

RESPIRABLE CRYSTALLINE SILICA: EMPLOYEE SAFETY TRAINING

INSTRUCTOR'S MANUAL

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TABLE OF CONTENTS

Part I: Training Session Overview	3
Topic coverage	3
Learning objectives	4
Suggested audience	4
Session format	5
Suggested training session schedule	5
Part II: Training materials overview	6
Presentation slides.....	6
Workshop activities	6
Activity 1: Small Group Discussion.....	6
Activity 2: Video Case Study.....	6
Activity 3: Action Plan	7
Trainee material.....	8
Training assessment.....	8
Training evaluation	9
Appendix A: PowerPoint Presentation Notes	10
Appendix B: Training Assessment	23
Appendix C: Training Evaluation	25

PART I: TRAINING SESSION OVERVIEW

TOPIC COVERAGE

This training addresses silica hazards in the concrete industry. Specifically, the training provides workers with an overview of silica hazards (recognition), methods to control silica exposure (abatement and prevention), and information on the OSHA silica requirements (from 29 CFR 1926.1153). The outline below shows the topics that are covered during the training session.

1. Welcome and Introduction
2. Course Objectives / Needs for Training
 - a. Trainee learning objectives
 - b. Needs for training
 - c. Course roadmap
3. Topic 1: Silica Hazards
 - a. About silica
 - b. Why it is hazardous
 - c. Possible health effects
 - d. Common working tasks/industry where silica hazards exist
4. Activity – Small group discussion – think/pair/share
5. Topic 2: Controlling Exposure to Silica
 - a. Engineering control methods
 - b. Administrative control methods
 - c. Personal protective equipment
6. Activity – Case Study Review
7. Topic 3: Employer Requirements & OSHA Silica Standard
 - a. 29 CFR 1926.1153 overview
 - b. Employer requirements
 - c. Employee's role
8. Activity – Video Analysis and Review
9. Wrap Up and Practical Steps
 - a. Reminder of learning objectives with brief summary of material
 - b. Steps each trainee should take to ensure they are safe when working with silica

LEARNING OBJECTIVES

By the end of the training session, each trainee will be able to:

- Identify silica hazards in their workplace
- Describe controls to reduce silica exposure
- Understand the OSHA requirements for silica safety
- Identify specific steps they can take to reduce their exposure to silica hazards at their job

SUGGESTED AUDIENCE

The targeted audiences for the training are workers that work in high hazard concrete industry.

Employers (e.g. managers, owners, and engineers) will also learn material from the training regarding silica hazards. However, the training will not cover the programmatic aspects of the OSHA silica standard (e.g. exposure assessment, record keeping), so the training is not a comprehensive program for the employer. However, it does provide all necessary information for workers. The training is especially beneficial for small businesses who may not have the personnel or resources to develop the training materials specifically for their company.

The training can also be used for workplaces outside of the concrete industry. Although the examples used in training are for the concrete industry, much of the information could be extended into other industries with similar silica hazards, such as glass, pottery, ceramic, brick, jewelry, and dental products manufacturing industries.

SESSION FORMAT

The training is designed to be presented in a classroom setting. Ideally, the instructor will have a projector on which the presentation slides and videos can be displayed. The training includes three interactive activities, where participants will need to discuss with others in the training session.

SUGGESTED TRAINING SESSION SCHEDULE

A recommended schedule for the training session is provided in Table 1. The training is designed for a 45-minute session. In general, the session includes 15 minutes of evaluation and assessment activities, 14 minutes of content delivery, and 16 minutes of interactive activities.

Table 1. Recommended session schedule

Session Time	Topic	Format
0:00-1:00	Welcome and Introduction	Lecture
1:00-6:00	Trainee Learning Evaluation: Pre-Test	Evaluation
6:00-10:00	Course Objectives; Needs for Training	Lecture
10:00-12:00	Topic 1: Silica Hazards	Lecture
12:00-18:00	Small Group Discussion – Think/Pair/Share	Activity
18:00-20:00	Topic 2: Controlling Exposure to Silica	Lecture
20:00-25:00	Video Case Study	Activity
25:00-27:00	Topic 3: Employer Requirements & OSHA Silica Standard	Lecture
27:00-32:00	Action Plan	Activity
32:00-35:00	Wrap Up and Practical Steps	Lecture
35:00-40:00	Trainee Learning Evaluation: Post-Test	Evaluation
40:00-45:00	Training Session Evaluation: Satisfaction Survey	Evaluation

PART II: TRAINING MATERIALS OVERVIEW

PRESENTATION SLIDES

A set of PowerPoint slides is provided that can be used in classroom training. If a projector or classroom is not available, the slides can be printed and distributed to trainees as a handout. Table 2 (see Appendix A) presents instructor notes and presentation suggestions for using the PowerPoint slides. Instructor notes are also included as notes within the PowerPoint file.

