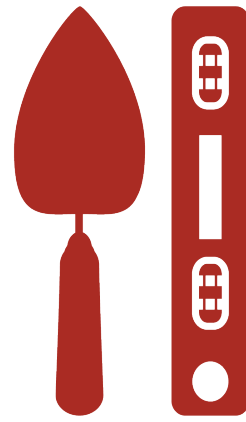


SAVE

SAFETY VOICE

FOR

ERGONOMICS



Training for Masonry Apprentices
2nd Edition

INSTRUCTOR MANUAL



ACKNOWLEDGMENTS

Safety Voice for Ergonomics (SAVE) was developed by occupational safety and health researchers Drs. Dan Anton (Eastern Washington University), Jennifer Hess (University of Oregon), Laurel Kincl (Oregon State University), and Douglas Weeks (Saint Luke's Rehabilitation Institute), in collaboration with the Masonry r2p Partnership.



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The Masonry r2p Partnership worked together to ensure that all stakeholders provided substantial input into development of these materials. This ensures that the final materials are appropriate and practical.

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TRAINING OVERVIEW

SAVE training is available free of charge for all to use.

Videos, manuals and presentations can be downloaded from:

- 1) CPWR at <https://www.cpwr.com> and search for SAVE Training. You can also access the videos via CPWR's Youtube Channel.
- 2) Oregon OSHA at <https://osha.oregon.gov/edu/Pages/index.aspx>
- 3) International Masonry Institute (IMI) at <https://www.imiweb.org>

Strains and sprains, also known as work-related musculoskeletal disorders (MSDs), continue to be a substantial problem in masonry. There are a growing number of ergonomic tools, equipment, and work practices available to reduce exposure to injury risks, and the Masonry r2p Partnership has made promoting their use a priority.

Providing workers, particularly apprentices, with information on how to identify potentially risky work practices and effectively communicate this information to those who can correct the situation is the focus of Safety Voice for Ergonomics (SAVE).

The SAVE training content includes Safety Voice and Ergonomic topics.

A few things to know...

- There are 7 units in total.
- Each unit lasts approximately 30 minutes, for a total of 3.5 hours of training.
- The units can be taught in one longer session or separately.
- A video for each unit leads the instructor and class through the material.
- The units have pictures, videos, examples, discussions, quiz questions and activities that are described in detail in this manual.

SAVE provides masonry apprentices with important knowledge and training to help them stay safe on the job.

By the end of this training apprentices will:

- Know about ergonomic principles and how work-related injuries occur.
- Identify risk factors for injury.
- Practice problem solving skills.
- Provide solutions to reduce their risk of injury.
- Know when and how to speak up about ergonomics and safety hazards at work.

TRAINING OVERVIEW

New Materials for Tile/Terrazzo/Marble and PCC Crafts

In 2020 SAVE units were updated to include materials specific to two additional masonry crafts: tile/terrazzo/marble and PCC/restoration. While video content has not changed the new materials can be found throughout the instructor manual and apprentice workbook. These materials include pictures, quizzes, activities, and discussion talking points that address work-related ergonomic hazards and solutions for Tile and PCC masons.

Before teaching SAVE be sure to watch the SAVE Instructor Orientation PowerPoint, which is available on the website along with the video, instructor manual and apprentice workbook. Also, since there is a lot of information in SAVE, it is important that you read through all of the activities and discussions and make notes for yourself prior to teaching so that you are prepared and comfortable with the material.



HOW CAN THESE MATERIALS BE USED?

If only one craft is being taught (such as only brick & block, tile/terrazzo/marble, or PCC) instructors can simply choose the materials that apply to the craft they are teaching.

If there are multiple crafts at a single training, instructors can break apprentices into discussion groups by craft and have each craft address issues that are specific to them. Discussion topics for each craft will be found in the instructor manual.

TRAINING OVERVIEW

New Materials for Tile/Terrazzo/Marble and PCC Crafts

THINK, PAIR, SHARE

This technique of having people work in groups is called ‘think, pair, share’. It works by having instructors present apprentices with a discussion question. Instruct apprentices to work in groups of 2-5, providing them a minute or two for discussion among themselves. Then, the instructor picks a person from each group to briefly summarize that group’s discussion and conclusions.

In this way, apprentices are able to problem solve issues specific to their craft. By presenting their discussion summary the entire class benefits from the broader application of ergonomic principles and solutions. Allow about 4 minutes for the ‘think, pair, share’ process for each discussion in a unit.

For example, in Unit 7, Activity 2 apprentices could break into groups so that brick and block masons discuss laying heavy block, PCC masons discuss hauling counter weights to a roof and tilers discuss handling large 36” tiles.

Regardless of the unit, instructors should introduce other examples that apply to the crafts present at the training. This helps them relate to the material and feel ‘ownership’ of the issues and solutions.

Quizzes on videos mainly reflect brick and block work. Where appropriate, there are new quiz questions that address allied craft workers. If tilers and PCC apprentices are present, tell them to look in their workbook for quiz questions that are specific to their craft. The instructor manual shows both brick & block quizzes and allied craft quiz questions and answers.

Activity 2: PCC Masons Solution Plan 1 of 2

Instructions: Guide PCC apprentices in considering the issues in this scenario and developing ergonomic solutions. This activity is meant to help apprentices integrate all the knowledge they’ve learned in these units. Have them consider questions in the list below. Then, lead a class discussion to address the issues and their recommendations for implementing the best solution.

SCENARIO 2 PCC Masons

You are starting restoration of exterior brick on an 8 story building. You’ll be setting up several outriggers. You’ll need to carry dozens of 50-lb counter weights to the building roof. The last set of stairs leading to the roof are very narrow and steep. The usual practice is to carry weights manually, 2 weights at a time, one in each hand.

1. Ask apprentices what are the physical risk factors they face in this situation?
Remind them that this activity combines risk factors: carrying heavy weights, awkward postures getting weights up the steep stairs, and repetition. Combining risk factors increases their chances of an injury.
2. Have apprentices describe 2 or more solutions that should be considered to complete this job safely. Have them record their ideas in their workbook.

Possible Solutions	Solution 1 Carry 1 weight at a time (instead of 2) to reduce the stress to the low back	Solution 2 Use a pulley system to pull the weights up the stair case	Solution 3 After the first outrigger is in place, use a crane to transport remaining counterweights to the roof.
Short or long term solution?	Short term	Long term for job duration	Long term for job duration
Who has control?	Worker	Worker and contractor	Worker and contractor
Type of solution? How effective is it?	Work practice solution; mildly effective, safer than carrying two.	Work practice and equipment solution; moderately effective, very safe	Equipment solution; very effective and safe
What are the barriers?	Takes time, more trips	Need pulleys	Have to carry counterweights until outrigger in place

Notes for instructor: As with many masonry job duties, this is a difficult job task with no stellar equipment solutions. There is high risk for injuring the lower back, mid back or shoulders. Solutions include using pulleys to pull weights up the steep stairway, transporting weights on the outrigger or a crane, when available. Are there other solutions?

Recommendations: If carrying weights is the chosen solution, discuss the practicality of carrying one weight at a time, which means more trips. Perhaps suggest using a system of passing weights from one worker to the next, i.e. one person at bottom of stairs carries to the top and hands off to person with a cart (if possible). If it’s a bigger job with different trades talk to the general see if moving weights can piggyback with another trade, ie roofing deliveries.



INFORMATION FOR TEACHING SAVE

This manual is designed to provide instructors with all the information and materials needed to successfully conduct the SAVE training. Instructor notes provided in the right column of each page are discussion suggestions to prompt and guide instructors. They are not scripted as every instructor has their own experiences to relate and teaching style.

SAVE Materials includes:

- .pdf of the student workbook
- narrated instructor orientation video
- video for each unit
- .pdf of the instructor manual

The SAVE Instructor Manual includes:

- Video navigation tips
- Instructions for each unit including: preparation; learning objectives; procedure; and instructor notes for the videos and to address PCC & tile, as well as brick & block masons

The SAVE Apprentice Workbook includes:

- General instructions
- Notes and appropriate worksheets for each unit
- Quizzes for tile, PCC and brick and block masons.

Time Management:

The video for each unit is between 7-15 minutes. There are prompts for the instructor to pause the video for a discussion, quiz or activity. A time estimate for each discussion, quiz question or activity is provided. Budget time for discussions and activities as you see fit, spending more or less time as appropriate for your apprentices' age and knowledge level.

Materials Needed:

SAVE Unit 1 (per apprentice)

- o Activity 1: 6 inch bendable wire and breakable wood lathe or popsicle stick
- o Activity 2: Toilet paper and gloves

SAVE Unit 2 (per apprentice)

- o 2 bricks

SAVE Unit 4 (per every two apprentices)

- o Tape Measure
- o Hand Tools

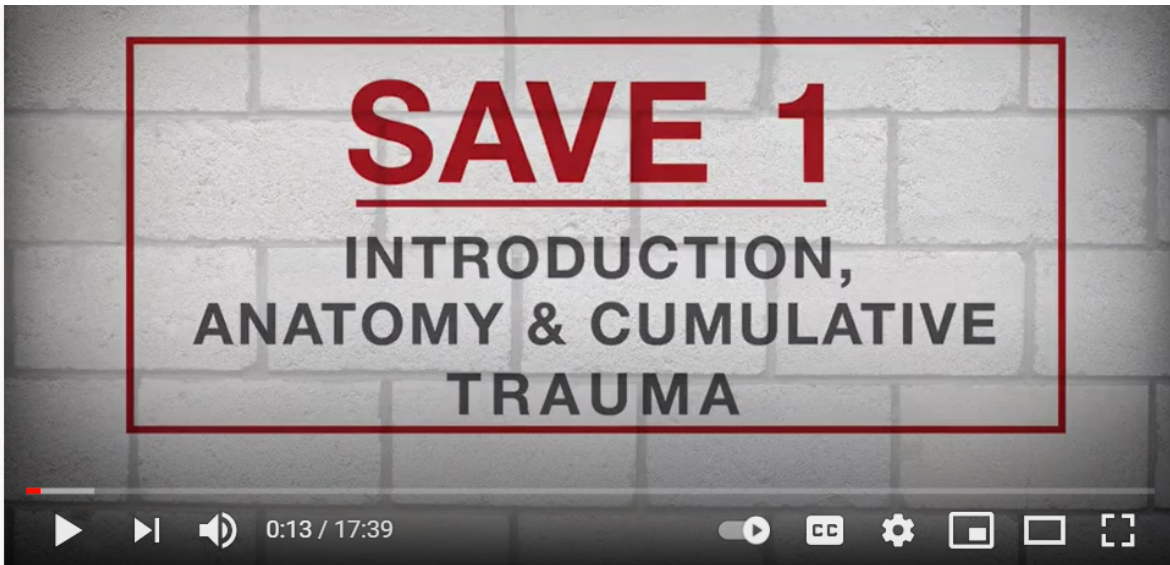


General Instructions:

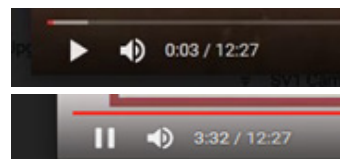
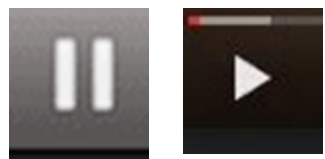
- 1) Start the video for the unit you plan to teach.
- 2) Ensure the video and audio play appropriately.
- 3) After the video of the unit starts, there will be prompts to pause the video for a discussion, quiz question or activity. The indicator looks like the symbol above right.

VIDEO NAVIGATION TIPS

You can access the videos through the CPWR website (search for “Save Training”) or through CPWR’s YouTube Channel.

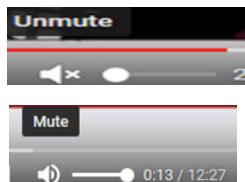
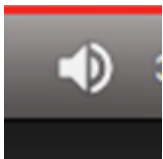


PAUSE/PLAY



Hit the space bar on your computer to pause the video for discussion, activities, and quizzes. Tap the space bar again to play/resume the video.

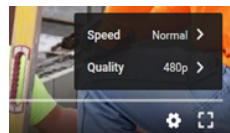
VOLUME



Hover over the volume button with your cursor to adjust the volume of the video up or down.

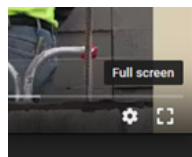
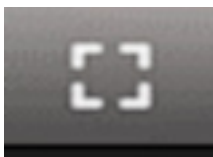
Click on the volume button to mute or unmute the audio.

SETTINGS



Click the settings button to adjust the speed or image quality of the video. For best results, video should be set at a speed of “normal” and the quality should be “480p” (p=pixels).

FULL SCREEN



Click the full screen button on the video to make the video take up the whole computer screen.

To leave the full screen, hit the “Esc” key on your keyboard.

SAVE ORIENTATION FOR INSTRUCTORS

An updated and narrated version of the SAVE Orientation titled **SAVE ORIENTATION FOR INSTRUCTORS** is available to view at CPWR, go to: <https://www.cpwr.com> and search for SAVE Training; from Oregon OSHA at <https://osha.oregon.gov/edu/Pages/index.aspx/> or for IMI instructors through the IMI instructor portal.

Ergonomics and Safety Voice Overview for Instructors



Dan Anton, PT, PhD, ATC - Eastern Washington University

Jennifer Hess, DC, MPH, PhD - University of Oregon

Laurel Kincl, PhD, CSP - Oregon State University

Doug Weeks, PhD - Sacred Heart Medical Center

Why Ergonomics? Masonry is Demanding!

- 38# each block*200/day = 3.8 tons or ~ 2 small SUVs



- 1 Week = 19 tons or ~7 F350 trucks



- 50 weeks/year = 950 tons or ~2 Airbus A380s at landing



Injuries Caused by Cumulative Trauma

- Cumulative trauma is damage that accumulates over time
- Like cancer from smoking, it's sneaky - taking months or years
- Muscles, tendons, ligaments and other 'soft' tissues can be injured



Examples: carpal tunnel syndrome, low back or neck pain, sciatica, rotator cuff injury, and strains and sprains

What is SAVE?

- SAVE stands for **S**afety **V**oice for **E**rgonomics
- 7 units with in-depth materials about:
 - Ergonomics principles and solutions
 - Safety communication and problem solving skills
- Goal: enable apprentices to identify and voice concerns when they see hazards on worksites

Ergonomics Defined: "Work smarter, not harder"

- Ergonomics is much more than stretching!
- Ergonomics is the science devoted to making changes in the work environment and tasks that reduce the risk of a worker being injured
- It is 'designing the work to fit the worker'
- Ergonomics solutions reduce the wear/tear on workers

Injury and Repair

- Cumulative trauma causes microscopic tears
- Tears heal but create adhesions that reduce tissue strength and flexibility
- Repair can take weeks to months
- Working 8 or more hours a day, 5 days a week doesn't allow sufficient healing
- Damage accumulates over time
- Can lead to pain, injury and even disability



Cumulative Trauma



- Masons understand acute injuries, like spraining an ankle or a broken bone
- Many may not understand cumulative trauma or connect it with injuries related to poor ergonomics
- Since cumulative trauma develops over time it results in chronic pain
- Once it manifests, it is difficult to resolve
- Prevention through ergonomics is key!

