers; a temporary framework of poles and planks that is used to support workers and materials during the erection, repair, or decoration of a building.

Screw Conveyor: Screw conveyors usually consist of a trough or tube containing either a spiral coiled around a shaft, driven at one end and held at the other, or a Shaftless Spiral, driven at one end and free at the other.

SDS: Safety Data Sheet, a document containing the chemical hazard and safe handling information pertaining to a specific chemical or compound and which is prepared in accordance with the OSHA Hazard Communication Standard.

Self-Retracting Lifeline/Lanyard: A deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under minimal tension during normal employee movement and which, after onset of a fall, automatically locks the drum and arrests the fall.

Shield: Structure able to withstand a cave-in and protect employees.

Shoring: A structure like a metal hydraulic, mechanical, or timber shoring system that supports the sides of an excavation and is used to prevent cave-ins.

Signals: Moving signs, provided by workers, such as flagmen, or by devices, such as flashing lights, to warn of possible or existing hazards.

Signs: Visual warnings of hazard, temporarily or permanently affixed to, or placed at locations, where hazards exist.

Silicosis: An occupational lung disease, this is a respiratory disease caused by the inhalation of silica.

Sills—Building Bottom of Frame: The horizontal part at the bottom of a window or door frame.

Sills—Building Window Ledge: A ledge below a window, especially one on the inside of a building.

Single-Cleat Ladder: A ladder consisting of a pair of side rails connected together by cleats, rungs, or steps.

Slab: Architecture stone base for something; a flat rectangular base or foundation of concrete or stone.

Sloping: A technique that employs a specific angle of incline on the sides of the excavation.

Snap-Hook: A connector consisting of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object.

Stair Rail System: A vertical barrier erected along the unprotected sides and edges of a stairway to prevent employees from falling to lower levels.

Standards: Measure of comparison for quantitative or qualitative value; a criterion.

Steep Roof: A roof having a slope greater than 4 in 12 (vertical to horizontal).

Superstructure: The rotating frame, gantry, and boom or other operating equipment.

Tags: Temporary signs, usually attached to pieces of equipment or structures, to warn of existing or immediate hazards.

TB: Tuberculosis.

Testing: The process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

Title 29 of the Code of Federal Regulations: This is the section of the CFR that contains all OSHA standards and guidelines (29 CFR).

Toeboard: A type of guard installed along the lower edge of scaffold platforms and overhead walkways that is designed to keep tools and other objects from falling and injuring workers below. Installing toeboards is considered an engineering control.

Toxic Substance: A substance that can affect the proper functioning of an organism, resulting in a change in physiology through a chemical process.

Trade Secret: Any confidential formula, pattern, process, device, information, or compilation of information that is used in an employer's business, and gives the employer an opportunity to obtain an advantage over competitors who do not know or use it.

Training: A course of study in which employees are trained to identify and work safely.

Tread Depth: The horizontal distance from front to back of a tread, excluding nosing, if any.

Trench: A narrow excavation made below the surface of the ground in which the depth is greater than the width and the width does not exceed 15 feet.

Ultraviolet Rays: Situated beyond the visible spectrum at its violet end; used to describe radiation having a wavelength shorter than those of visible light and longer than those of x-rays.

Unprotected Sides and Edges: Any side or edge (except at entrances to points of access) of a walking/working surface (e.g., floor, roof, ramp, or runway) where there is no wall or guardrail system at least 39 inches (1 meter) high.

Valve: Device for controlling the flow of fluids (liquids and gases).

Volts: The electrical pressure (measure of electrical force).

Walking/Working Surface: Any surface, whether horizontal or vertical, on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, formwork, and concrete reinforcing steel. Does not include ladders, vehicles, or trailers on which employees must be located to perform their work duties.

Warning Line System: A barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and which designates an area in which roofing work may take place without the use of guardrail, body belt, or safety net systems to protect employees in the area.

Watts: Measurement work produced by the electrical circuit.

Wire Gauge: System used to measure the physical size of wire.

Workplace: An establishment, job site, or project at one geographical location containing one or more work areas.