WORKSHOP ACTIVITIES

ACTIVITY 1: SMALL GROUP DISCUSSION

For the first activity, small groups will discuss the following questions. As the course instructor, it is recommended that you use a think-pair-share approach. In this approach, you state the question, then encourage students to think about their own answer quietly. Then, after 30 seconds has passed, ask them to turn to a student near them (forming a pair), and tell the other student their answer. After 60 seconds of the pairs talking, bring the class back together and ask for volunteers to share responses with the entire class. The think-pair-share exercise should take no more than five minutes. The questions for this small group discussion activity are:

1. Are you exposed to crystalline silica at work? If so, describe.
2. What could be the consequences of that exposure?

ACTIVITY 2: VIDEO CASE STUDY

For the second activity, watch the video that accompanies these materials called "SilicaActivity2.mp4." In this video, a man is using a concrete saw to cut a straight line through a slab of concrete. Notice the amount of dust that is coming up from the saw. The man is wearing a face mask to protect himself from

the dust. There is sound in the video, but the activity does not require the sound. After the video plays, ask the trainees to answer the following questions. The questions can be answered using think-pair-share, or as a class-based discussion. The questions are:

1. What silica hazards were in the video?

Possible answers: Silica dust from sawing concrete

2. What types of controls were used for the silica hazard?

Possible answers: Face mask (PPE)

3. What additional controls could be put in place for this job?

Possible answers: Ventilation or wet methods (engineering controls), housekeeping and job rotation (administrative controls)

ACTIVITY 3: ACTION PLAN

This final activity encourages trainees to create an action plan based on the information learned in the training session. The instructor should distribute a few post-it notes and pens to each trainee. Tell the trainees: "Keeping our workplace safe is everyone's responsibility. Your employer has responsibilities such as monitoring the amount of silica you are exposed to, and providing a control plan, training, and PPE. But the employee is also responsible for keeping the workplace safe. What can you do to reduce the risks associated with silica dust? Write your ideas on the post-it notes, then bring them to the front of the room." As trainees complete their notes, you should display them for the entire class to review. It may be helpful to group similar answers together. After all trainees have posted their ideas, review the results with the class. Reiterate the employee's role items from the presentation:

- Use equipment and controls properly
- Be aware
- Participate in training, exposure monitoring, and screening programs
- Don't bring dust home
- Don't eat, drink, smoke, or apply cosmetics while near silica dust

- Wash hands and face outside of dusty areas

TRAINEE MATERIAL

The trainee handout should be given to trainees at the end of the session. The handout includes a summary of the information provided during training that they can reference once training is complete.

The information on the handout is included here, and can be used as reminders in safety bulletins, employee briefings, or other company communications.

What is Respirable Crystalline Silica?

- Small particles of silica dust
- Found in many construction materials

Why is it hazardous?

- If it travels into your lungs, it can lead to lung disease, cancer, or even death
- The particles are too small to see, so you may not realize the risk

Am I at risk?

- It depends on your exposure
 - Long-term exposure to small amounts causes harm
 - Short-term exposure to large amounts causes harm
- Risk increases with certain activities, such as smoking

How can I reduce my risk?

- Follow your company's procedures for controlling the hazard
 - This can include using specially designed equipment, following job rotation schedules, or wearing provided personal protective equipment (PPE) like masks
- Be educated! Attend safety training and safety briefings.
- Participate in screening programs to evaluate your risk
- Don't bring dust home

Figure 1. Information included in trainee handout

TRAINING ASSESSMENT

The training assessment will be conducted to gather feedback from trainees at the end of the training session. The assessment includes seven items for trainees to rate their agreement on a scale ranging

from 1 (strongly disagree) to 7 (strongly agree). There is also a space on the survey for trainees to leave comments. The responses gathered by the trainer from the training assessment will be used for continuous improvement of the training material. The training assessment is provided in Appendix B.