Musculoskeletal Disorder (MSD)

- Risk factors include:
 - Awkward postures (bending, twisting, reaching, stooping)
 - Static postures
 - Heavy lifting
 - Sudden shift in load
 - Repetitive activities
 - Vibration
- Risk increases by combining risk factors
- Risk increases with frequency, intensity and duration of work



SAVE Emphasizes Effective Solutions

- | | |
|--|--|
| <ol style="list-style-type: none"> 1) Eliminate hazard if possible 2) Engineering Solutions <ul style="list-style-type: none"> • Ergonomically designed tools and equipment • Better materials 3) Administrative Solutions <ul style="list-style-type: none"> • Jobsite layout • Work Sequencing • Ergonomics programs and training 4) Work Practice Solutions <ul style="list-style-type: none"> • Better material handling • Housekeeping • Lift teams for 12" block • Body postures | <p>Most Effective</p> <p>Least Effective</p> |
|--|--|

Masonry Stakeholder Meeting

- In 2004, NIOSH organized a masonry meeting
- Included NIOSH, CPWR, ICE, BAC, laborers, masonry contractors, masons, researchers and ergonomists
- They identified effective ergonomic solutions
- This list is the basis for SAVE ergonomic solutions

Why aren't solutions used more?

	# Innov used	West Coast %	Mid West %	South East %	North East %	Total %
Of the 136 innovation users, significantly fewer innovations used in NE than other regions	0	18.9	20.0	18.4	44.7	25.7
	1	28.3	33.3	23.7	23.4	27.3
	2	26.4	15.6	28.9	25.5	24.0
Most contractors surveyed use only 0-2 innovations	3	18.9	11.1	21.1	4.3	13.7
	4	7.5	15.6	2.6	2.1	7.1
	5	0	4.4	5.3	0	2.2

SAVE wants to enhance use of ergonomic solutions



Most masons, especially young apprentices, lack knowledge of soft skills (Safety Voice) required to communicate hazards and speak up for solutions.

These skills can be taught.

NIOSH Safe Skilled Ready Workforce



Basic workplace safety and health skills are the foundation for a lifetime of safe and healthy work.

Apprentices must have the ability to recognize:

Safe,
Skilled,
Ready:
Basic
Skills

- All workers can be injured, become sick, or killed on the job
- Work-related injuries and illnesses are predictable/preventable
- Hazards at work
- How to prevent injury and illness
- Emergencies at work
- Employer and worker rights and responsibilities
- Resources that help keep workers safe and healthy on the job
- How workers can communicate with others

Safety Voice Defined

Safety Voice is the term used in SAVE to represent the skill of speaking up appropriately about safety hazards.

We want all apprentices to master the skills of:



Communication Lines

- Hierarchy at worksites and within the union.
- Explain to apprentices the chain of command within your local.
- **Who** to talk to, **how** to talk about safety concerns.
- SAVE teaches basic communication skills: eye contact and body language, reflection and active listening.



Problem Solving: Get from complaining to solving

SAVE teaches a simple process (PASS)

- P**roblem – this is the hazard identification step. Apprentices must learn to put their health and safety knowledge to work and be aware of hazards at work.
- A**dvice – this walks apprentices through where and who they can get health and safety information from.
- S**afety – this step is about making a plan to evaluate solutions to make work safer.
- S**olution – is the final step of how to get a solution into practice.

Conflict Resolution: Positive Change

Conflict is a vital and necessary part of human interaction.

SAVE presents some basic steps :

- A**sk questions – be sure to get various perspectives and understand
- B**rainstorm – thinking of as many solutions as possible
- C**hoose – selecting the solution that all involved will be happy with

Conclusions

- Apprentices, as young workers are a vulnerable population and prone to work injuries
- There are many viable ergonomics solutions available for masonry
- SAVE training teaching apprentices about MSD risk factors and viable solutions
- SAVE also guides apprentices to talk about hazards and identifying solutions on the job

ERGONOMICS SOLUTIONS FOR MASONS

This list was developed & compiled by masonry stakeholders over the course of a two day meeting. Enztel P et al, Best Practices for Prevention Musculoskeletal Disorders in Masonry: Stakeholder Perspectives, Applied Ergonomics, 2007.

1) Engineering Solutions

Type of Control	Suggested Control	
Personnel platforms & lifts	<ul style="list-style-type: none"> Mast climbing work platforms 	<ul style="list-style-type: none"> Adjustable tower scaffolding Personnel lifts (for caulkers)
Materials and tool platforms	<ul style="list-style-type: none"> Split-level scaffolding Mortar pan stands 	<ul style="list-style-type: none"> Stock board stands Adjustable-height saw tables
Material handling equipment	<ul style="list-style-type: none"> Silo mortar dispensing systems Hydraulic mixers Grout pumps, Grout Hog Wheelbarrows, buggies, handcarts, dollies 	<ul style="list-style-type: none"> Power pallet movers Power pallet jacks Forklifts Cranes, hoisting equipment
Tools	<ul style="list-style-type: none"> Rebar shakers Dual-handle grinders Power caulking guns Trowels with angled handles 	<ul style="list-style-type: none"> Power washers Decreased vibration saws Cordless tools Tools with cushion-grip handles
Materials	<ul style="list-style-type: none"> Lightweight block H-block, A-block Knock-out block Large blocks 	<ul style="list-style-type: none"> Pre-stressed masonry Self-consolidating grout Pre-blended mortar Reduced-size pallets

2) Administrative Solutions

Type of Control	Suggested Control	
Jobsite layout & materials staging	<ul style="list-style-type: none"> Build scaffolding with access from inside Stock pre-cut shapes to avoid saw cutting Don't overstock (to avoid traffic problems) Pre-plan materials placement Cover unused materials to keep them dry/ 	<ul style="list-style-type: none"> Place Port-a-John on scaffold Use two-way radio for communication to reduce climbing Pre-stock supplies to avoid delays Stage materials close to end use
Work sequencing & scheduling	<ul style="list-style-type: none"> Hold joint meetings to coordinate activities among subcontractors and trades Schedule jobs to utilize equipment 	<ul style="list-style-type: none"> Rotate workers Avoid overtime Schedule regular rest breaks
Participatory ergonomic programs	<ul style="list-style-type: none"> Hold regular labor-management meetings to discuss jobsite ergonomics and possible improvements 	<ul style="list-style-type: none"> Get mason and mason tender feedback on new products
Exercise programs	<ul style="list-style-type: none"> Start each shift with a warm up session 	
Training	<ul style="list-style-type: none"> Provide ergonomics training Strengthen apprentice programs 	<ul style="list-style-type: none"> Reinforce apprenticeship training

3) Work Practice Solutions

Type of Control	Suggested Control	
Transporting materials	<ul style="list-style-type: none"> Manually handle materials on scaffolding only Balance loads (carry 2 buckets instead of 1) Use shovels of appropriate size and length 	
Cutting brick/block	<ul style="list-style-type: none"> Saw cut brick/block instead of using hammer Saw/cut using table saw, not on scaffolding Maintain saw blades 	
Laying brick/block	<ul style="list-style-type: none"> Use two-person lifting Re-temper mortar to keep it soft Use trowel of appropriate size and design 	
Housekeeping and maintenance	<ul style="list-style-type: none"> Keep good housekeeping Maintain tools and equipment Maintain proper scaffolding height 	

Additional Information on Alternative Ergonomics Solutions in Masonry

These slides were not presented with the SAVE train the trainer materials, but are included here for your reference

Administrative Solutions

- Administrative solutions are about managing risks rather than preventing risk
- They are mostly in the control of contractors and supervisors
- Examples include:
 - Jobsite layout and materials staging
 - High lift grouting
 - Work sequencing and scheduling
 - Participatory ergonomics programs
 - Exercise programs
 - Training



Under Utilized Masonry Materials and Work Practice Alternatives

- Lift teams
- Autoclaved Aerated Concrete (AAC)
- High Lift Grouting

Engineering Solutions

- These solutions are mostly in the control of owners and contractors
- Examples include:
 - Platforms and lifts
 - Materials handling equipment (handcarts, dollies, cranes)
 - Better tools (quick-cut saws, cordless tools)
 - Materials (H-block, light weight block, etc)



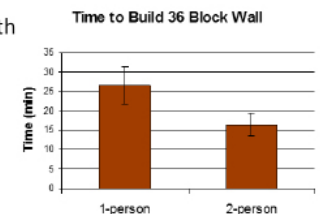
Work Practice Solutions

- These solutions are most in the control of masons
- They involve work activities by masons such as:
 - Transporting materials around the jobsite
 - Cutting brick and block
 - Laying brick and block
 - Housekeeping and maintenance
 - Use of safer body postures



Masonry Study of Lift Teams Found:

- Two-mason lift teams used low back and shoulder muscles less when working at waist level or below
- Higher shoulder muscle use with lift teams when laying block above course 6
- Less physical exertion (fatigue) with lift teams
- Lift teams constructed a wall significantly faster
 - 6 courses, 36 blocks total



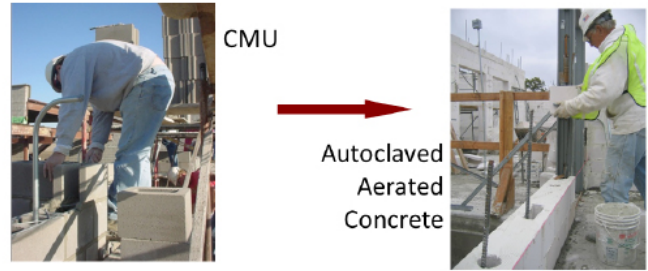
Lighter Materials: AAC



- Autoclaved Aerated Concrete (AAC) is a CMU alternative
- Lighter weight (by area)
- Larger (24" long) so less block handled
- Handling with 2 hands reduces stress to each arm
- Buttering process different – uses tile trowel and Thinset
- Used in Europe for > 60 years



Autoclaved Aerated Concrete (AAC)



Comparison of masons laying CMU and Autoclaved Aerated Concrete (AAC) showed AAC less physically demanding than CMU

Hess JA, Kincl L, Amasay T, Wolfe, P, Ergonomic evaluation of masons laying concrete masonry units and AAC, 2010

AAC has other benefits:

- Pain
 - Masons laying CMU reported more low back and should pain
- Postures
 - No difference in right arm movement or postures with CMU or AAC
 - AAC masons moved their left arm less indicating fewer repetitive motions
 - CMU masons spent more time with left arm above 30° - an awkward posture
- Force & Heart Rate
 - Low back forces high for both CMU and AAC
 - Slightly greater heart rates laying CMU indicating greater fatigue
- Exposure
 - CMU handled longer than AAC indicating greater exposure

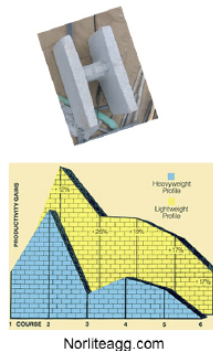
Lifting Over Rebar

Laying block over vertical rebar with a tall lap contributes to shoulder injuries due to repetitive reaching above chest level



H-Block: Productivity & Cost

- Anecdotal evidence suggests H-block and LWB increase productivity 15-50% (depending on vertical rebar spacing)
- With practice no additional breakage
- In California H-block and CMU cost the same per unit
- Cost difference to build with H-block marginal



Productivity & Perception

One masonry study comparing traditional block placement over rebar found:

- More block place per hour with high lift grouting
- Masons thought 'traditional method' required most exertion while high lift grouting required the less



SAVE UNIT 1

INTRODUCTION, ANATOMY & CUMULATIVE TRAUMA

PREPARATION

1. Prior to teaching, watch the video *SAVE Unit 1 – Introduction, Anatomy & Cumulative Trauma* while referring to the following instructor notes. Make your own additional notes to help you guide the apprentices through the unit.
2. Note the quizzes, discussions and activities where they are located in the Apprentice Workbook.

MATERIALS NEEDED:

Activity 1: Wire Bending

- 6 inch bendable wire for each apprentice
- breakable wood lathe or popsicle stick for each apprentice

Activity 2: Simulating Numbness

- roll of 2 ply toilet paper
- gloves for each apprentice

LEARNING OBJECTIVES

1. Define ergonomics and know why it is important.
2. Understand risk factors for cumulative trauma.
3. Identify the causes of work-related musculoskeletal injuries.
4. Know how good ergonomic practices can be used to reduce injuries.

PROCEDURE

1. Welcome apprentices.
2. Make sure that each apprentice has a workbook to follow along with the video. You will ask them to write individual responses in their workbook to any discussion or activity.
3. Start the video for *SAVE Unit 1 – Introduction, Anatomy & Cumulative Trauma*.
4. Be prepared to pause the video by pressing the space bar.
5. Have fun!

TOTAL VIDEO TIME: 17.5 minutes

Please note: The following Instructor Notes do not contain every detail of the unit. They are meant to be an outline and provide you instructions to lead discussions and activities. Key video content is highlighted in the left column and additional instructions and notes in the right column.

INSTRUCTOR NOTES

SAVE UNIT 1 VIDEO

Discussion 1: Phil's Story

Video Content

The injury in the following video is the result of years of heavy lifting

The video provides Phil's testimonial about how he injured his low back at work, resulting in surgery.



Instructor Notes

Phil's testimonial is a 'hook' for the SAVE units and gives an example of how masons can get serious musculoskeletal injuries at work.

Pg. 1
Apprentice
Workbook

Discussion 1: Phil's Story
Time: 3-5 minutes

PAUSE VIDEO

Ask apprentices:

How do you keep this from happening to you?

Make the point that we use our bodies a lot during masonry work and the effects may not show up as an injury for many years. But when injury does show up, it can be painful, difficult to heal and sometimes disabling.

Discuss that it's hard to know what Phil could have done to prevent his injury. Point out that these injuries build up over time. The purpose of the SAVE program is to provide training on ergonomics.

Ergonomics can prevent the kinds of injuries that develop over time, and eliminate or reduce the risk factors that lead to these injuries.

RESUME VIDEO

Introduction

Video Content

These SAVE units will introduce you to ergonomic and safety voice topics. Using this combined knowledge is the best way to become a safety leader in ergonomics and prevent injuries at work.

Ergonomic Goals:

- Reduce on the job injuries
- Teach you how ergonomics can help prevent injuries
- Recognize ergonomic solutions used by masons



Safety Voice Goals:

- Solve safety problems
- Reduce hazards and injuries
- Increase morale and teamwork
- Improve productivity and quality



Ergonomics is defined as the interaction between you, the worker, your job, and your work environment.

