

OSC 10
Ohio Safety Congress & Expo

Confined space entry/non-entry rescue statistical review (Advanced)
504
Raymond C. Davis, CIPS, CIT, CESM, REP, CET, CES, CHMM
President/CEO, RL Environmental Consulting and Training Inc., Middleburg Heights, OH

Tuesday, March 30, 2010 1 to 2 p.m.

Confined Space Entry/Non-entry Rescue Statistical Review - Advanced **Ohio** Bureau of Workers' Compensation

Objectives:

- * Listed CSE Fatalities from January 2010
- * Review 29 CFR 1920.146 PRCS Citations
- * OSHA's Accident Investigation Summaries
- * OSHA CSE Regulations
- * American National Standards Institute (ANSI) American Society of Safety Engineers (ASSE) Z117.1 - 2003, Safety Requirements for Confined Spaces



Confined Space Entry/Non-entry Rescue Statistical Review - Advanced **Ohio** Bureau of Workers' Compensation

Objectives: cont'd

- * OHIO BWC Public Employee Risk Reduction Program (PERRP) Standards
- * Root Causes of CSE Fatalities/Injuries
- * Controlling confined space hazards
- * CSE non-entry rescue and entry rescue
- * CSE "Contractor" requirements



Confined Space Entry/Non-entry Rescue Statistical Review - Advanced **Ohio** Bureau of Workers' Compensation

Background :

- * 2,000,000 Entries
- * 400 Fatalities
- * Accidents
- * Chemical and Physical Hazards
- * Permit-Required Confined Spaces (PRCS) Final Rule April 15, 1993
- * 29 CFR 1910.146




Confined Space Entry/Non-entry Rescue Statistical Review - Advanced **Ohio** Bureau of Workers' Compensation

Listed CSE Fatalities from January 2010

1/28/2010 Thermal Polymer Systems, LC, Angleton, TX 77515

Workers were coating the interior of a trailer tank; fumes ignited from the trailer tank, causing a flash fire. One worker fatality and two workers were hospitalized.



Source: www.osha.gov

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Listed CSE Fatalities from January 2010

1/21/2010 Color Spot Nurseries, New Summerfield, TX 75780

Worker had entered a soil hopper system while the auger was rotating. Worker's clothes were caught in the rotating auger, pulling the worker's body into the auger.



Source: www.osha.gov

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Listed CSE Fatalities from January 2010

**1/11/2010 HIP Inc.
Milwaukee, WI 53202**

Worker was working on a roof/deck and fell into an elevator shaft, 30-feet.



Source: www.osha.gov

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Listed CSE Fatalities from January 2010

**12/31/2009 Scott Company
Marysville, OH 43040**

Worker in the process area was found under a freight elevator.



Source: www.osha.gov

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Listed CSE Fatalities from January 2010

**12/29/2009 Peterson Grain
Decatur, IN 46733**

Worker fell 80 feet in grain silo.



Source: www.osha.gov

Citations 29 CFR 1920.146 PRCS per SIC 10/08 to 9/09 **Ohio** Bureau of Workers' Compensation

#Cited	#Insp	\$ Penalty	Industry Classification/SIC Division
587	242	\$1,166,425	Division D/Manufacturing
142	39	\$379,028	Division I/Services
125	37	\$736,557	Division E/Transportation, Communications, Electric, Gas, And Sanitary Services
104	23	\$307,662	Division F/Wholesale Trade
83	17	\$163,200	Division C/Construction
14	5	\$23,900	Division B/Mining
11	1	\$13,500	Division A/Agriculture, Forestry, And Fishing
9	7	\$7,059	Division G/Retail Trade
3	3	\$0	Division J/Public Administration

Citations 29 CFR 1920.146 PRCS per SIC Divisions 10/08 to 9/09 **Ohio** Bureau of Workers' Compensation