TRAINING EVALUATION

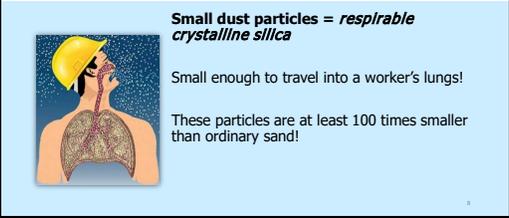
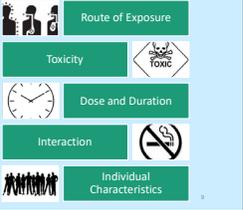
The training evaluation will be conducted through a pre-test and post-test of trainee knowledge. Before the training, trainees should complete the evaluation (pre-test). After the training, trainees should complete the evaluation again (post-test). The evaluation is developed to assess how trainees understand the training material, and how much the training session has improved their understanding. The evaluation includes two types of questions: multiple choice questions and true/false questions. The multiple choice questions are used to test how trainees memorize the basic concepts, while true/false questions are used to evaluate how trainees reflect during a given specific condition. The training evaluation is provided in Appendix C, along with an answer key.

APPENDIX A: POWERPOINT PRESENTATION NOTES

Table 2. Instructor notes for PowerPoint presentation slides

Slide #	Slide Image	Slide Notes
Slide 1	<p style="text-align: center;">Respirable Crystalline Silica</p> <p style="text-align: center;"><i>Employee Safety Training</i></p> 	This training is intended for employees that are exposed to respirable crystalline silica in their jobs.
Slide 2	<p style="text-align: center;">Disclaimer</p> <p style="font-size: small;">This material was produced under grant number SH050475H8 from the Occupational Safety and Health Administration, U.S. Department of Labor. It does not necessarily reflect the views or policies of the U.S. Department of Labor, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.</p>	Disclaimer.
Slide 3	<p style="text-align: center;">Trainee Learning Objectives</p> <p>By the end of the training session, each trainee will be able to:</p> <ol style="list-style-type: none"> 1. Identify silica hazards in their workplace 2. Describe controls to reduce silica exposure 3. Understand the OSHA requirements for silica safety 4. Identify specific steps they can take to reduce their exposure to silica hazards at their job 	These four learning objectives describe what the trainees will be able to do by the end of the training session.
Slide 4	<p style="text-align: center;">Course Roadmap</p> <ul style="list-style-type: none"> • Section 1: Why Silica is Hazardous • Section 2: Controlling Exposure to Silica • Section 3: Employer Requirements & OSHA Silica Standard • Section 4: Summary and Practical Steps 	The training is divided into four sections. In the first section, trainees will learn why silica is hazardous. In the second section, trainees will learn ways to control exposure to silica. In section three, trainees will learn about employer requirements and the OSHA silica standard. They will also learn what their role is with regards to silica safety. In the last section, material will be summarized.

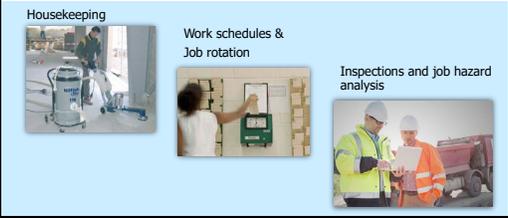
Slide #	Slide Image	Slide Notes
Slide 5	<p style="text-align: center;">Why Silica is Hazardous</p> 	<p>Section 1: Why Silica is Hazardous In this section, training will focus on the first learning objective: "Identify silica hazards in their workplace."</p>
Slide 6	<p>About Silica</p> <p>Crystalline silica is a mineral found in many materials</p> 	<p>Crystalline silica is a mineral found in many materials:</p> <ul style="list-style-type: none"> Stone Rock Concrete Brick Block Mortrar
Slide 7	<p>Silica in Industrial Processes</p> <ul style="list-style-type: none"> • Industrial processes on these materials can cause workers to be exposed to small silica dust particles <ul style="list-style-type: none"> • Cutting, sawing, grinding, sanding, crushing, and drilling 	<p>Industrial processes on these materials can cause workers to be exposed to small silica dust particles</p> <ul style="list-style-type: none"> Cutting, sawing, grinding, sanding, crushing, and drilling <p>Affected industries include:</p> <ul style="list-style-type: none"> Construction Glass manufacturing Pottery products Structural clay products Concrete products Foundries Dental laboratories Paintings and coatings Jewelry production Refractory products Ready-mix concrete Cut stone and stone products Abrasive blasting in maritime, construction, and general industry Refractory furnace installation and repair Railroad transportation Oil and gas operations