Instructor Notes

This section introduces apprentices to ergonomic principles and provides:

- Training goals
- Definition of ergonomics

A couple of key points to emphasize to apprentices as you go along are:

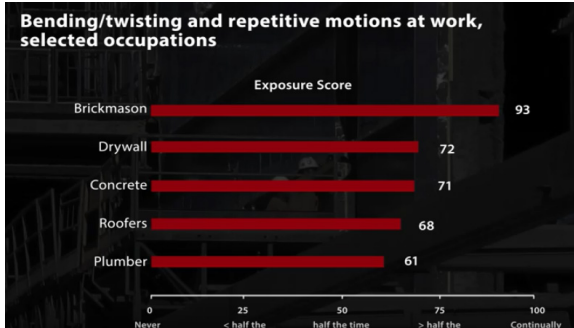
- 1) Ergonomics means using appropriate tools, equipment and work practices to help prevent injuries.
- 2) Ergonomics is much more than stretching.
- 3) Practicing ergonomics keeps masons safe and working their entire career! Starting early in career prevents cumulative trauma.



Ergonomics Overview

Video Content

Ergonomics is important because injuries to muscles, ligaments, joints and discs are common among construction workers and can end your career.



Instructor Notes

This section gives statistics on injuries and exposures of construction workers.

An overview is provided to orient you and the apprentices to what ergonomic topics will be covered in the SAVE program. This includes:

- Anatomy
- Cumulative trauma
- Risk factors
- Solutions



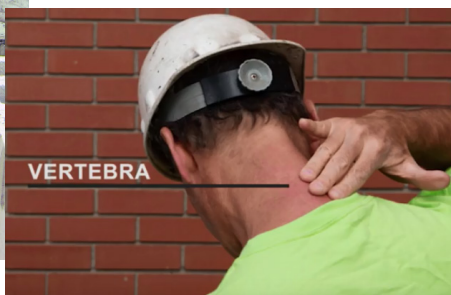
Anatomy

To understand how to prevent injuries to soft tissues like your ligaments, muscles, and discs, it's important to know the structural characteristics of your body. This is anatomy.



Your back bone is called the spine. The bones of the spine are called vertebrae.

Feel the bones behind your neck. You're pressing on part of a vertebra.



This section is an overview of important anatomy related to musculoskeletal injuries.

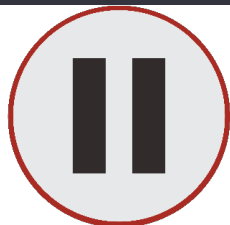
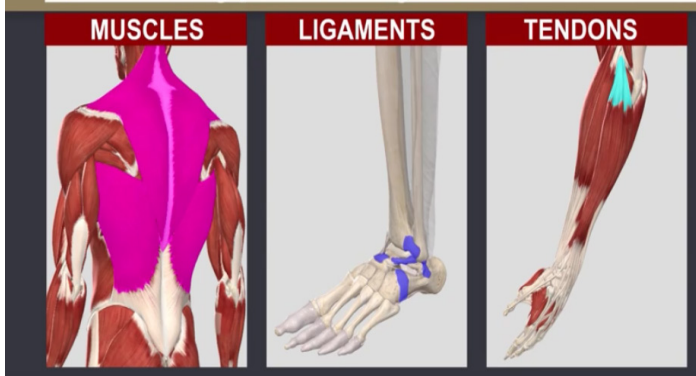
This includes information about muscles, tendons and ligaments. The anatomy of the spine is also discussed.

Quiz 1: Type of Injury

Video Content

What do you call injuries to your muscles, ligaments, and tendons?

QUIZ 1: Types of injuries



PAUSE

Instructor Notes

Quiz 1: Type of Injury

Time: ~1 minute

Pg. 3
Apprentice
Workbook

PAUSE VIDEO

Give apprentices a minute to record the answers to the quiz question in their workbook.

No discussion is required. Explanations are provided when video resumes.

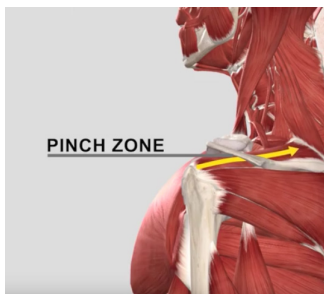
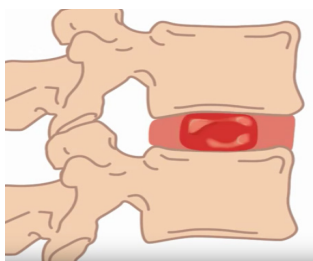
RESUME VIDEO

Answers:

- An injury to a muscle is called a strain.
- An injury to a ligament is called a sprain.
- A tendon injury is called tendonitis.

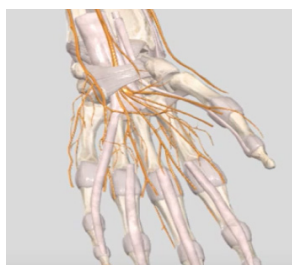
Anatomy of Discs, Shoulders and Wrists

Between every two vertebrae there are discs. The disc has jelly like material on the inside and strong fibrous bands on the outside.



There is a tunnel in the shoulder. A rotator cuff tendon goes through this tunnel and can be pinched. This is why this part of the shoulder is called the 'pinch zone.'

There are important nerves that allow the hand to function. One of these nerves runs through a tunnel created by the carpal bones and into the hand.



This is an overview of the anatomy and common injuries to discs, shoulders and wrists.

The disc between the vertebrae act like cushions in the spine and allow for movement.

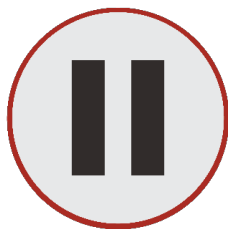
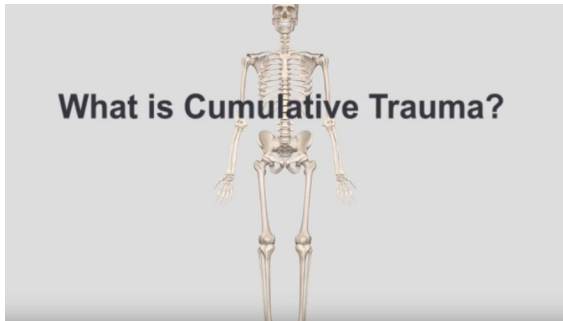
Likewise, the shoulder has many tendons, muscles and ligaments allowing for a wide range of movement. The rotator cuff tendon passes through a tunnel in the shoulder.

Finally, wrists are important for masons. Nerves to the fingers run through the carpal tunnel at the wrist

Discussion 2: Cumulative Trauma

Video Content

Have you heard the term 'cumulative trauma'? What do you think it means?



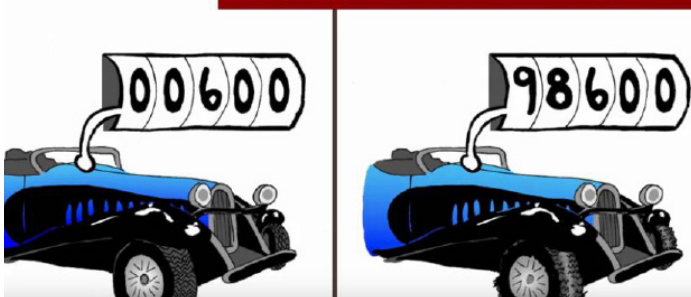
PAUSE

Just like there are different ways to get a flat tire, there are different ways you can injure yourself.

ACUTE TRAUMA



CUMULATIVE TRAUMA



Instructor Notes

Many times construction workers think that injuries are mostly the result of heavy lifting. They may not have thought about how damage can accumulate little by little over time, so that even minor activities can trigger an injury. This discussion begins the lesson on cumulative trauma.

Discussion 2: Cumulative Trauma

Time: ~2-3 minutes

Pg. 3
Apprentice
Workbook

PAUSE VIDEO

Ask apprentices:

What is 'Cumulative Trauma'?

Apprentice answers will give you an idea about how knowledgeable they are. As the video continues, additional material on cumulative trauma is presented so you can explain it further if necessary.

Emphasize to apprentices that everyone accumulates 'wear and tear' on their bodies. Staying fit alone won't prevent cumulative trauma injuries.

RESUME VIDEO

The video continues by giving an example of a tire. Acute trauma is compared to running over a nail and getting a flat tire. Cumulative trauma is compared to a tire that becomes bald after miles and miles of driving. The tire becomes worn.

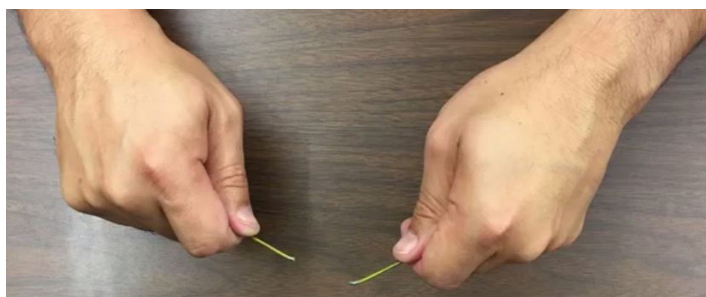
Activity 1: Wire Bending

Video Content

Acute trauma happens immediately, like spraining an ankle while hiking or getting hurt during a workplace accident, such as a fall.



Cumulative trauma seems invisible because the damage builds up over time and occurs from repetitively doing the same thing over and over.



PAUSE

Instructor Notes

This activity is designed to illustrate how our body wears out from a single activity or from repeated use.

Activity 1: Wire Bending

Time: ~5 minutes

Pg. 4
Apprentice
Workbook

PAUSE VIDEO

Materials needed (per apprentice):

- 6 inch bendable wire
- breakable wood lathe or popsicle stick

1. Pass out wire and wood to apprentices. Explain that these will be used to demonstrate acute and cumulative trauma.
2. Instruct apprentices to bend their piece of wood in half until it breaks. This is a demonstration of acute trauma which occurs immediately, as when lifting something that is very heavy.
3. Next, instruct them to bend their piece of wire in half and note that it does not break.
4. Finally, have apprentices bend the wire repeatedly until it breaks. This demonstrates cumulative trauma and how damage occurs over time with use. Emphasize that the wire is perfectly capable of making the bend many times without damage.

Similarly, workplace injuries can be acute, like breaking the wood. However, some injuries occur with repeated stress, like bending the wire until it breaks.

RESUME VIDEO

The Cycle of Cumulative Trauma

Video Content



Instructor Notes

This section describes the cycle of cumulative trauma:

1. Damage to tissues, such as muscles and tendons causes microscopic tears.
2. The tears heal with small scars.
3. Scars make tissues lose elasticity.
4. Loss of elasticity makes the tissue weaker.
5. These steps lead to fatigue and pain.
6. Eventually, a cumulative trauma injury may result.

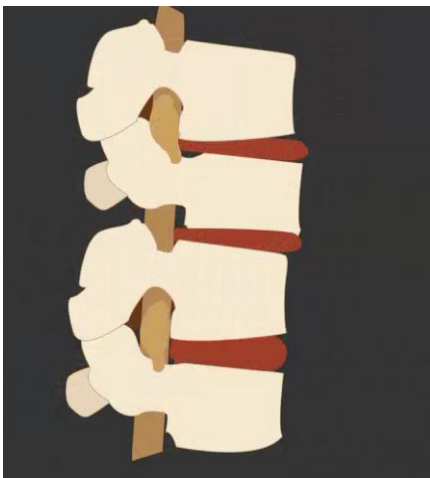
Mild vs. Severe Injury

Acute and cumulative trauma back strains and sprains can be mild, and heal on their own in a few days or weeks. However, it's common with cumulative trauma that these injuries become frequent and chronic, lasting months or more. That makes them difficult to heal.

Discomfort and pain are indicators of potential injury. If pain becomes frequent and chronic, it is difficult for the tissue to heal properly.



Disc Injuries



This section highlights common disc injuries to masons including:

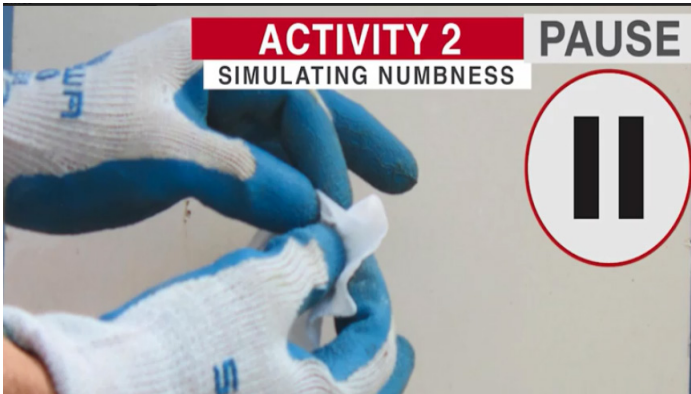
- *Slipped Disc/Disc Protrusion* is when the disc is pushed backwards enough to cause back pain
- *Disc Herniation* is more severe and occurs when the center is released from the disc
- *Sciatic Nerve Injury* occurs when a disc presses against a nerve that runs down the back of the spine.

Disc injuries can occur in the neck as well as the upper and lower back.

Activity 2: Simulating Numbness

Video Content

With overuse, such as frequent bending of the wrist or work in awkward wrist postures, the carpal tunnel becomes inflamed and the nerve becomes irritated. This can cause pain and numbness in the hand, called Carpal Tunnel Syndrome.



Instructor Notes

This activity simulates what it can be like to have hand numbness from carpal tunnel syndrome (CTS).

Activity 2: Simulating Numbness

Time: ~5 minutes

Pg. 5
Apprentice
Workbook

PAUSE VIDEO

Materials Needed (per apprentice):

- 1-2 foot lengths of toilet paper
- Work gloves

1. Give apprentices toilet paper and ask them to separate the two layers with bare hands. This demonstrates normal skin sensitivity.
2. Next, have them put on gloves and try it again. This simulates the experience of carpal tunnel numbness.

RESUME VIDEO

Rotator Cuff Injuries



There are several shoulder muscles in the 'rotator cuff'. They are frequently injured from cumulative overuse & working in awkward postures.

Rotator cuff injuries are painful. They can:

- Require surgery to repair
- Cause time loss
- Lead to long term shoulder problems
- Affect their career

Quiz 2: Low Back Injuries

How are discs in the low back frequently injured?

- A. Sitting all day
- B. Heavy lifting
- C. Using stooped postures
- D. All of the above



Quiz 2: Low Back Injuries

Time: ~1 minute

Pg. 6
Apprentice
Workbook

PAUSE VIDEO

Give apprentices a minute to record the answers to the quiz question in their workbook. No discussion is required. An explanation is provided when the video resumes.

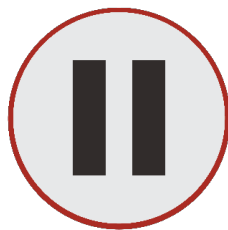
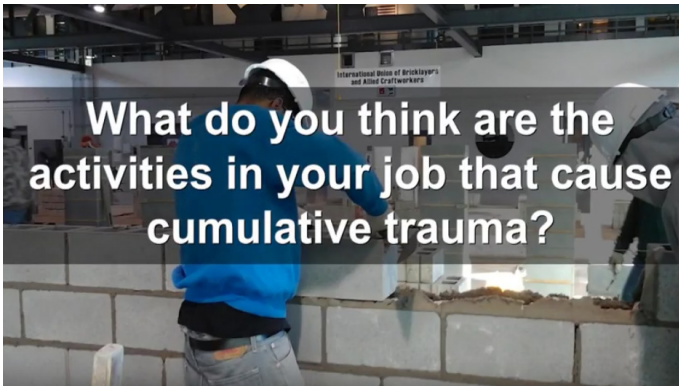
RESUME VIDEO

The correct answer is D, all of the above. Most of us know someone who has an acute disc injury from lifting a heavy weight, but sitting all day or working in stooped postures tear the disc over time, allowing it to bulge on to the spinal nerves.