#Cited	#Insp	\$ Penalty	SIC Division - Division D/Manufacturing
117	50	\$664,349	2000 Food And Kindred Products (10th ranked citation)
33	11	\$20,924	2600 Paper And Allied Products (11th ranked citation)
47	20	\$49,012	2800 Chemicals & Allied Products (10th ranked citation)
17	4	\$28,700	2900 Petroleum Refining & Related Industries (6th ranked citation)
21	12	\$6,878	3000 Rubber And Miscellaneous Plastics Products
9	2	\$18,525	3100 Leather And Leather Products (5th ranked citation)
66	28	\$56,938	3300 Primary Metal Industries (13th ranked citation)
80	31	\$102,205	3400 Fabricated Metal Products, Except Machinery & Transp. Equip.
47	18	\$27,175	3500 Industrial And Commercial Machinery And Computer Equipment

Citations 29 CFR 1920.146 PRCS per SIC Divisions 10/08 to 9/09 **Ohio** Bureau of Workers' Compensation

#Cited	#Insp	\$Penalty	SIC Division - Division D/Manufacturing (cont'd)
16	6	\$39,800	3600 Electronic And Other Electrical Equipment And Components, Except Computer Equipment (13th ranked citation)
26	9	\$51,775	3700 Transportation Equipment
14	4	\$23,015	3900 Miscellaneous Manufacturing Industries (17th ranked citation)



Citations 29 CFR 1920.146 PRCS per SIC Divisions 10/08 to 9/09			
#Cited	#Insp	\$ Penalty	SIC Division - Division I/Services
2	2	\$1,000	7000 Hotels, Rooming Houses, Camps, And Other Lodging Places
8	3	\$7,331	7200 Personal Services (16th ranked citation)
44	9	\$52,554	7300 Business Services (7th ranked citation)
2	2	\$2,188	7500 Automotive Repair, Services, And Parking
63	12	\$30,4976	7600 Miscellaneous Repair Services (3rd ranked citation)
20	8	\$10,380	8000 Health Services (14th ranked citation)
2	2	\$600	8700 Engineering, Accounting, Research, Management, And Related Services
1	1	\$0	8900 Miscellaneous Services



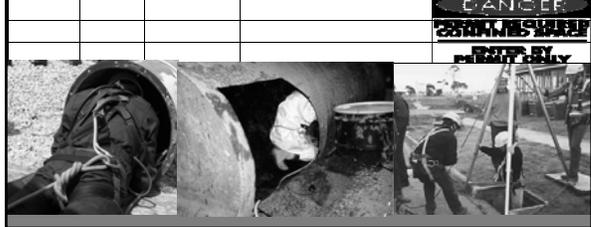
Citations 29 CFR 1920.146 PRCS per SIC Divisions 10/08 to 9/09			
#Cited	#Insp	\$Penalty	SIC Division - Division E/Transportation, Communications, Electric, Gas, And Sanitary Services
23	13	\$27,250	4200 Motor Freight Transportation And Warehousing (24th ranked citation)
17	2	\$30,130	4600 Pipelines, Except Natural Gas (1st ranked citation)
33	5	\$355,988	4700 Transportation Services (2nd ranked citation)
52	17	\$323,190	4900 Electric, Gas, And Sanitary Services (6th ranked citation)



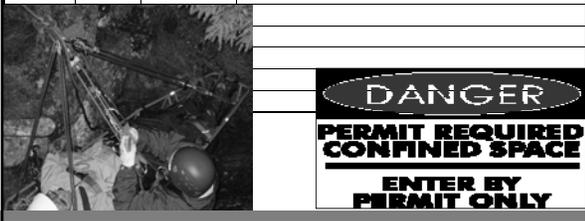
Citations 29 CFR 1920.146 PRCS per SIC Divisions 10/08 to 9/09			
#Cited	#Insp	\$Penalty	SIC Division - Division F/Wholesale Trade
64	11	\$100,638	5000 Wholesale Trade-durable Goods (14th ranked citation)
40	12	\$207,025	5100 Wholesale Trade-non-durable Goods (16th ranked citation)



Citations 29 CFR 1920.146 PRCS per SIC Divisions 10/08 to 9/09			
#Cited	#Insp	\$Penalty	SIC Division - Division C/Construction
7	1	\$6,000	1500 Building Construction General Contractors And Operative Builders
14	4	\$9,200	1600 Heavy Construction Other Than Building Construction Contractors
62	13	\$148,000	1700 Construction Special Trade Contractors