Slide #	Slide Image	Slide Notes
Slide 8	<p data-bbox="376 281 594 306">The Hazards of Silica</p> 	<p data-bbox="889 256 1357 319">The small silica dust particles are often called <i>respirable crystalline silica</i></p> <p data-bbox="889 327 1357 390">The particles are small enough to travel into a worker's lungs</p> <p data-bbox="889 399 1334 462">These particles are at least 100 times smaller than ordinary sand</p>
Slide 9	<p data-bbox="376 596 626 621">Is Exposure Hazardous?</p> <p data-bbox="370 651 548 697">Is exposure to crystalline silica hazardous? It depends on various factors:</p> <ul data-bbox="370 697 522 793" style="list-style-type: none"> • Route of exposure • Toxicity • Dose and duration • Interaction • Individual characteristics 	<p data-bbox="889 571 1334 634">Factors that determine if exposure is hazardous</p> <p data-bbox="984 642 1318 705">Route of exposure: contact, ingestion, inhalation</p> <p data-bbox="984 714 1373 777">Toxicity: how much substance is needed to cause harm</p> <p data-bbox="984 785 1390 890">Dose and duration: amount of substance entering body; amount of time you are exposed</p> <p data-bbox="984 898 1341 1033">Interaction: being exposed to other substances at the same time can lead to negative interactions (e.g. smoking)</p> <p data-bbox="984 1041 1357 1104">Individual characteristics: age, gender, diet, use of medication</p>

Slide #	Slide Image	Slide Notes
Slide 10	<p>Possible Health Effects</p> <ul style="list-style-type: none"> • Once respirable crystalline silica reaches a worker's lungs, it can cause: <ul style="list-style-type: none"> • Silicosis – an incurable lung disease that can lead to disability and death • Lung cancer • COPD – chronic obstructive pulmonary disease • Kidney disease 	<p>Once respirable crystalline silica reaches a worker's lungs, it can cause:</p> <ul style="list-style-type: none"> Silicosis – an incurable lung disease that can lead to disability and death Lung cancer COPD – chronic obstructive pulmonary disease Kidney disease <p>Often times it takes years of exposure to respirable crystalline silica for these diseases to manifest</p> <p>Silica is hazardous because:</p> <ul style="list-style-type: none"> It is found in many construction materials Airborne particles are too small to see Silica dust travels deep into your lungs Long-time exposure to small amounts causes harm Short-term exposure to large amounts causes harm Effects are worse if you also smoke Causes lung disease, cancer, even death
Slide 11	<p>Common Work Tasks and Industries where Silica Hazards Exist</p> <ul style="list-style-type: none"> • Manufacturing <ul style="list-style-type: none"> • Glass, pottery, ceramic, brick, concrete, asphalt roofing, jewelry, artificial stone, dental, porcelain, or structural clay products • Industrial sand <ul style="list-style-type: none"> • Use of industrial sand in operations such as foundry work and hydraulic fracturing • Use of industrial sand for abrasive blasting 	<p>Manufacturing</p> <ul style="list-style-type: none"> Glass, pottery, ceramic, brick, concrete, asphalt roofing, jewelry, artificial stone, dental, porcelain, or structural clay products <p>Industrial sand</p> <ul style="list-style-type: none"> Use of industrial sand in operations such as foundry work and hydraulic fracturing Use of industrial sand for abrasive blasting

Slide #	Slide Image	Slide Notes
Slide 12	<p style="text-align: center;">Activity #1</p> <div style="background-color: #c8e6c9; padding: 10px; text-align: center;"> <p>Small Group Discussion Think/Pair/Share</p> </div>	<p>For the first activity, small groups will discuss the following questions. As the course instructor, it is recommended that you use a think-pair-share approach. In this approach, you state the question, then encourage trainees to think about their own answer quietly. Then, after 30 seconds has passed, ask them to turn to a trainee near them (forming a pair), and tell the other trainees their answer. After 60 seconds of the pairs talking, bring the class back together and ask for volunteers to share responses with the entire class. The think-pair-share exercise should take no more than five minutes. The questions for this small group discussion activity are:</p> <ul style="list-style-type: none"> • Are you exposed to crystalline silica at work? If so, describe. •What could be the consequences of that exposure?
Slide 13	<p style="text-align: center;">Controlling Exposure to Silica</p> 	<p>Section 2: Controlling Exposure to Silica In this section, training will focus on the second learning objective: “describe controls to reduce silica exposure.”</p>