Discussion 3: Work Postures

Video Content



PAUSE

Cumulative trauma is caused by wear and tear over time. It is sneaky and can take months or even years before the damage leads to an actual injury.

Like a tire wearing, the repeated wear and tear to your muscles, ligaments, tendons and discs, creates damage making them less stretchy and more prone to eventual injury.

Instructor Notes

This discussion focuses on risky work postures that can lead to cumulative trauma.

Discussion 3: Work Postures

Time: ~3-5 minutes

Pg. 6
Apprentice
Workbook

PAUSE VIDEO

Ask apprentices:

What do you think are the activities in your job that could cause cumulative trauma?

Ask each craft present to provide 1 or 2 examples that apply to their craft.

Some examples might be:

- Tilers kneeling all day
- Prolonged stooping to work at ground level
- Repetitive reaching over head
- Heavy lifting
- Using awkward wrist postures when tuckpointing.

Try to guide apprentices toward looking at how they are interacting with their work environment and briefly discuss whether they think some postures are easier on their body than other postures.

RESUME VIDEO

Wrap-up



Your knowledge about ergonomics, anatomy and cumulative trauma will help you spot job tasks that are risky. Later units will explore risk factors that lead to injury and solutions to help reduce your chances of developing a serious work injury.

This completes *SAVE Unit 1: Introduction, Anatomy & Cumulative Trauma*.

Continue to discuss any content you want to highlight from the unit or answer any questions from apprentices as time permits.

Proceed to *SAVE Unit 2: Awkward & Neutral Postures*.

SAVE UNIT 2

AWKWARD & NEUTRAL POSTURES

PREPARATION

1. Prior to teaching, watch the video *SAVE Unit 2 – Awkward & Neutral Postures* while referring to the following instructor notes. Make your own additional notes to help you guide the students through the unit.
2. Note the activities, discussion, and quizzes.

MATERIALS NEEDED:

Activity 3: Awkward Shoulder Posture

- 2 bricks for each apprentice

LEARNING OBJECTIVES

1. List the four physical risk factors (H.A.R.P.). Have a more in-depth understanding of the risk factors for cumulative trauma.
2. Describe or demonstrate at least one awkward posture used at work, related to the back, shoulders and wrists.
3. Describe or demonstrate neutral posture solutions for awkward back, shoulder and wrist postures.
4. Understand why it is important to avoid awkward postures whenever possible, and the importance of using neutral posture.

PROCEDURE

1. Welcome apprentices.
2. Make sure that each apprentice has a workbook to follow along with the video. You will ask them to write individual responses in their workbooks to any discussion, quiz or activity.
3. Start the video for *SAVE Unit 2 – Awkward & Neutral Postures*.
4. Be prepared to PAUSE the video by pressing the space bar.
5. Have fun!

TOTAL VIDEO TIME: 15 minutes

Please note: The following Instructor Notes do not contain every detail of the unit. They are meant to be an outline and provide you instructions to lead discussions and activities. Key video content is highlighted in the left column and additional instructions and notes in the right column.

INSTRUCTOR NOTES

SAVE UNIT 2 VIDEO

Introduction and Musculoskeletal Injury Risk Factors

Video Content

There are four main risk factors that can result in work-related musculoskeletal disorders.



- H** Heavy Lifting
- A** Awkward Postures
- R** Repetitive Activities
- P** Prolonged Postures

In this unit we'll focus on awkward postures and show you how to minimize them by using neutral postures.

Instructor Notes

- SAVE Unit 2 provides more detailed information about awkward postures - a known risk factor for musculoskeletal injuries.
- Remind apprentices that there are four main risk factors for work-related musculoskeletal injuries.
- This unit also provides examples of neutral posture solutions for many of the awkward postures described.

DON'T
H A R P
about back pain!

Neutral Postures

The spine has three natural curves that make it strong and sturdy.

Neutral postures are postures that put the least amount of stress on the muscles and joints.



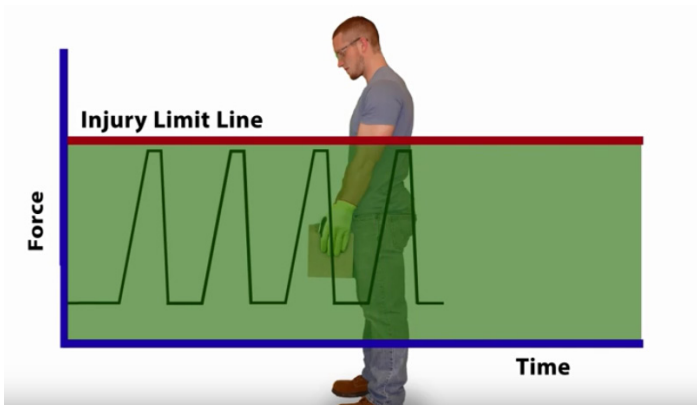
- Neutral postures are postures that put the least amount of stress on the spine, discs, muscles and joints.
- This section introduces the concept of neutral postures to the apprentices. It also explains that masons cannot always work in neutral postures. However, shifting to neutral, even briefly, can reduce the stress on muscles and joints.



Safety Margins

Video Content

For every part of your body, there's a safe functional limit for postures. As long your body stays below this threshold, you minimize your risk of being injured. In other words, you are working within the margin of safety also called the green zone.



Instructor Notes

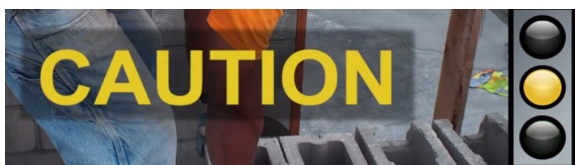
If the margin of safety concept is confusing to apprentices, explain to them that, whether made of steel or human muscles, all materials have a structural limit and once that limit is crossed, the material fails.

In the case of muscles, the consequence of not respecting the margin of safety can be pain and injuries such as strains and sprains, or worse.

Caution Zones

We'll talk about risky postures as **caution zones** since that's a good way to know when your posture might be harmful.

For the rest of the unit, green means the posture is safe while yellow means use caution.



This section introduces **caution zones** as a good way to indicate if a posture might be harmful.

Apprentices can use this visualization of caution zones while they are working.

You will see the stop lights throughout the rest of the unit. A green light means the posture is safe while a yellow light means use caution.

Discussion 1: Awkward Postures

Video Content

Non-neutral postures are called awkward postures.



Instructor Notes

- Apprentices may not know the most awkward postures for the work they do. This discussion gets them thinking about their postures before the next unit which explains awkward postures in detail.

Discussion 1: Awkward Postures

Time: ~3 minutes

Pg. 8
Apprentice
Workbook

PAUSE VIDEO

Ask the apprentices: What are awkward postures common to your craft?

- Instruct apprentices to write in their workbooks one example of an awkward low back, shoulder and wrist posture.
- Next, pick a few apprentices and ask each to demonstrate a frequently used awkward work posture. Ask them to point to the body region being stressed, such as the low back or wrists. If there are multiple crafts in the training, try to get examples from each craft for awkward postures they experience most often.

FOR EXAMPLE

Apprentices might stoop as when installing tile lippage system, and point to their low back, or reach overhead demonstrating lifting block above rebar, and say this is awkward for their shoulders and neck.

RESUME VIDEO

Low Back Posture

There's a 'sweet spot' about halfway between rounding your back and flattening your back.



- The next few sections will review neutral and awkward postures for different parts of the body starting with the low back.

Activity 1: Neutral Spine Posture

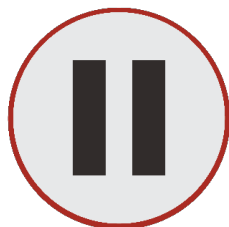
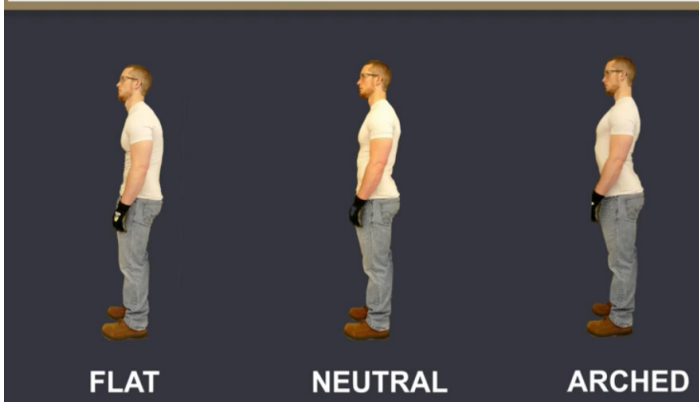
Video Content

When you are in the 'sweet spot' your back is in a neutral, safe posture. It's also where your back should feel the best.

So let's practice it. Everyone should stand up to practice.



Neutral Postures



PAUSE

Instructor Notes

The goal of this activity is for apprentices to practice finding their neutral low back posture. This posture isn't intuitive for everyone and requires practice. You may need to demonstrate it for them.

Activity 1: Neutral Spine Posture

Time: ~5 minutes

Pg. 9
Apprentice
Workbook

PAUSE VIDEO

Instruct apprentices to stand against a wall. If space is limited have apprentices work in pairs, observing and critiquing each other.

Have them do the following:

- Lean against the wall with feet about a foot away from the wall.
- Place the palm of one hand against the wall between the wall and their low back.
- Flatten their back by tightening their stomach and buttock muscles, rocking their pelvis backward until they feel their low back pushing against their hand. This is '**flat back**' position.
- Arch their back to form a hollow space between the wall and the lower back. This is '**arched back**' position.
- Practice rocking their pelvis to arch and flatten their back. Then, instruct them to find their '**sweet spot**' which is where their back feels most comfortable. This should be about half way between flat and arched back postures. *Explain that this is their low back's neutral spine posture. In this position their low back is strong, stable and the least likely to be injured.*
- Have them step away from the wall and simulate lifting CMU that is about 3 feet from the ground while maintaining a neutral low back posture. To do this, they will have to set their back in neutral posture, then bend their hips and knees.
- If apprentices work in pairs, have them switch so the other apprentice has a chance to practice.

RESUME VIDEO

Awkward Back Postures

Video Content

So, what are other examples of awkward back postures?

These include bending your neck or low back too much, twisting, or combining bending and twisting.

Forward bending more than 30° degrees is a position that over stretches back muscles and can lead to fatigue and damage.



Instructor Notes

- These are some key points to remind apprentices about. The combination of bending and twisting is hard on the low back, especially for the discs.
- Remind them not to bend and twist.



Activity 2: The Green Zone

Bending forward less than 30° is safer for your low back and is in the 'green zone'.

Look at the pictures and practice bending about the same amount.



- Bending less than 30° puts less stress on the low back and is safer, especially when it is done while maintaining neutral spine posture.

Activity 2: The Green Zone

Time: ~2 min

Pg. 10
Apprentice
Workbook

PAUSE VIDEO

- Have apprentices mimic the bending posture in the pictures. Ask them to notice how it feels. There should be no pain and it should feel comfortable.

- Emphasize that even though they may have to bend more than 30° for some of their job tasks, the idea is to get in the habit of using better postures whenever it is feasible, even if that is only 10% of the time.
- Remind them about the Margin of Safety.
- Every time they use neutral postures they reduce their chances of exceeding their personal margin of safety and getting injured.

RESUME VIDEO

Squatting

Video Content

Another way to work without bending forward too far is to squat.



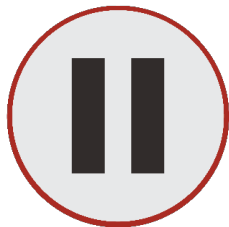
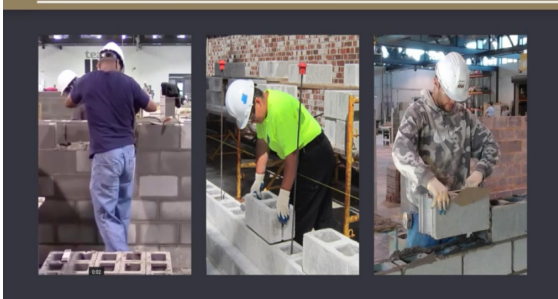
Instructor Notes



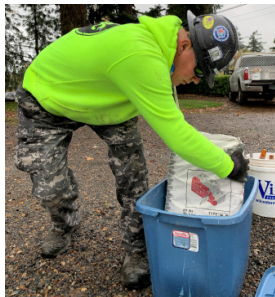
When possible use alternatives to stooping such as squatting or half kneeling. The point to emphasize is to 'change it up'.

Quiz 1: Worst Back Posture

Which mason is in the worst posture for their back?



PAUSE



Quiz 1: Worst Back Posture

Time: ~1 minute

Pg. 10
Apprentice
Workbook

PAUSE VIDEO

Which mason is in the worst posture for their back?

Give apprentices a minute to record their answer to the quiz question in their workbooks. The correct answer will be explained in the video.

RESUME VIDEO

The correct answer is: the mason in the middle picture who is twisting AND bending at the same time is in the worst posture.

Awkward Neck Postures



Your head weighs about 12 pounds, which is about the same as a bowling ball.

When you work with your head bent forward, it isn't balanced over your trunk and gravity is more able to push it towards the ground.

This section covers neck postures.

Just as bending forward with the low back, having your neck bent forward can over-stretch and fatigue the muscles in your neck.

Working for extended time with the head bent forward is a **yellow zone posture**.



Awkward Shoulder Postures

Video Content

The shoulder is in a neutral posture when the arms hang at the side of your body.

Shoulder - Yellow Zone

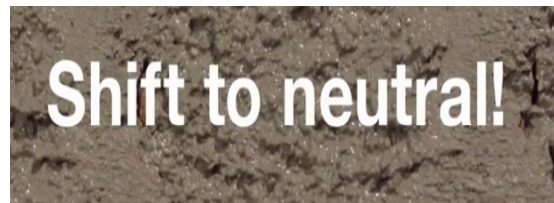
- Arms extended fully
- Arms above shoulder level
- Chicken wings



Instructor Notes

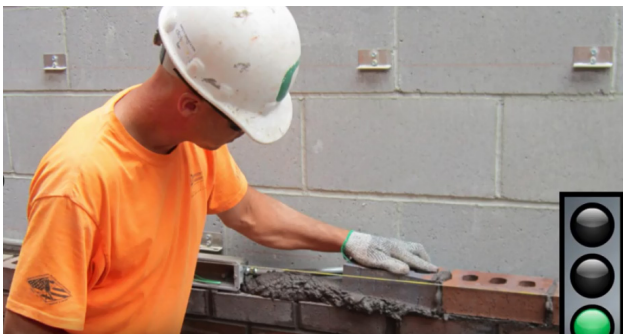
The shoulders get a lot of use with masonry work. A baseball analogy is used in the video since many can relate to how much a pitcher uses their shoulder.