Citations 29 CFR 1920.146 PRCS per SIC Divisions 10/08 to 9/09			
#Cited	#Insp	\$Penalty	SIC Division - Division B/Mining
11	4	\$22,150	1300 Oil And Gas Extraction
3	1	\$1,750	1400 Mining And Quarrying Of Nonmetallic Minerals, Except Fuels (5th ranked citation)



Citations 29 CFR 1920.146 PRCS per SIC Divisions 10/08 to 9/09			
#Cited	#Insp	\$Penalty	SIC Division - Division A/Agriculture, Forestry, And Fishing
11	1	\$13,500	0720 Crop Services



Citations 29 CFR 1920.146 PRCS per SIC Divisions 10/08 to 9/09 

#Cited	#Insp	\$Penalty	SIC Division - Division G/Retail Trade
5	3	\$4,875	5400 Food Stores (19th ranked citation)
1	1	\$334	5500 Automotive Dealers And Gasoline Service Stations
2	2	\$1,350	5800 Eating And Drinking Places
1	1	\$500	5900 Miscellaneous Retail



Citations 29 CFR 1920.146 PRCS per SIC Divisions 10/08 to 9/09 

#Cited	#Insp	\$Penalty	SIC Division - Division J/Public Administration
2	2	\$0	9500 Administration Of Environmental Quality And Housing Programs
1	1	\$0	9700 National Security And International Affairs



Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

Accident Investigation Summary:

- OSHA's Accident Investigation Summaries (OSHA-170 form)
- Keyword "Confined Space" contained 709 summaries from OSHA accident inspections
- March 14, 2005 to March 14, 2010 Query dates



Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

Accident: 202445417 - Employee Dies From Chemical Intoxication
OSHA's Accident Investigation Summaries (OSHA-170 form) example 1

Accident: 202445417 -- Report ID: 0950633 -- Event Date: 12/13/2006

Inspection	Open Date	SIC	Establishment Name
125882159	12/14/2006	3713	Armando Chavira Dba Industrial Equipment

Keywords: asphyxiated, toxic atmosphere, toxic fumes, painter, confined space, ventilation, inhalation, construction, repair

Inspection	Degree	Nature	Occupation
125882159	Fatality	Asphyxia	Painters, construction and maintenance

Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

Accident: 202445417 - Employee Dies From Chemical Intoxication
Establishment Name: Armando Chavira Dba Industrial Equipment

At 12:40 p.m. on December 13, 2006, Employee #1, a painter, was worker for an employer that fabricated dump trucks and water carriage trucks on existing truck cab/chassis assemblies. Employee #1 was spray-coating Dyna-Pro rubberized undercoating, which contained 15 ppm of toluene and 50 ppm of VM&P naphtha solvents, inside of a 2,500 gallon tank that measured 10-feet long by 8-feet wide by 4.5-feet high. He was wearing a full faced air-purifying respirator and three one-gallon undercoating cans were inside the tank. Additionally, there was a 2 feet by 2 feet square hatch opening with a 4-inch high collar that was centered on the top of the tank. As Employee #1 was inside the tank applying the spray coating, he collapsed. Employee #1, who was working alone and was unattended, was discovered by coworkers. The coworkers pulled Employee #1 from the tank and began CPR until emergency medical services arrived. Employee #1 was resuscitated and taken to San Antonio Community Hospital, where he died due to chemical intoxication. The accident investigation revealed that there were no records of Employee #1 having received permit space training.

Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

Group Activity Example 1 time limit 5 min.

Answer CSE Non-compliance questions from Accident: 202445417 Summary

Physical and chemical hazards?
PPE issues?
Hazard controlling equipment?
Atmospheric monitoring equipment?
CSE entry/rescue equipment?
CSE key personnel?
CSE training?
CSE Permit?



Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

Accident: 200355691 - Employee Is Killed After Being Engulfed In Silo
 OSHA's Accident Investigation Summaries (OSHA-170 form) example 2

Accident: 200355691 -- Report ID: 0453710 -- Event Date: 09/24/2006			
Inspection	Open Date	SIC	Establishment Name
310498415	9/25/2006	2048	Nash Johnson & Sons Farms, Inc.
Keywords: silo, grain, mill-plant, fall, fall protection, confined space, roof, hatch, slope, work rules			
Inspection	Degree	Nature	Occupation
310498415	Fatality	Asphyxia	Management related occupations, n.e.c

Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

Accident: 200355691
Employee Is Killed After Being Engulfed In Silo
Establishment Name: Nash Johnson & Sons Farms, Inc.