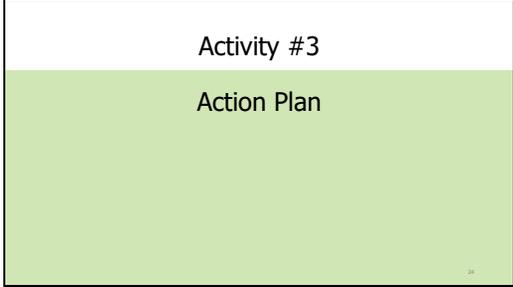
Slide #	Slide Image	Slide Notes
Slide 14	<p>Types of Controls</p> <p>The hazards related to crystalline silica can be controlled using a variety of techniques. The types of controls include Elimination, Substitution, Engineering and Administrative controls, and PPE.</p> <p>Hierarchy of Controls</p> <ul style="list-style-type: none"> Elimination: Physically remove the hazard Substitution: Replace the hazard Engineering Controls: Isolate people from the hazard Administrative Controls: Change the way people work PPE: Protect the worker with Personal Protective Equipment 	<p>The hierarchy of controls describes the effectiveness of various types of controls. It starts on top with the most effective types of controls – elimination. The least effective types of controls are PPE (personal protective equipment). The five types of controls are:</p> <ul style="list-style-type: none"> • Elimination: Physically remove the hazard. • Substitution: replace the hazard. • Engineering controls: Isolate people from the hazard. • Administrative controls: Change the way people work. • PPE: Protect the worker with personal protective equipment. <p>In the case of respirable crystalline silica, the two most effective controls (elimination and substitution) are often infeasible due to the nature of the work being completed and the materials required to complete the work. However, if non-silica materials are available, they may present a useful and safer alternative. In this training, we will focus on controls that fit into the last three categories: engineering controls, administrative controls, and PPE.</p>
Slide 15	<p>Engineering Control Methods</p> <p>Wet methods: Apply water where silica dust is made</p>  <p>Local exhaust ventilation: Removes silica dust at or near the point where the dust is made</p>  <p>Enclosures: Isolate the work process or the worker</p> 	<p>Engineering controls isolate people from the hazard. Engineering controls for crystalline silica include wet methods, local exhaust ventilation, and using enclosures. These methods focus on minimizing the amount of dust that reaches the worker.</p>

Slide #	Slide Image	Slide Notes
Slide 16	<p data-bbox="378 281 699 306">Administrative Control Methods</p>  <p>The slide content includes three images: 'Housekeeping' showing a person cleaning with a vacuum, 'Work schedules & Job rotation' showing a person at a computer, and 'Inspections and job hazard analysis' showing two workers in safety gear reviewing documents. The text 'Administrative Control Methods' is at the top.</p>	<p data-bbox="891 254 1390 495">Administrative controls change the way people work. They reduce the amount of time a person is exposed to the hazard by using methods such as scheduling and job rotation. Housekeeping and job hazard analysis are also used to reduce risk related to silica safety.</p>
Slide 17	<p data-bbox="378 596 693 621">Personal Protective Equipment</p> <p data-bbox="386 638 812 674">Only engineering and administrative controls are not enough</p>  <p>The slide content includes three images of workers wearing different types of respirators: a half-face respirator, a full-face respirator, and a PAPR. Below the images is the text: 'Employers must provide appropriate respirators, and comply with requirements of the silica standard and the OSHA respiratory protection standard (29 CFR 1910.134)'. The text 'Personal Protective Equipment' is at the top.</p>	<p data-bbox="891 569 1357 669">PPE required varies based on level of exposure at work. The PPE can include (from low protection to high):</p> <ul data-bbox="891 680 1263 821" style="list-style-type: none"> • Half face respirator • Full face respirator • PAPR (powered air purifying respirator) <p data-bbox="891 863 1390 963">Additional PPE that can be used to prevent exposure via contact through skin include:</p> <ul data-bbox="891 974 1011 1031" style="list-style-type: none"> • Gloves • Coveralls