It is hard for masons to work while keeping their shoulders in neutral postures but emphasize that they should shift into neutral whenever they can.



Activity 3: Awkward Shoulder Postures

Most of your tasks require you to have your arms between 60° and 120°. This region is called the “pinch zone” because it can pinch your rotator cuff muscles. Working with your arms close to your body is the safest.



This activity is designed to illustrate the effect of awkward shoulder postures over time, and distance of weight.

Activity 3: Extended Arms

Time: ~3 minutes

Materials Needed:

- 2 bricks for each mason

Pg. 11
Apprentice
Workbook

PAUSE VIDEO

- Instruct apprentices to hold a brick in each hand with arms extended parallel to the ground without bending their elbows, for about one minute.
- Then, have apprentices hold the bricks to their chest for one minute.
- Ask what they feel at their shoulders in each position?
- Ask them which position felt best: arms extended or brick held close to their chest?
- Ask apprentices from other crafts whether holding an 8lb brick is similar to holding a mud board close or far from the body?
- Point out that while they may not hold brick and block for a minute in such an awkward shoulder posture, even doing it for a few seconds adds up over time, potentially leading to an injury.

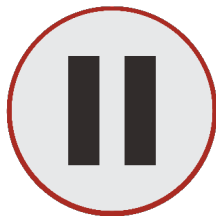
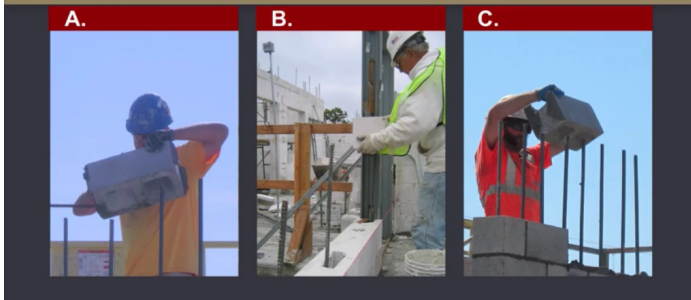
Quiz 2: Awkward Shoulder Postures - Brick and Block

Video Content

Working with your arms overhead is also hard on your shoulders and is a yellow zone posture.

The final awkward shoulder posture is called the “chicken wing” posture.

Which bricklayer is in the least awkward shoulder posture?



PAUSE

Instructor Notes

Quiz 2: Awkward Shoulder Postures

Time: ~1 minute

Pg. 11
Apprentice
Workbook

PAUSE VIDEO

Give apprentices a minute to record the answer to the quiz question in their workbooks. No discussion is required. An explanation is provided when the video resumes.

RESUME VIDEO

The correct answer is B.

Quiz 2: Awkward Shoulder Postures - Allied Crafts

Working with your arms overhead is also hard on your shoulders and is a yellow zone posture.

The final awkward shoulder posture is called the “chicken wing” posture.

Which tiler is in the least awkward shoulder posture?



PAUSE

Quiz 2: Awkward Shoulder Postures

Time: ~1 minute

Pg. 12
Apprentice
Workbook

PAUSE VIDEO

Instruct allied craft apprentices to look in their workbook for a quiz question specific to them. Give them a minute to record their answer in their workbook.

RESUME VIDEO

The correct answer is B.

Awkward Wrist Postures

Video Content

“Awkward” wrist postures include bending your wrists excessively forward, backward, or to either side.



Instructor Notes

This section describes neutral and awkward wrists postures. Awkward wrist postures are especially common among PCC masons doing tuckpointing and grinding. Remind them to “keep their wrists straight and locked” to prevent injury.

Whenever possible, apprentices should keep their wrist in a straight line with the forearm.

Neutral Posture Summary

Neutral Postures Include:

- Arms close to sides
- Head over shoulders
- Trunk over hips
- Flat wrists



Prior to the end of the unit quiz questions, the video summarizes neutral postures for the shoulders, back and wrists.

Shift to neutral!

The important concept to reinforce is to “**Shift to Neutral**” whenever it is feasible during their work day. Even doing this a few times a day reduces the wear and tear on their body and helps to spare their muscles, ligaments, discs and joints.

Quiz 3: Worst Body Position

What part of the mason's body is in the worst position?

- A. Low back
- B. Shoulders
- C. Wrists or hands
- D. Nothing's wrong, it all looks good to me!



Quiz 3: Worst Body Position

Time: ~1 minute

Pg. 12
Apprentice
Workbook

PAUSE VIDEO

What part of the mason's body is in the worst position?

Instruct apprentices to record the answer to the quiz question in their workbooks. The correct answer will be explained in the video.

RESUME VIDEO

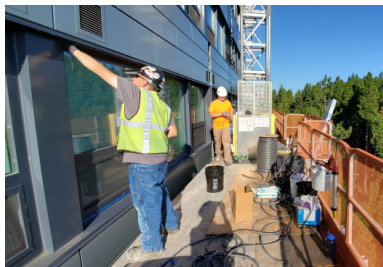
The correct answer is A, Low back.

Quiz 4: Worst Body Position

Video Content

What part of the mason's body is in the worst position?

- A. Back
- B. Shoulders
- C. Wrists or hands
- D. Nothing's wrong, it all looks good to me!



Instructor Notes

Quiz 4: Worst Body Position

Time: ~1 minute

Pg. 13
Apprentice
Workbook

PAUSE VIDEO

What part of the mason's body is in the worst position?

Give apprentices a minute to record the answer to the quiz question in their workbooks. The correct answer will be explained in the video.

RESUME VIDEO

The correct answer is B, Shoulders.

Quiz 5: Worst Body Position

What part of the mason's body is in the worst position?

- A. Back
- B. Shoulders
- C. Wrists or hands
- D. Nothing's wrong, it all looks good to me!



Quiz 5: Worst Body Position

Time: ~1 minute

Pg. 13
Apprentice
Workbook

PAUSE VIDEO

What part of the mason's body is in the worst position?

Give apprentices a minute to record the answers to the quiz question in their workbooks. The correct answer will be explained in the video.

RESUME VIDEO

The correct answer is both B and C, Shoulder and Wrist or Hands.

Wrap-up

Video Content

As a mason, your work will always require you to use awkward postures. Try your best to minimize these postures and frequently shift into neutral. Especially try to avoid combinations of awkward postures like bending and twisting.

While changing your posture is one solution, ergonomically designed tools, equipment and work practices are even better, and should always be your first choice. We'll discuss these options in later units.

AWKWARD POSTURES - WRAP UP

- Back
- Neck
- Shoulders
- Wrists



Instructor Notes

This concludes *SAVE Unit 2: Awkward & Neutral Postures*.

As time permits continue to discuss any content you want to highlight from the unit or answer any questions from apprentices.

Proceed to *SAVE Unit 3: Heavy Lifting, Repetitive Activities, & Prolonged Postures*.

SAVE UNIT 3

HEAVY LIFTING, REPETITIVE ACTIVITIES & PROLONGED POSTURES

PREPARATION

1. Prior to teaching, watch the video *SAVE Unit 3 – Heavy Lifting, Repetitive Activities & Prolonged Postures* while referring to the following instructor notes. Make your own additional notes to help you guide the apprentices through the unit.
2. Note the activity, discussions and quizzes.

MATERIALS NEEDED:

None

LEARNING OBJECTIVES

1. List the four physical risk factors (H.A.R.P.).
2. Describe repetitive activities and prolonged postures.
3. Understand the risks associated with heavy lifting, prolonged postures and repetition over the course of their career and how to minimize each risk factor.
4. Explain strategies for reducing the effects of heavy lifting, repetition and prolonged postures.

PROCEDURE:

1. Welcome apprentices.
2. Make sure that each apprentice has a workbook to follow along with the video. You will ask them to write their individual responses in the workbook to any discussion or activity.
3. Start the video for *SAVE Unit 3 – Heavy Lifting, Repetitive Activities & Prolonged Postures*.
4. Be prepared to pause the video by pressing the space bar.
5. Have fun!

TOTAL VIDEO TIME: 15 minutes

Please note: The following Instructor Notes do not contain every detail of the unit. They are meant to be an outline and provide you instructions to lead discussions and activities. Key video content is highlighted in the left column and additional instructions and notes in the right column.

INSTRUCTOR NOTES

SAVE UNIT 3 VIDEO

Review

Video Content

In the previous unit, we talked about the risk factor awkward postures. Now we'll talk about a few more.



Instructor Notes

- This is a brief review of the risk factor called awkward postures. This unit continues talking about risk factors, what they are, how they affect masons and what masons can do to minimize the risk.

Steve's Story

Let's listen to Steve's story about his shoulder injury which was caused by frequent repetitive work in postures above his shoulder.



- We begin this topic with a testimonial by Steve Flickinger, an IMI JATC apprentice instructor. Steve injured his right shoulder from years of work that required him to repetitively work in postures above his shoulder and overhead.

- Steve's story is common among older masons. This is why learning about and applying ergonomics is so important – to prevent masons from getting injured, missing work due to injury and from having chronic pain that never truly resolves.

- This is a quick reminder of HARP - the risk factors that lead to musculoskeletal injuries like Steve described.

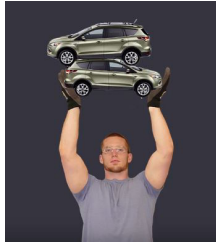
RISK FACTORS:

- **H** → Heavy Lifting
- **A** → Awkward Postures
- **R** → Repetitive Activities
- **P** → Prolonged Postures

How much do you lift?

Video Content

In one day, you lift almost 4 tons of CMU. This is the same as lifting 2 SUVs.



This adds up to 19 tons in a week, or about 8 full size pickup trucks!



After one year, the average mason has lifted about 950 tons. Imagine lifting 2 1/2 fully loaded Boeing 747s!



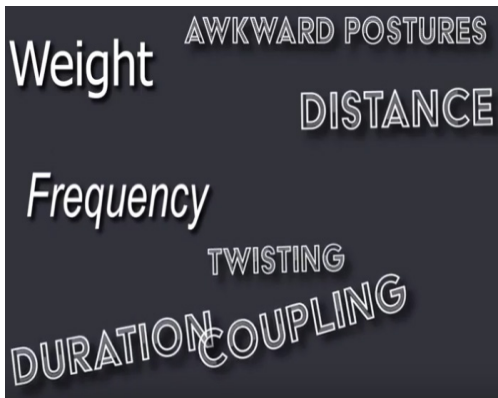
Instructor Notes

- The video demonstrates how much brick and block masons lift in a day, week and a year. It is pretty
- incredible how much masons lift over time! Reinforce
- that while other crafts may not lift as much as brick
- and block masons, all masonry craft workers need to
- ‘work smarter’.

What Makes a Lift Unsafe

When we think of lifting or manual material handling, we usually think of how much the object weighs, and this is really important. However, there are other factors that make lifting and carrying materials safe or unsafe.

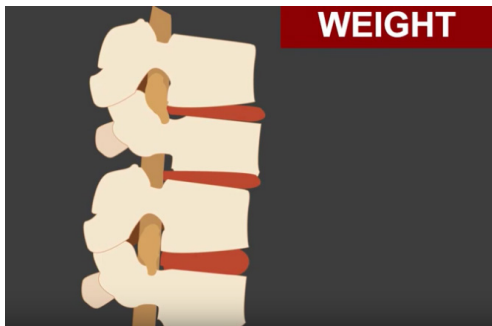
- This section introduces the various factors related to
- lifting that can make it safe or unsafe.



Weight

Video Content

In general, the heavier the material you lift, the more pressure there is on your back.



Instructor Notes

This short section reminds the apprentices what they learned about anatomy and the back.



Discussion 1: Staying Strong

What do you think:

By staying strong, you won't get hurt lifting brick and block?



Many young workers in particular think they are invincible and believe that if they stay fit and work out they won't get injured....it won't happen to them!

Discussion 1: Staying Strong

Time: ~5 minutes

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Apprentice
Workbook

PAUSE VIDEO

Ask apprentices:

If you stay strong, would you be less likely to be hurt lifting?

Have you heard stories like Steve's from journeylevel masons or other instructors?

If no one volunteers, pick one or two to respond. If they think it won't happen to them, ask them why.

For example, emphasize that while staying fit is important, the body wears out with use no matter how fit the person is. Remind them that all materials (steel and muscles) have structural limits and wear out with use. So, it is important for new masons to use their bodies wisely and minimize wear whenever possible.

Remind apprentices that everyone is different – age, level of fitness, body structure, past injuries, etc, but no matter how fit you are, awkward postures performed repetitively will catch up with you.

RESUME VIDEO

Frequency, Awkward Posture, Twisting, Distance

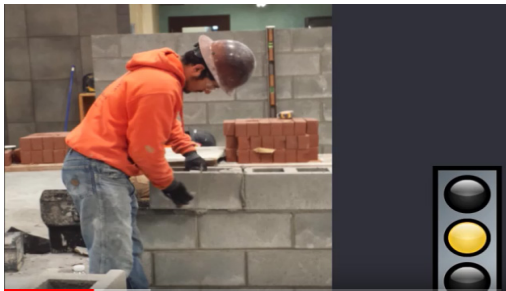
Video Content

Frequency, or how often you lift is the next risk factor. It might seem crazy, but even lifting brick can injure your back, shoulders or arms because you lift so many of them each day.



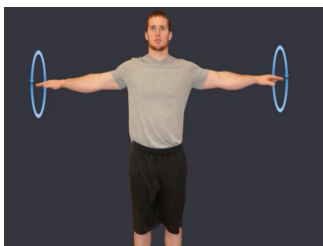
Frequency -> Cumulative Trauma Injury

While you can't control lifting frequency, you can control how frequently you use awkward postures while lifting.

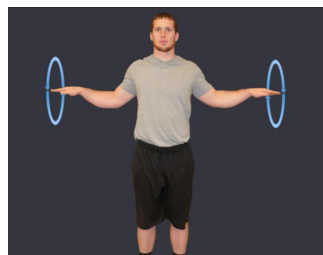


Another risk factor you have some control over is twisting while lifting.

Remember, bending combined with twisting is the worst posture for your back.



Your back muscles work harder when you work with your arms extended far out in front of you, whether you are placing CMU, brick or using a caulking gun.



Always try to keep work close to your body.

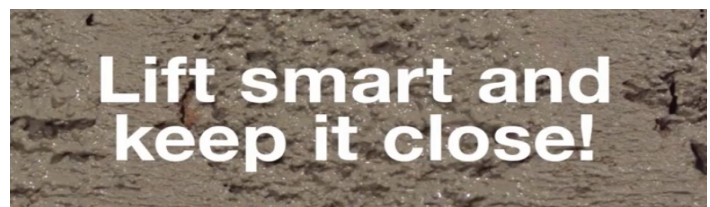
The distance you reach from your body is as important as the weight of what you lift.