On September 24, 2006, Employee #1, a mill supervisor, was working alone at a country animal feed grain mill. He climbed 55 ft up a 70 ft caged ladder mounted between two wet corn silos. Employee #1 then cross over a guardrail and proceeded across the silo's conical-shaped, 30-degree-sloped roof. He opened a roof access hatch that measured 30 in. wide by 36 in. long, which led to an area classified as a permit-required confined space. After Employee #1 could not be located, rescue operations were initiated at 2:10 p.m. Emergency responders removed approximately 30,000 bushels of corn by hand before finding Employee #1 at 2:01 a.m. the following morning. He was killed. Employee #1 was not wearing fall protection equipment even though the equipment was available.

Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

Group Activity Example 2 time limit 5 min.

Answer CSE Non-compliance questions from Accident: 200355691 Summary

Physical and chemical hazards?

PPE issues?

Hazard controlling equipment?

Atmospheric monitoring equipment?

CSE entry/rescue equipment?

CSE key personnel?

CSE training?

CSE Permit?



Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

OSHA 29 CFR CSE Regulations

- * General Industry Regulation, §1910.146 Permit-required confined spaces (PRCS)
- * Does not apply to construction industry
- * Construction Safety and Health Regulations Part 1926 do not contain a permit-required confined space regulation
- * Subpart C, §1926.21 Safety training and education specifies training for "confined or enclosed space" entries
- * Construction Regulations address "confined or enclosed spaces":
 - underground construction (Subpart S)
 - underground electric transmission & distribution work (§1926.956)
 - excavations (Subpart P)
 - welding and cutting (Subpart J)



Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

American National Standards Institute (ANSI)
American Society of Safety Engineers (ASSE)

- * Z117.1 - 2003, Safety Requirements for Confined Spaces
- * Minimum confined space safety requirements
- * Entry, exiting and working activities
- * Does not apply to underground mining, tunneling, caisson work
- * OSHA Letter of Support - August 2003



Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

Public Employment Risk Reduction Program (PERRP)
Helping Ohio's public employers in risk management by conducting free safety and health inspections

- ORC 4167-3-04 Amending of existing standards (House Bill 308)
- * Referenced by:
 - "(L) U.S. department of labor [OSHA, 1998] "29 CFR 1910.146; Permit required confined space; final rule." Federal register, vol. 63, no. 230, pages 66018 through and including 66040, December 1, 1998"
 - * Effective December 10, 2007
 - * Prior Effective Dates: 11/15/96 to 5/8/04




Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

NIOSH Fatality Assessment and Control Evaluation (FACE) Program

- * NIOSH In-house FACE began in 1982.
 - traumatic occupational fatalities
 - targeted causes of death
 - included confined spaces, electrocutions, machine-related, falls from elevation, and logging
- * NIOSH State-based FACE began in 1989.
 - conducting surveillance, targeted investigations, and prevention

Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

Root Causes of CSE Fatalities/Injuries

- * No CSE Awareness Training
- * No CSE Program and /or Training
- * No CSE Permit (Hazard Evaluation and Control, PPE)
- * Not following all portions of the CSE Permit



Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

Evaluating Confined Space Hazards 1910.146(c)(1)

- * "The employer shall evaluate the workplace to determine if any spaces are permit-required confined spaces".
- * NOTE: Proper application of the decision flow chart in Appendix A to section 1910.146 would facilitate compliance with this requirement



Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

INITIAL DETERMINATION FLOWCHART FOR CONFINED SPACES §1910.146

If you have an... **ENCLOSED SPACE**

Can it be bodily entered by an individual?
 Does it have a limited or restricted means of entry and egress?
 Is the space unadventitious (i.e. not designed) for continuous employee occupancy?

Then it is a... **CONFINED SPACE**

Does it contain or have the potential to contain a hazardous atmosphere?
 Does it contain a material that has the potential for engulfing an entrant?
 Does it have an internal configuration which could trap or asphyxiate an entrant due to inwardly converging walls or downward sloping floors impeding into a smaller cross-section?
 Does it contain any other recognized serious safety or health hazard?