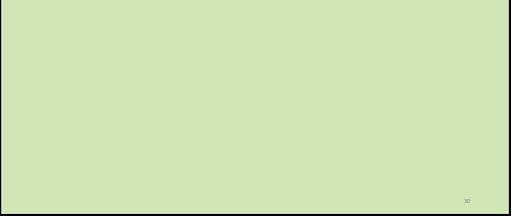
Slide #	Slide Image	Slide Notes
Slide 18	<div style="text-align: center;"> <p>Activity #2</p> <p>Video Case Study</p> <p>Link to Video</p> </div>	<p>For the second activity, play the video that is in the hyperlink above. The video address is: https://www.youtube.com/watch?v=QAKAEcOzb2Q. In this video, a man is using a concrete saw to cut a straight line through a slab of concrete. Notice the amount of dust that is coming up from the saw. The man is wearing a face mask to protect himself from the dust. There is sound in the video, but the activity does not require the sound. After the video plays, ask the trainees to answer the following questions. The questions can be answered using think-pair-share, or as a class-based discussion. The questions are:</p> <ul style="list-style-type: none"> • What silica hazards were in the video? <div style="text-align: center;">Possible answers: Silica dust from sawing concrete</div> • What types of controls were used for the silica hazard? <div style="text-align: center;">Possible answers: Face mask (PPE)</div> • What additional controls could be put in place for this job? <div style="text-align: center;">Possible answers: Ventilation or wet methods (engineering controls), housekeeping and job rotation (administrative controls)</div>
Slide 19	<div style="text-align: center;"> <p>Employer Requirements</p> <p><i>OSHA Silica Standard</i></p>  </div>	<p>Section 3. Employer Requirements and OSHA Silica Standard.</p> <p>In this section, training will focus on learning objective three (“Understand the OSHA requirements for silica safety”) and learning objective four (“Identify specific steps they can take to reduce their exposure to silica hazards at their job”).</p>

Slide #	Slide Image	Slide Notes
Slide 20	<p data-bbox="378 281 802 306">OSHA Silica Standard: 29 CFR 1926.1153</p> <ul data-bbox="378 327 709 348" style="list-style-type: none"> • Provides silica safety requirements for employers 	<p data-bbox="891 256 1386 424">OSHA has a standard that addresses silica safety: 29 CFR 1926.1153. This is a federal standard that applies to exposure respirable crystalline silica in construction work.</p> <p data-bbox="891 468 1341 636">Who must comply with standard: All employers if exposure is above 25 micrograms per cubic meter of air (25 $\mu\text{g}/\text{m}^3$) for an 8-hour time weighted average</p> <p data-bbox="891 646 1325 709">When it went into effect: 2016, with enforcement beginning in 2017.</p>
Slide 21	<p data-bbox="378 743 623 768">Employer Requirements</p> <ul data-bbox="378 789 613 957" style="list-style-type: none"> • Determine the amount of silica that workers are exposed to <ul data-bbox="402 810 574 852" style="list-style-type: none"> • Action level = 25 $\mu\text{g}/\text{m}^3$, averaged over an 8-hour day • Provide worker protection when respirable crystalline silica exposure is above the permissible exposure limit <ul data-bbox="402 926 613 957" style="list-style-type: none"> • Permissible exposure limit = 50 $\mu\text{g}/\text{m}^3$, averaged over an 8-hour day 	<p data-bbox="891 718 1386 1033">Under the OSHA standard, employers are required to measure and monitor workers' exposure to crystalline silica. If the amount of exposure is higher than 25 $\mu\text{g}/\text{m}^3$, averaged over an 8-hour day, the employer must take action. The employer must provide worker protection if the exposure is higher than 50 $\mu\text{g}/\text{m}^3$, averaged over an 8-hour day.</p>
Slide 22	<p data-bbox="378 1068 732 1094">Additional Employer Requirements</p>  <ul data-bbox="518 1115 824 1304" style="list-style-type: none"> ✓ Limit access to areas with respirable crystalline silica ✓ Use dust control and safer work methods ✓ Provide respirators when other controls cannot limit exposure ✓ Provide a written exposure control plan ✓ Restrict housekeeping practices that expose workers to silica ✓ Offer medical exams (chest x-rays and lung function tests) every three years to workers exposed at or above the action level for 30+ days per year ✓ Train workers on silica exposure ✓ Keep records of exposure and medical exams 	<p data-bbox="891 1043 1373 1211">Besides monitoring, employers have additional responsibilities as well. These requirements are important in keeping workers safe and minimizing risk related to silica hazards.</p>