Instructor Notes

This section provides information on other factors relating to manual material handling or lifting that should be considered to reduce the risk of cumulative trauma.

These factors are:

- Lifting frequency.
- Lifting in awkward postures.
- Twisting while lifting (emphasize that bending and twisting in combination is especially risky).
- Distance of the weight from the body.



The “Right” Way to Lift

Video Content

One way to keep materials close is to do a squat lift, like a weight lifter. Lifting like this can save your back but might increase the stress on your knees.



Instructor Notes

This section is a reminder that lifting properly involves the legs - a squat lift. However, it's recommended that masons use different lifting postures throughout the day since squat lifting can add stress to the knees.



Coupling

Here again, change it up, sometimes lifting with both hands instead of just one.

Be sure you have good fitting gloves that protect your hands and provide a good grip.



How a mason holds materials is also a factor to consider. This section brings up using one hand versus two hands. Good fitting gloves reduce the force needed to grip materials.



Quiz 1: Awkward Postures When Lifting

Video Content

What's the best way to control awkward postures while lifting?

- A. Use adjustable height scaffolding
- B. Squat to lift like a weightlifter
- C. There is no way to control awkward postures at work



Instructor Notes

Quiz 1: Awkward Postures When Lifting

Time: ~1 minutes

Pg. 17
Apprentice
Workbook

PAUSE VIDEO

Instruct apprentices to record the answer to the quiz question in their workbooks. The correct answer will be explained in the video.

RESUME VIDEO

The correct answer is "A." Modify the height of adjustable height scaffolding frequently to keep work in the green zone between your shoulders and knees. However, for some trades, like tilers and restoration crafts, using a squat lift is the best solution for lifting heavy materials.

Quiz 2: Factors You Control - Brick and Block

What factor do you have the most control over when lifting?

- A. The weight of the CMU you handle
- B. How far you reach when laying CMU
- C. How often you lift CMU



Quiz 2: Factors You Control

Time: ~1 minute

Pg. 17
Apprentice
Workbook

PAUSE VIDEO

Instruct apprentices to record the answers to the quiz questions in their workbooks. The correct answer will be explained in the video.

RESUME VIDEO

The correct answer is "B." Always try to limit how far you reach by keeping materials, tools, equipment and work close.

Quiz 2: Factors You Control - Allied Crafts

Video Content

What factor do you have the most control over when lifting?

- A. Weight of the materials you handle, such as tiles
- B. How far you reach when tuckpointing
- C. How often you have to lift tiles

Instructor Notes

Quiz 2: Factors You Control

Time: ~1 minute

Pg. 17
Apprentice
Workbook

PAUSE VIDEO

Instruct allied craft apprentices to look in their workbook for a quiz question specific to them. Give them a minute to record their answer in their workbook.

RESUME VIDEO

The correct answer is "B." Always try to limit how far you reach by keeping materials, tools and equipment close.

Repetition

Another activity that increases your risk of injury is repetitive motion, where you use the same muscles and joints over and over.



- This section explains that repetition can be over a short period of time or over weeks, months or years.
- Repetitive motion causes the micro-damage that leads to cumulative trauma injury.



Activity 1: Repetition

Video Content

Let's practice an activity that demonstrates the effect of repetition on our bodies.



Instructor Notes

This is an opportunity for apprentices to experience the effect of repetitive squatting.

Activity 1: Repetition

Time: ~3 minutes

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Apprentice
Workbook

PAUSE VIDEO

Note: Apprentices shouldn't do this activity if they have a current knee injury. They should discontinue if they get knee pain while doing squats.

1. Have apprentices stand with their feet shoulder width apart and arms forward as a counterbalance. Next, have them squat until their thighs are parallel to the floor 3 or 4 times, keeping the arch in their lower back. **Ask them what they feel.**
2. Next, instruct apprentices to do as many squats as they can for a minute. They should be able to do 30 -40 squats. **Ask them what they feel.**
3. Take a few seconds to ask apprentices from different crafts to name a few repetitive activities they do frequently.

They should 'feel the burn' of working their muscles and fatigue. Explain to them that this effect happens to muscles over the course of a day from lifting. The muscles become fatigued, increasing the chance of an injury.

RESUME VIDEO

Prolonged Postures

Prolonged postures are a risk factor because our muscles and joints like movement. When muscles are in a position for too long, especially a stretched posture, they tend to get tighter and tired.



This section introduces prolonged postures.

These are positions held for longer than a few seconds. Just as too much repetition or movement can be a risk factor, so can too little movement.

If time, take a few seconds to ask apprentices from different crafts to name a few job tasks that require prolonged postures.

Quiz 3: Prolonged Postures - Brick and Block

Video Content

Which is a prolonged work posture?



PAUSE

Instructor Notes

Quiz 3: Prolonged Postures

Time: ~1 minute

Pg. 18
Apprentice
Workbook

PAUSE VIDEO

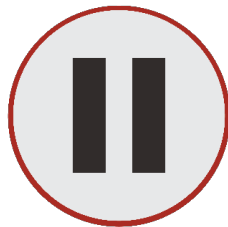
Give apprentices a minute to record the answers to the quiz questions in their workbooks. The correct answer will be explained in the video.

RESUME VIDEO

The correct answer is B, which is a stooped posture. Staying in this position for a long time can lead to low back fatigue and injury.

Quiz 3: Prolonged Postures - Allied Crafts

Which is a prolonged work posture?



PAUSE

Quiz 3: Prolonged Postures

Time: ~1 minute

Pg. 19
Apprentice
Workbook

PAUSE VIDEO

Instruct allied craft apprentices to look in their workbook for a quiz question specific to them. Give them a minute to record their answer in their workbook.

RESUME VIDEO

The correct answer is B, which is a prolonged bending posture. Staying in this posture for more than a few minutes can lead to low back fatigue and injury.

Combined Risk Factors

Video Content

Masons spend 93% of their work time bending, twisting, and performing repetitive motions at work.

These are called 'Combined Risk Factors.' When risk factors are combined it is more likely that they will lead to pain or an eventual injury.



Instructor Notes

This is a reminder to NOT combine risk factors.



Discussion 2: Minimize Risk Factors

When possible, limit your exposure to only 1 risk factor at a time.

One way you can do this is to get in the habit of turning your whole body while lifting instead of planting your feet.

Or, instead of always stooping by bending at your waist, try to squat sometimes.



Discussion 2: Minimize risk factors

Time: ~3 minutes

Pg. 19
Apprentice
Workbook

PAUSE VIDEO

Ask apprentices:

What are some ways to minimize risk factors for injury?

If no one volunteers, call on one or more apprentices to provide suggestions.

Some suggestions:

- Change it up.
- Use equipment when possible (carts, lifts etc.).
- Keep equipment adjusted (e.g. scaffolding at correct height) and use it correctly.



Emphasize that the most important thing is to UNCOUPLE risk factors. In other words, don't twist AND bend while lifting.

See if they come up with other ideas.

RESUME VIDEO

Quiz 4: Most Injured Area

Video Content

Which part of the body is most injured in masons?

- A. Shoulder
- B. Low back
- C. Hands
- D. Hips and knees



PAUSE



Instructor Notes

Quiz 4: Most Injured Area

Time: ~1 minute

Pg. 20
Apprentice
Workbook

PAUSE VIDEO

Give apprentices a minute to record the answer to the quiz question in their workbooks. The correct answer will be explained in the video. Remind them that in all crafts, the lower back takes a lot of abuse.

RESUME VIDEO

The correct answer is B, the low back. Most overexertion injuries among masons involve the low back.

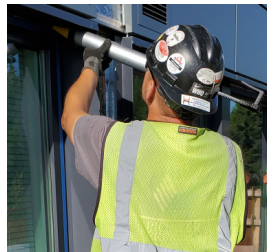
Quiz 5: Second Most Injured Area

What region is injured second most?

- A. Shoulder
- B. Low Back
- C. Hands
- D. Hips and knees



PAUSE



Quiz 5: Second Most Injured Area

Time: ~1 minute

Pg. 20
Apprentice
Workbook

PAUSE VIDEO

Give apprentices a minute to record the answer to the quiz question in their workbooks. If time, ask what they do that causes their shoulder to be injured, such as working with arms overhead or working on hands and knees.

RESUME VIDEO

The correct answer is A. The shoulder is injured second most.

Wrap-up

HARP risk factors are a regular part of your job. So, think about how to minimize these risk factors whenever possible.



- Change it up
- Shift to neutral
- Avoid combinations
- Use proper equipment

This completes *SAVE Unit 3: Heavy Lifting, Repetitive Activities & Prolonged Postures*.

Continue to discuss any content you want to highlight from the unit or answer any questions from apprentices as time permits.

Proceed to *SAVE Unit 4: Safety Voice, Responsibility & Information*. This next unit will begin the safety voice topics.

SAVE UNIT 4

SAFETY VOICE, RESPONSIBILITIES & INFORMATION



PREPARATION

1. Prior to teaching, watch the video *SAVE Unit 4 – Safety Voice, Responsibilities & Information* while referring to the following instructor notes. Make your own additional notes to help you guide the apprentices through the unit.
2. Note the discussions and activities.

MATERIALS NEEDED:

Activity 2: Grip Size (1 per every two apprentices)

- Tape measure
- common handtool such as a trowel.

LEARNING OBJECTIVES

1. Define safety voice and know when to use it.
2. Understand the rights and responsibilities of employers and masons.
3. Identify the hierarchy and chain of command for your local.
4. Know who to go to for safety advice.
5. Know where to look up relevant safety information.

PROCEDURE

1. Welcome apprentices.
2. Make sure that each apprentice has a workbook to follow along with the video. You will ask them to write their individual responses in the workbook to any discussion, quiz or activity.
3. Start the video for *SAVE Unit 4 – Safety Voice, Responsibilities & Information*.
4. Be prepared to pause the video by pressing the space bar.
5. Have fun!

TOTAL VIDEO TIME: 10 minutes

Please note: The following Instructor Notes do not contain every detail of the video. They are meant to provide you with the instructions you need to lead discussions and activities. Key video content is in the left column with corresponding instructions and notes in the right column.

INSTRUCTOR NOTES

SAVE UNIT 4 VIDEO

Review

Video Content

- Review:**
- H** → Heavy Lifting
 - A** → Awkward Postures
 - R** → Repetitive Activities
 - P** → Prolonged Postures

Instructor Notes

- Previously we learned about ergonomics, the risk factors for sprains and strains: HARP.
- Review this briefly before going into safety voice skills.

Discussion 1: Jessie's Story



“In training, I was told that acid washing brick needs specific PPE. On a jobsite, I was not provided the necessary PPE and when I asked for it, the foreman downplayed my concerns for safety.

After I called my union about this, a business agent and my apprentice coordinator became involved to help resolve the issue. I was then provided the PPE I needed to do my job safely.

I was trained to work safely. Because of my union, I had backing when I stood up for my right to have proper PPE.”



- Jessie's story is a good example of a safety voice.
- There is a right way to speak up.

Discussion 1: Jessie's Story

Time: ~3-5 minutes

PAUSE VIDEO

Ask the apprentices:

Would you have spoken up?

- If students say they would have spoken up, ask them to explain. They might say they:

- Are confident
- Are able to recognize hazards
- Know how to identify the solution
- Know who to call to ask for guidance

- If the students say they would not have spoken up, remind them that reporting safety hazards is their responsibility. That's what these units are about: how to speak up and report hazards.

Ask the apprentices:

Has anything like this ever happened to you?

Try to get examples from different crafts.

Sharing actual experiences highlights the challenges of speaking up as well as the opportunities.

RESUME VIDEO

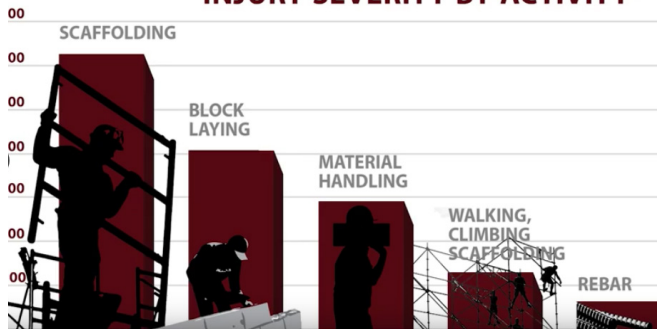
Pg. 21
Apprentice
Workbook

Introduction to Safety Voice, Injuries, and Training Goals

Video Content



INJURY SEVERITY BY ACTIVITY



Instructor Notes

It is just as important to be skilled at using a safety voice as it is to learn a trade and safety skills.

What is Safety Voice?

The images shown on the left of unsafe and safe scaffolding are an example of an obvious safety issue.

Speaking up to fix hazards = using your **Safety Voice**

The bar chart shows the results of a study published in 2013. Three masonry activities were responsible for the majority of severe injuries:

- Scaffold erection and dismantling
- Laying block
- Material handling

Knowing how to complete masonry activities as safely as possible is important. Knowing how to speak up if you are not in a safe situation is just as important.

Reviewing the goals of safety voice lets apprentices know what to expect.

Activity 1: Rights and Responsibilities

Video Content

There are certain responsibilities that both you, your employer and your union have:

Your employer is responsible for providing:

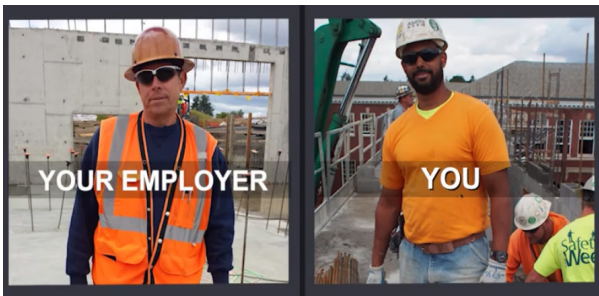
- A safe and healthy workplace
- Information on hazards at the worksite
- Training about health and safety on the job

You must:

- Report any hazards
- Know hazards and solutions
- Follow all safety procedures

Your union:

- Provides training
- Helps solve health and safety issues



All workers have the right to:

- A safe workplace.
- Raise a safety or health concern with your employer or OSHA, or report a work-related injury or illness, without being

Employers must:

- Provide employees a workplace free from recognized hazards. It is illegal to retaliate against an employee for using any of their rights under the law, including raising a health



Instructor Notes

This activity reminds apprentices that they have certain safety rights and responsibilities and employers have others.

Activity 1: Rights and Responsibilities

Time: ~5-10 minutes

Pg. 23-24
Apprentice
Workbook

PAUSE VIDEO

1. Have apprentices open the R & R worksheet in their workbook.
2. Put apprentices in pairs or teams of three. By working on this together, apprentices practice communication skills.
3. Give instructions: The worksheet has a number of statements. Each statement is either a right or a responsibility for the employer, the worker or the union. Write in “employer”, “worker” or “union” next to each statement in either the “rights” or “responsibilities” column. Some of the statements will be the right and/or responsibility of more than one party.
4. Allow apprentices a few minutes to mark as many of the answers as they can.
5. Discuss worksheet answers (given on next page). If there is disagreement, discuss it. If the apprentices want to assign a right or responsibility to more than one party, discuss why that is or isn't appropriate. By reviewing the worksheet as a whole class, the discussion can deepen their understanding that everyone on the job has safety responsibilities.