Then it is a... **PERMIT-REQUIRED CONFINED SPACE**

Based on Appendix A to 1910.146 - Permit-Required Confined Space Decision Flow Chart

Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

Controlling Confined Space Hazards 1910.146(c)(4) CSE Program

- * "The employer shall develop and implement a written permit space program"
- 1910.146(c)(5)(ii)(C) Atmospheric Testing
 - * the internal atmosphere shall be tested
 - * calibrated direct-reading instrument
 - * oxygen, flammable gases/vapors, and for potential toxic air contaminants, in that order
 - * pre-entry testing



Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

Controlling Confined Space Hazards (cont'd) 1910.146(f)(3)-(f)(15) CSE PERMIT

- * "The entry permit that documents compliance with this section and authorizes entry to a permit space shall identify .."
- 1910.146(g)(1)-(g)(4) Training
 - * Training for affected employees
 - * Proficiency with new or revised procedures
 - * Certification of training



Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

CSE Non-entry Rescue
1910.146(k)(3)

- * To facilitate non-entry rescue, retrieval systems or methods shall be used
- * Authorized entrant enters a permit space
- * Unless the retrieval equipment would increase the overall risk of entry
- * Or not contribute to the rescue of the entrant.




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CSE Entry Rescue
1910.146(k)(l)(ii)

- * Evaluate a prospective rescue service's ability
- * Rescue-related tasks and equipment
- * Types of permit spaces identified

1910.146(k)(l)(v)

- * Provide selected rescue team/service with access to all permit spaces
- * Develop appropriate rescue plans and practice rescue operations
- * Non-mandatory Appendix F contains examples of evaluating criteria



Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

CSE Entry Rescue
1910.146(k)(l)(ii)

- * Evaluate a prospective rescue service's ability
- * Rescue-related tasks and equipment
- * Types of permit spaces identified

1910.146(k)(l)(v)

- * Provide selected rescue team/service with access to all permit spaces
- * Develop appropriate rescue plans and practice rescue operations
- * Non-mandatory Appendix F contains examples of evaluating criteria



Self-Rescue 

Entrant is capable of recognizing a hazard and is able to exit from the space with no assistance



Non-Entry Rescue - external 

- Rescue performed from outside the space
- Prior to entry, retrieval systems and body harnesses should be in place



Entry Rescue - internal 

Entry rescue is clearly the form of rescue that presents the greatest risk

Entry rescues should be avoided whenever possible

Entry rescue requires a considerable amount of equipment



Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

CSE "Contractor"
1910.146(c)(8)-(c)(8)(v)(ii)

- * ***"Host employer shall" inform of PRCS entry with a CSE permit***
- * ***Identify hazards of the space***
- * ***Apprise the contractor of any precautions or procedures implemented***
- * ***Coordinate entry operations with contractor***
- * ***Debrief contractor at conclusion of entry***



Confined Space Entry/Non-entry Rescue Statistical Review - Advanced 

CSE "Contractor" (cont.d)
1910.146(c)(9)-(c)(9)(iii)

- * ***"Contractor shall" obtain any information regarding permit space hazards and entry operations from the host employer;***
- * ***Coordinate entry operations with host employer***
- * ***Inform the host employer of the permit space program that the contractor will follow and of any hazards confronted or created in permit spaces, either through a debriefing or during the entry operation***




TEN BASIC RULES FOR CONFINED SPACE ENTRY 

CSE Summary

1. ***PLANNING*** by qualified person
2. ***TRAINING***, entry personnel, attendants, and rescue personnel
3. ***ISOLATION OF SPACE***
4. ***TESTING*** of atmosphere
5. ***VENTILATION***




TEN BASIC RULES FOR CONFINED SPACE ENTRY 

CSE Summary (cont'd)

6. ***ATTENDANT*** and communication
7. ***SAFETY EQUIPMENT*** and proper tools
8. ***ENTRY PERMIT***
9. ***PERIODIC MONITORING*** of atmosphere
10. ***RESCUE PLAN AND EQUIPMENT***