Slide #	Slide Image	Slide Notes
Slide 23	<p data-bbox="378 281 545 310">Employee's Role</p> <ul data-bbox="378 327 591 506" style="list-style-type: none"> ✓ Use equipment and controls properly ✓ Be aware ✓ Participate in training, exposure monitoring, and screening programs ✓ Don't bring dust home ✓ Don't eat, drink, smoke, or apply cosmetics while near silica dust ✓ Wash hands and face outside of dusty areas 	<p data-bbox="889 256 1393 926">As the employee, you have a responsibility as well. Attending this training is an important step in staying safe. Employees must also stay aware and alert for silica hazards. It is important that employees use all equipment and controls properly, including PPE. The engineering and administrative controls are only effective if employees use them properly. Employees should also take care to not bring dust home after work. This will limit exposure time and reduce risk. To do this, employees may choose to change clothes prior to going home, or brush off and shower. Employees should not eat, drink, smoke, or apply cosmetics near areas with silica dust. Employees should wash their hands and face when outside of dusty areas.</p>

Slide #	Slide Image	Slide Notes
Slide 24	<div style="text-align: center;"> <p>Activity #3</p> <p>Action Plan</p> </div> 	<p>This final activity encourages trainees to create an action plan based on the information learned in the training session. The instructor should distribute a few post-it notes and pens to each trainee. Tell the trainees: “Keeping our workplace safe is everyone’s responsibility. Your employer has responsibilities such as monitoring the amount of silica you are exposed to, and providing a control plan, training, and PPE. But the employee is also responsible for keeping the workplace safe. What can you do to reduce the risks associated with silica dust? Write your ideas on the post-it notes, then bring them to the front of the room.” As trainees complete their notes, you should display them for the entire class to review. It may be helpful to group similar answers together. After all trainees have posted their ideas, review the results with the class. Reiterate the employee’s role items from the presentation:</p> <ul style="list-style-type: none"> • Use equipment and controls properly • Be aware • Participate in training, exposure monitoring, and screening programs • Don’t bring dust home • Don’t eat, drink, smoke, or apply cosmetics while near silica dust • Wash hands and face outside of dusty areas
Slide 25	<div style="text-align: center;"> <p>Wrap Up</p> </div> 	<p>Section 4. Wrap Up</p> <p>In this section, material from the training course is summarized for the trainees. The material in this section is organized by the four learning objectives.</p>

Slide #	Slide Image	Slide Notes
Slide 26	<p style="text-align: center;">Learning Objective 1 Review & Summary</p> <p style="text-align: center;">1. Identify silica hazards in their workplace</p> <ul style="list-style-type: none"> • Crystalline silica is a mineral found in many materials: Stone, Rock, Concrete, Brick, Block, Mortar • Industrial processes (cutting, sawing, grinding, sanding, crushing, drilling) on these materials can cause workers to be exposed to small silica dust particles 	<p>Crystalline silica is more common than some people may think. Many construction jobs include materials that create silica dust when processed. Employees need to be aware of where they are exposed to crystalline silica in their jobs.</p>
Slide 27	<p style="text-align: center;">Learning Objective 2 Review & Summary</p> <p style="text-align: center;">2. Describe controls to reduce silica exposure</p> <p style="text-align: center;">Engineering Controls > Administrative Controls > Personal Protective Equipment</p>	<p>The best way to reduce exposure to a hazard is to remove the hazard completely. When silica dust can't be removed from the workplace, using engineering controls is the best approach, followed by administrative controls, and then PPE.</p>
Slide 28	<p style="text-align: center;">Learning Objective 3 Review & Summary</p> <p style="text-align: center;">3. Understand the OSHA requirements for silica safety</p> <p>Some of the requirements of OSHA's Silica Standard are:</p> <ul style="list-style-type: none"> • Measure and monitor silica exposure • Provide worker protection when necessary • Train workers • Keep records 	<p>The employer requirements for silica safety, as outlined in the OSHA silica standard, include measuring and monitoring exposure, providing worker protection, keeping records, and training workers.</p>
Slide 29	<p style="text-align: center;">Learning Objective 4 Review & Summary</p> <p style="text-align: center;">4. Identify specific steps they can take to reduce their exposure to silica hazards at their job</p> <ul style="list-style-type: none"> ✓ Use equipment and controls properly ✓ Be aware ✓ Participate in training, exposure monitoring, and screening programs ✓ Don't bring dust home ✓ Don't eat, drink, smoke, or apply cosmetics while near silica dust ✓ Wash hands and face outside of dusty areas 	<p>Employees should take an active role to keep themselves safe from silica hazards. Employees can reduce their exposure by using equipment properly, participating in training, and being aware.</p>