RESUME VIDEO

SAVE Unit 4

Activity 1: R & R Worksheet

Instructor version with answers

For each statement, decide if each statement is a “Right” or a “Responsibility” for the **employer**, the **worker**, or the **union** and write down the answer in the space provided. Could be more than one.

Statement	Right	Responsibility
“Look out for co-workers”	_____	Worker _____
“Provide training you understand”	_____	Employer Union _____
“Represent you regarding workplace issues”	Union _____	_____
“Ask for safety training”	Worker _____	_____
“Get medical care paid if you’re injured on the job”	Worker _____	_____
“Use and maintain PPE”	_____	Worker _____
“Provide a safe and healthy workplace”	_____	Employer _____
“Work together to improve conditions on the job”	_____	Employer Worker Union _____
“Provide safety gear and PPE”	_____	Employer _____
“Know what to do if there’s an accident on the job”	_____	Employer Worker _____
“Work without being harassed”	Worker _____	_____
“Speak up if you know there’s a hazard”	_____	Worker _____
“Stand up to bullying”	_____	Worker _____

Why Build a Safety Voice?

Video Content



Instructor Notes

This section gives justification for why building a safety voice is important.

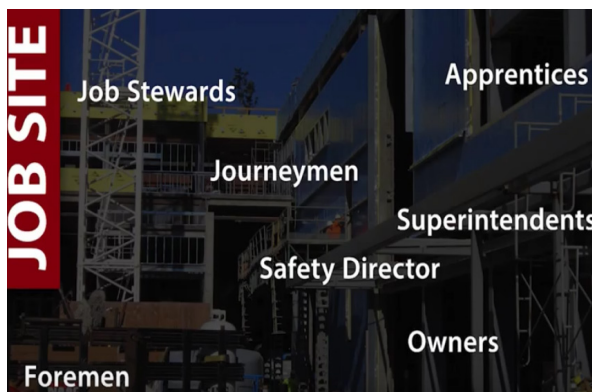
- Long career
- Do what you like outside of work
- Quality of life
- Access to good paying jobs
- Safe working conditions
- Solidarity among members
- Helps contractors be more profitable
- Improves business reputation

You might think of other reasons speaking up for safety would be important for your apprentices.

Discussion 2: Your Situation

It's important to recognize the bigger picture and how important you are in this picture.

Let's talk about how you fit into the bigger picture with your local and your jobsites.



Discussion 2: Your situation

Time: ~3-5 minutes

PAUSE VIDEO

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Apprentice
Workbook

Ask the apprentices:
How do you fit into the bigger picture?

How does our local hierarchy work?

What is the chain of command?

Draw your local hierarchy on the board and discuss it.
Have the apprentices draw it in the space provided in their workbook.

RESUME VIDEO

Getting Advice

Video Content

Let's talk about the best way to get advice or information.

It's best to talk with someone on the job for worksite problems.

Who is the best person to get advice from?



Instructor Notes

This section discusses how to get the best advice about safety on jobsites.

The point is that there are right and wrong people to contact when there is a safety issue on a jobsite.

Discussion 3: Line of Communication

It depends on your region, but this person could be a trusted coworker, your union steward or agent, or your apprenticeship training coordinator or instructor.



Discussion 3: Line of Communication

Time: ~3-5 minutes

PAUSE VIDEO

Ask the apprentices:

What is the best line of communication for your local?

Who should you talk with about safety issues?

Do you know how to get in touch with them?

Apprentices could talk to many different people about safety issues. Discuss who they could reach out to. Discuss when it is appropriate to reach out to specific people in the union or at jobsites. Have the apprentices write down who to get in touch with and how to get a hold of them in the space provided in their workbook.

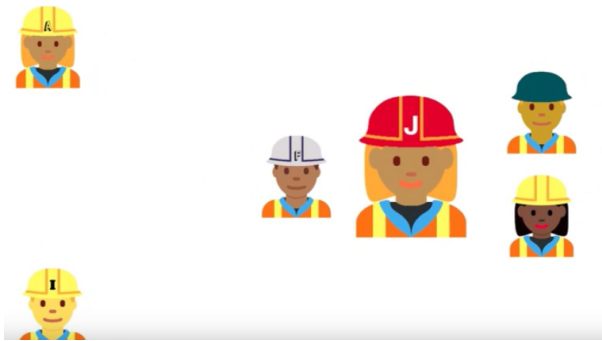
RESUME VIDEO

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Workbook

Review of Jessie's Story

Video Content

She knew the person who would be able to provide her with proper PPE would be her foreman. Before she spoke up to the foreman, she double checked with her co-workers what the PPE requirements were. Then when she spoke with the foreman, she knew the exact PPE she needed to work safely. Once her foreman downplayed her concerns, she knew she needed to get help so she called her local and spoke with her instructor. Her instructor spoke with the union business agent to determine the best action. They knew Jesse was right and needed the proper PPE to do the job.



Instructor Notes

This takes us back to Jessie's story and goes through who she spoke with to resolve her safety issue.

Safety Information

Let's talk about available information that may help you problem solve safety issues.

Your local can tell you about specific resources.

You can consider taking additional safety training, for example OSHA training and Foundations for Safety Leadership training.



Your workbook has a list of online resources.

This section introduces safety resources available for masonry and construction workers.

If you know of any other resources, or your union has anything specific, be sure to point these out to apprentices.

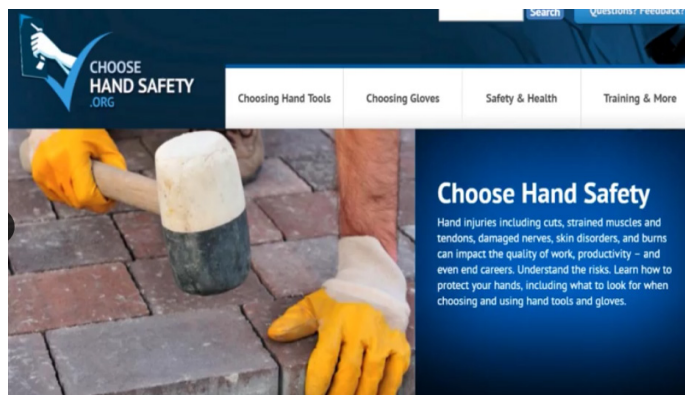
Take time to explore the online resources before teaching this unit and identify which ones you would like to emphasize for the apprentices as most helpful.

Online resources provided on page 91.

Activity 2: Grip Size - Choose Hand Safety

Video Content

Let's try one activity that is found on the "Choose Hand Safety" website. This will help you learn about your grip size and how that determines the appropriate handle size for your hand tools.



Instructor Notes

This activity introduces apprentices to the idea of getting the right tool for your grip size.

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Apprentice
Workbook

Activity 2: Grip Size

Time: ~10 minutes

Materials Needed (1 per every 2 apprentices):

- Tape measure
- Handtools

PAUSE VIDEO

- Read through the Choose Hand Safety Worksheet before teaching this activity
- Direct apprentices to the worksheet in their workbook
- Put the apprentices in pairs or in groups of 3 and provide them hand tools to evaluate
- Provide each group with a tape measure. A cloth tape measure is best

Follow the detailed instructions on the worksheet:

1. Measure their hand.
2. Calculate their grip size.
3. Check the handle size of some handtools
4. Have the groups compare grip sizes.

RESUME VIDEO

Wrap-Up

We covered a lot in this unit!

Building your safety voice is about the right way to speak up when you run into a safety issue.

Remember, knowing your rights and responsibilities at work are important. Check and use available safety information to help you become a safety leader and problem solver.

This completes *SAVE Unit 4: Safety Voice, Responsibility & Information*.

Continue to discuss any content you want to highlight from the unit or answer any questions from apprentices as time permits.

Proceed to *SAVE Unit 5: Communication & Conflict Resolution*.

Choose Hand Safety Worksheet

SAVE Unit 4: Safety Voice, Responsibilities & Information

Activity 2: Grip Size

Everyone is different, but there are some key measurements that will help you select hand tools that are the right size for you. The following is a detailed explanation of how to measure your hand.

These measurements are used to answer the questions:

- "How do I use my hand size when buying hand tools?" and
- "What should I look for in a hand tool?"

1) What is my Hand Length? _____ inches.

Hand Length



A person's hand length is measured by the length of their hand from bottom of palm to tip of longest finger.

To figure out the length of your hand, measure the distance from the fold in your wrist below the palm to the tip of your middle finger when your hand is flat.

EXAMPLE: In this photo, the hand length is about 7.25" (or 7-1/4").

2) What is my Grip Diameter (Hand Length x .20)? _____ inches.

20% of your hand length equals your grip diameter.

EXAMPLE: 7.25" x 0.20 = 1.45" --rounds up to 1.5")

3) What is my Grip Size (Grip Diameter x 3.14)? _____ inches.

Multiply your grip diameter by 3.14 or π (Grip Diameter x 3.14)

EXAMPLE: 1.5" x 3.14 = 4.7"

4) Use your grip size to determine the appropriate handle size (grip).

Look for hand tools that have a grip size that matches or is close to your grip size. To figure out a hand tool's grip size, you can measure the widest point of the handle or the area that you will be gripping most of the time during your work. In the photo to the right, for example, the grip size is about 4-1/2".



Handle Grip Measurement

If a tool's handle is too big or too small, there are options for modifying it to fit your grip:

- Use a replacement handle, if available.
- If the handle is **too small**, add a sleeve or cushion (or duct tape) to the handle to increase its size.
- If a handle is **too large**, you might be able to sand it down to a smaller diameter if it is made out of wood. But be careful, sanding too much could affect the strength of the handle and increase the chance of the handle breaking.

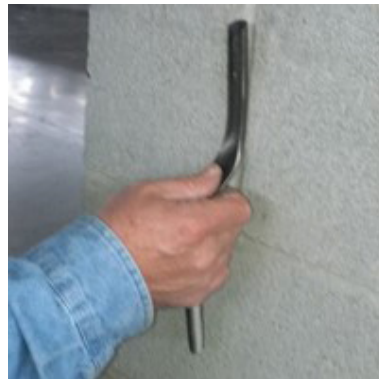
Don't assume tool handles with indentations or finger ridges are better. If your fingers do not align with the indentations, you will end up putting excess pressure on your hand that could cause discomfort and increase the risk for injury.

Also consider that there are two main types of grips:

- A **power grip**, used to hold a mallet or trowel, uses the muscles in the forearm and your hand is wrapped around the handle (photo to right).



- A **precision grip** (or a pinch grip), often used to hold jointers or plaster cutting and shaping tools, relies more on smaller and weaker finger muscles (photo to right).



Learn more about what you should consider for hand safety:

- Handle length
- Hand tool weight
- Gloves
- Anti-slip materials
- Shock and vibration
- Handle angles

A screenshot of the CHOOSE HAND SAFETY .ORG website. The header features the logo and navigation links: "Choosing Hand Tools", "Choosing Gloves", "Safety & Health", and "Training & More". The main content area shows a person wearing yellow gloves using a mallet on a brick surface. A text box on the right reads: "Choose Hand Safety. Hand injuries including cuts, strained muscles and tendons, damaged nerves, skin disorders, and burns can impact the quality of work, productivity – and even end careers. Understand the risks. Learn how to protect your hands, including what to look for when choosing and using hand tools and gloves."

SAVE UNIT 5

COMMUNICATION & CONFLICT RESOLUTION

PREPARATION

1. Prior to teaching, watch the video *SAVE Unit 5 - Communication & Conflict Resolution* while referring to the following instructor notes. Make your own additional notes to help you guide the apprentices through the unit.
2. Note the discussions and activities.

MATERIALS NEEDED

None

LEARNING OBJECTIVES

1. Identify appropriate verbal and non-verbal communication strategies.
2. Understand that conflict is normal and can be positive.
3. Use the ABC model to resolve conflicts.

PROCEDURE

1. Welcome apprentices.
2. Make sure that each apprentice has his or her own workbook to follow along with the video. You will ask them to write their individual responses in the workbook for any discussion or activity.
3. Start the video for *SAVE Unit 5 – Communication & Conflict Resolution*.
4. Be prepared to pause the video by pressing the space bar.
5. Have fun!

Please note: the following Instructor Notes do not contain every detail of the video. They are meant to provide you with the instructions you need to lead discussions and activities.

Key video content is in the left column and corresponding instructions and notes in the right column.

INSTRUCTOR NOTES

SAVE UNIT 5 VIDEO

Review

Video Content



Instructor Notes

- Previously, we introduced the concept of Safety Voice.
- Also, we discussed employer and worker safety responsibilities, and where to get ergonomic and safety information.

Communicating Well

A big part of having a safety voice is communicating well.

Good communication is especially important at work, like these guys working together on this two person lift.

If they did not communicate well, do you think the work would go smoothly?

- This section covers tips for communicating effectively.
- While some of the content may seem basic, not all apprentices have experience speaking up in professional settings or may never have learned about communication skills.

WHY LEARN TO COMMUNICATE?



Discussion 1: Communication Skills

Video Content

Think about situations or conversations you have had at work or anywhere.



Instructor Notes

- Having apprentices discuss what they have observed to be good or bad communication skills can help you reinforce appropriate skills for work.

Discussion 1: Communication Skills

Time: ~3-5 minutes

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PAUSE VIDEO

Ask apprentices:

What is a good communication skill?

- Example answers may be: Speaking clearly, Being to the point, Being polite, Being fully informed

Write down your own examples here:

What is a bad communication skill?

- Example answers may be: Mumbling, Being rude, Confusing the issue, Not providing enough information

Write down your own examples here:

- Reinforce that good communication skills are important on jobsites and with co-workers.

RESUME VIDEO

Different Ways of Communicating

People communicate in a wide range of ways: non-verbal and verbal.

Non-verbal communication is what your body and facial expressions say.

Verbal is how you speak and how you phrase what you say.



- The next sections describes and gives tips for non-verbal and verbal communication.

Discussion 2: Hand Signals

Video Content

Over half of all communication is non-verbal, so let's talk about that first.

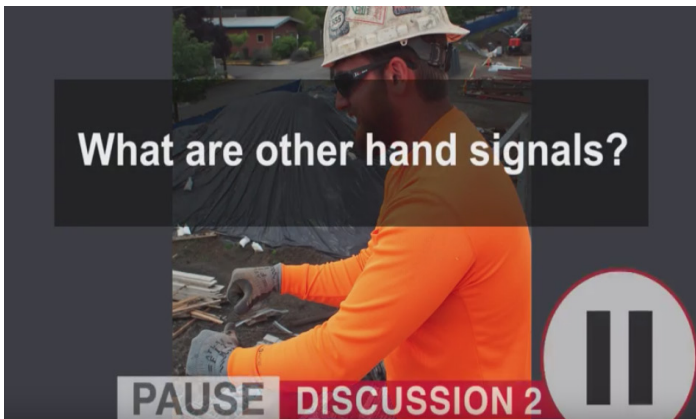
Non-verbal communication

- Hand gestures
- Posture
- Facial expressions
- Eye contact



Hand signals can express a lot.