Slide #	Slide Image	Slide Notes
Slide 30	<p data-bbox="483 289 704 321" style="text-align: center;">Stop Silicosis Video</p> 	<p data-bbox="889 254 1354 321">Play the video that is hyperlinked. The web address is:</p> <p data-bbox="889 331 1390 399">https://www.youtube.com/watch?v=HAByIzQSuU. This video, produced by the U.S. Department of Labor, summarizes many of the topics from this training course, and also clearly communicates the importance of silica safety. The video requires sound, and should be played if enough time remains in the training session. Run time is 3 minutes 15 seconds.</p>
Slide 31	<p data-bbox="477 768 711 800" style="text-align: center;">End of Training</p>  	

APPENDIX B: TRAINING ASSESSMENT

Training Assessment Survey for Silica Safety in Construction Industry

Instructor's Name: _____ Date: _____

Rate your level of agreement with each statement below by circling the corresponding number.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither	Somewhat Agree	Agree	Strongly Agree
1. The instructor was knowledgeable in the subject matter taught.	1	2	3	4	5	6	7
2. The instructions and directions given during class were effective and helpful.	1	2	3	4	5	6	7
3. The training preparation and content helped me accomplish my career/personal goal(s).	1	2	3	4	5	6	7
4. The pace of the training was good for me.	1	2	3	4	5	6	7
5. The handouts and/or supporting resources were very helpful.	1	2	3	4	5	6	7
6. The workshop activities were helpful in improving my understanding of the material.	1	2	3	4	5	6	7
7. Overall, I was satisfied with this training session.	1	2	3	4	5	6	7

Comments:

APPENDIX C: TRAINING EVALUATION

“RESPIRABLE CRYSTALLINE SILICA: EMPLOYEE SAFETY TRAINING”

TRAINING EVALUATION

Trainee’s Name: _____ Date: _____ Pre or Post Test: _____

This evaluation has two types of questions: multiple choice questions and true/false questions. Please circle the most correct answer to each question.

1. Which of the following is true about silica?

- A. Silica occurs naturally
- B. Silica is a chemical compound
- C. Silica is a common mineral
- D. All of the above is true

2. Crystalline silica is a mineral found in many materials, except which of the following?

- A. Stone
- B. Rock
- C. Paper
- D. Brick

3. Which of the following statements is true regarding respirable dust:

- A. Particle size is greater than 10 microns.
- B. You can expel it from the body by coughing, sneezing, blowing your nose.
- C. Can penetrate deep into your lungs.
- D. All of the above statements are true

4. Which of the following factors are able to determine if the exposure is hazardous?

- A. Route of exposure: contact, ingestion, inhalation
- B. Toxicity: how much substance is needed to cause harm
- C. Interaction: being exposed to other substances at the same time can lead to negative interactions (smoking)
- D. All of the above

5. Once respirable crystalline silica reaches a worker’s lung, it can cause many diseases directly except:

- A. Silicosis: an incurable lung disease that can lead to disability and death.
- B. Lung cancer.
- C. High blood pressure.
- D. Kidney disease.

6. Which of the following is NOT a preferred way to control silica?

- A. Apply water where silica dust is made
- B. Remove silica dust at or near the point where the dust is made
- C. Isolate the work process or the worker
- D. Wear company required PPE jacket

7. Engineering controls (such as changing equipment) are more effective at reducing the risk of silica exposure than PPE.

- A. True
- B. False

8. Workers should change into clean clothing before leaving the worksite because contaminated clothing has been found to significantly contribute to silica exposures.

- A. True
- B. False

<i>For instructor use</i>
Evaluation Score: _____ / 8

EVALUATION KEY

Correct answers for the evaluation questions are:

1. D

2. C

3. C

4. D

5. C

6. D

7. A

8. A