You can probably think of other hand signals that help you communicate on worksites.



Instructor Notes

Discussion 2: Signals

Time: ~3-5 minutes

PAUSE VIDEO

Ask apprentices:

- You can probably think of other hand signals that help you communicate on worksites.
- What are they?

Discuss how signals can communicate a lot on a jobsite.

Write in other common hand signals that are used on jobsites and demonstrate them to apprentices.

Hand signals are a form of non-verbal communication. This discussion leads apprentices through hand signals they use at worksites.

What does this mean?

Bring it up



And this?

Move together



RESUME VIDEO

Open vs. Closed Postures

Video Content



OPEN VS CLOSED POSTURES

An open posture expresses interest in talking and listening.



A closed posture expresses discomfort, disinterest or disagreement.

Instructor Notes

- Which group looks like they are having a good conversation?
- It should be pretty apparent that the top picture with 'open postures' depicts a productive conversation.
- The lower picture with 'closed postures' conveys that there is conflict.

Facial Expressions



- Emphasize with apprentices that facial expressions can show your emotions pretty quickly.
- Raise awareness in your apprentices about how their facial expressions can effect their communications.

Eye Contact

Eye contact is important. Looking directly in the eye of someone lets them know that you're listening.

As you go through this section, remind apprentices that eye contact is important.



- Maintaining eye contact represents honesty.
- Eye contact helps to signal when to speak.
- Eye contact means you are actively listening.

Discussion 3: First Impressions

Video Content

Verbal Communication



Verbal communication is what you say.

The first few minutes of a conversation can be really important.

GREETINGS



Instructor Notes

This discussion helps apprentices understand the way they say something is as important as what they say.

Discussion 3: First Impressions

Time: ~3-5 minutes

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Workbook

PAUSE VIDEO

Ask apprentices:

What is the appropriate start to a conversation at worksites you've been on?

What is your friendly start?

Go around the room and have each apprentice give their friendly start.

Have the class rate each other's conversation starters. Would they lead to a productive conversation? If not, how could it be improved?

Provide class feedback on what is professional and respectable.

RESUME VIDEO



Friendly greetings get you further

Conversation Tips

The following tips are covered:

- Active Listening
- Reflect & Clarify
- Offer a solution

These conversation tips may not be obvious to apprentices. As you go through the unit remind them of these important tips.

Active Listening: be prepared to listen, keep an open mind, and try not to jump to conclusions before you have heard everything.

Repeat & Understand: Sometimes you need to repeat what your co-worker said to check that you understand.

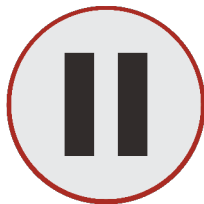
Offer a Solution: It's important to not just complain, but also offer up a reasonable solution.



Discussions 4-6: Joe's Story

Video Content

Joe was working on an equipment storage building. A brick needed to be cut out and replaced on a wall about 15 feet above the ground. The foreman directed Joe to climb into the bucket of a skid-steer loader to be lifted to the repair site.



PAUSE

The bucket of a skid-steer loader is not designed to be a work platform and no fall protection was available!

Joe knew that this was a violation of OSHA safety regulations and was unsafe. He knew he could erect a scaffold in a short time and take care of this task safely.



PAUSE

Instructor Notes

This story is a true example of speaking up for safety.

Discussion 4: Joe's Situation

Time: ~3-4 minutes

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PAUSE VIDEO

Ask apprentices:

What's wrong with this situation?

A skid steer loader is not designed to be a work platform, no fall protection was available and it is an OSHA violation.



RESUME VIDEO

Discussion 5: Joe's Communication

Time: 3-4 minutes

PAUSE VIDEO

Ask apprentices:

How can Joe best communicate this to his foreman? Think about what you might say or do in this situation.

Point out that Joe knew using the skid steer loader was an OSHA violation and unsafe. Joe knew how to do the job properly so how can he communicate this appropriately to his foreman? Discuss appropriate actions apprentices could take or ways they could speak up.

Emphasize that apprentices should remain calm but tell the foreman why using a skid steer as a work platform was unsafe, and what could be done to get the job done properly and safely.

RESUME VIDEO

Discussion 4-6: Joe's Story (cont.)

Video Content

Joe thought about what to say and how to say it.

He wanted to be calm and communicate openly.

He pointed out that on the busy street it would look bad for him to be seen working unsafely.

He said that he couldn't work safely from the bucket of the skid-steer loader.

Lastly, he offered to erect the scaffold right away and get the job done.

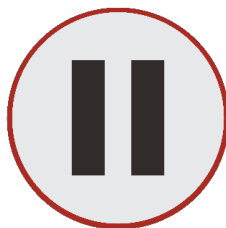
Foreman realized Joe was concerned about:

- Safety
- Image of contractor
- Liability of contractor



After Joe spoke up, the foreman realized Joe was concerned about safety, the image and liability of the contractor, and he had offered a reasonable solution. He agreed to have the scaffold erected and have the task completed properly and safely.

The next day the foreman pulled Joe aside and told him that he respected him for speaking up about a safety issue and offering a solution.



PAUSE

Instructor Notes



Discussion 6: Joe's Debrief

Time: 3-4 minutes

PAUSE VIDEO

Ask apprentices:

Can you think of other examples of successfully speaking up for safety?

If you have another example, you can provide it if students do not have one. Encourage them to discuss situations they have experienced or heard of when masons were able to speak up and get a safety issue resolved.

RESUME VIDEO

Introduction to Conflict Resolution

Video Content

Sometimes we don't see eye to eye with those we work with. It's important to know how to prevent and resolve conflicts in a professional and respectful manner.



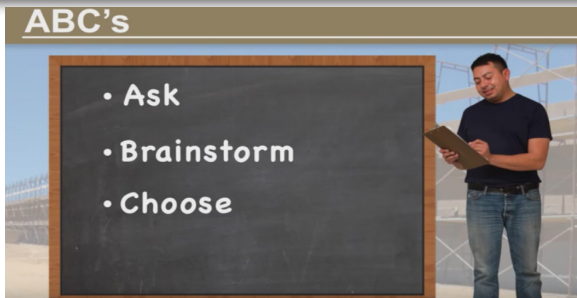
Conflict is perfectly normal. The way we handle these disagreements determines if the outcome will be positive. Conflicting views can even bring about new ideas, which promote positive results.

Instructor Notes

- This introduction should emphasize that conflict is normal. Sometimes we all get angry or do not see eye to eye. Getting upset does not usually help situations.
- This section of the unit talks about an approach, the ABC model, to handle conflicts.

Conflict is normal
and can be positive

ABC's of Conflict Resolution



"A" stands for ask. Take a step back and ask questions. You'll establish trust by treating others with respect and asking their opinion.

"B" means to brainstorm. Usually, there's more than one solution. Brainstorming solutions together can result in better solutions.

"C" stands for choosing the best solution. Try to get everyone to agree to the solution.

TIPS:

- Don't jump to conclusions
- Keep your cool
- Involve others
- Check with your local

- This sections covers the basic steps for resolving conflicts. It also helps apprentices realize that they might get frustrated or angry at work. Controlling their emotions is professional. They will regret outbursts or fighting, so apprentices should learn to avoid them.

Go back to your ABC's

Discussion 7: Scaffolding Safety

Video Content

Pete was working with a large crew on a jobsite. There were multiple scaffolds being used but the contractor only had one extension ladder.

This meant only one scaffold had a ladder for access. On the other scaffolds, the workers were climbing the cross-bracing.

This is an OSHA violation and extremely unsafe.

Pete shared his concern about this with his co-worker, Bob. Bob told him to be quiet and work. They disagreed that this was an important issue that needed to be resolved.



During a break, Pete called his union agent to ask for guidance on how to deal with the problem.

The agent came immediately. He met with the foreman and walked around the job site making general comments, staying very positive. After a few minutes the agent commented about the fact that there were not enough ladders for the masons to access the scaffolding. The foreman said he instructed the laborers to move the ladder when needed. The agent pointed out that this violated OSHA standards and the local union contract. In a polite but firm manner, he told the foreman that there would have to be a ladder for every scaffold.

The foreman immediately requested more ladders for the job site.

Conflict resolution skills:

- Called his agent
- Asked for guidance
- Agent came to site
- Polite but firm request



Instructor Notes

Here is a real life example to check the apprentices' problem solving and conflict resolution skills.

Discussion 7: Scaffolding Safety

Time: ~3-4 minutes

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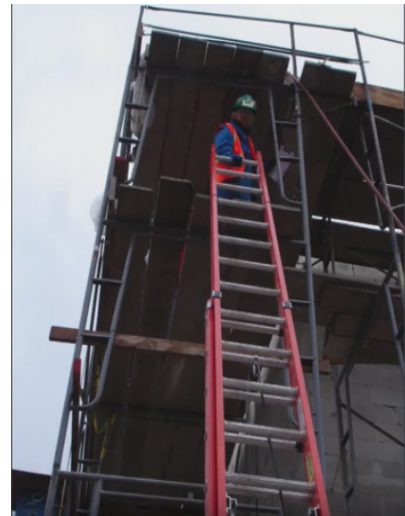
PAUSE VIDEO

Have two apprentices act out this conversation between coworkers. One apprentice is the mason who is concerned and the other apprentice is the mason who wants to ignore the issue and stay quiet.

Direct them to practice using the ABC model to see if they can come to an agreement about what they should do.

Note: This example will continue after the pause. Pete, despite his co-worker thinking this was not an important issue, decided to seek outside advice and called his union agent. When you start the video, the story will continue.

RESUME VIDEO



Discussion 8: Example Resolution

Video Content

The agent did not escalate the situation, even though he was speaking up for safety. Here's some things he did right:

Conflict resolution skills:

- Kept mason confidential
- Listened but still requested ladders
- Kept calm



Instructor Notes

This part of the story teaches apprentices that staying calm can help conflicts be resolved smoothly.

Discussion 8: Example
Time: ~3-5 minutes

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PAUSE VIDEO

Ask apprentices:

Did you notice what actions and strategies were good in this example?

Reinforce that Pete reached out to his union agent after he tried talking to his coworkers. Then his agent acted appropriately.

Have you had an experience like this that you can share? Perhaps when things went well when done appropriately?

Write down any examples you can think of here. Be ready to discuss them with apprentices if they do not have any of their own.

Wrap-up

In this unit, you learned about good communication skills and how to resolve conflicts.

You will need these skills to build your safety voice and become a leader. In the next unit, you'll learn about ergonomic solutions for masonry work.



This completes *SAVE Unit 5: Communication & Conflict Resolution*.

Continue to discuss any content you want to highlight from the unit or answer any questions from apprentices as time permits.

Proceed to *SAVE Unit 6: Ergonomic Solutions*. Unit 6 will provide ergonomic solutions to reduce the risk of strain and sprain injuries, which are specific to masonry craft worker jobs.

SAVE UNIT 6

ERGONOMIC SOLUTIONS

PREPARATION

1. Prior to teaching, watch the video *SAVE Unit 6 – Ergonomic Solutions* while referring to the following instructor notes. Make your own additional notes to help you guide the apprentices through the unit.
2. Note the activities, discussions and quizzes.

MATERIALS NEEDED:

None

LEARNING OBJECTIVES

1. List the three categories of ergonomic solutions for masonry.
2. Describe several engineering solutions.
3. Describe several administrative solutions.
4. Describe several work practice solutions.
5. Understand the hierarchy of controls (solutions).

PROCEDURE

1. Welcome the apprentices.
2. Make sure that each apprentice has their own workbook to follow along with the video. You will ask them to write their individual responses in the workbook to any discussion or activity.
3. Start the video for *SAVE Unit 6 – Ergonomic Solutions*.
4. Be prepared to pause the video by pressing the space bar.
5. Have fun!

TOTAL VIDEO TIME: 15 minutes

Please note: The following Instructor Notes do not contain every detail of the unit. They are meant to be an outline and provide you instructions to lead discussions and activities. Key video content is highlighted in the left column and additional instructions and notes in the right column.

INSTRUCTOR NOTES

SAVE UNIT 6 VIDEO

Review

Video Content

In the previous units we talked about safety voice. We learned about risk factors for sprains and strains. Also, we discussed safety responsibility and using good communication skills.



Instructor Notes

This is a brief review of safety voice and using good communication skills.

This unit covers specific masonry ergonomic solutions to reduce the risk factors covered previously.

Ergonomic Solutions

Using ergonomic solutions whenever possible reduces your chance of injuries, and can help you stay healthy and active for your entire career.

Solutions generally fall into three categories: engineering, administrative and work practice solutions, but they are not equally effective.

This unit describes engineering, administrative and work practice solutions available to the masonry crafts. Engineering solutions are the most effective, followed by administrative then work practices.

The solutions described in this unit are drawn from a more complete list published in an article titled, “Best practices for preventing musculoskeletal disorders in masonry: Stakeholder perspectives.” The complete list is provided on page 4 in the SAVE Orientation for Instructors..

This article was the result of a meeting in 2004 of 43 stakeholders including NIOSH, The Center for Construction Research and Training (CPWR), BAC, ICE, masonry contractors, ergonomists, occupational safety and health researchers, and masonry trades people.

Ergonomic Solutions

- Engineering
- Administrative
- Work Practices



Engineering Solutions

Video Content

What's an 'engineering' solution?

Engineering Solutions

- Equipment
- Tools
- Materials



Instructor Notes

- Emphasize that engineering solutions are the most effective way to eliminate or minimize injuries.
- There are 3 categories of engineering solutions:
 - 1) Equipment which includes: a) worker platforms, such as mast climbing scaffolding, and lifts. b) material and tool platforms such as mortar pan stands and split-level scaffolding, and c) material handling equipment such as cranes, mortar silos, forklifts, and handcarts.
 - 2) Tools such as ones that reduce vibration, ones with easy to squeeze triggers, like power caulking guns, electric hammers, and mini-grinders.
 - 3) Materials include lightweight block, Knock-out block, and pre-blended mortar.
- For tile and PCC masons, engineering solutions include equipment such as using carts to move materials, using a drycut saw with the HEPA vac built in or suction cup systems to move large porcelain tile.

Quiz 1: Equipment Solutions - Brick and Block

Which do you think is an example of an equipment solution?

Equipment Solution?

A. MORTAR MIXER

B. MUD ON TROWEL

C. H BLOCK



PAUSE

Quiz 1: Equipment Solutions

Time: ~2 minutes

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Apprentice
Workbook

PAUSE VIDEO

Ask Apprentices:

Which do you think is an example of an equipment solution?

Instruct apprentices to record the answer to the quiz question in their workbooks. The correct answer will be explained in the video.

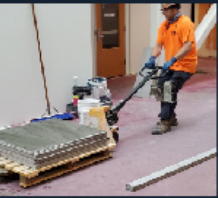
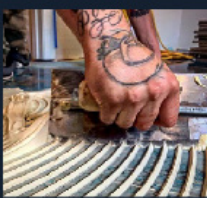
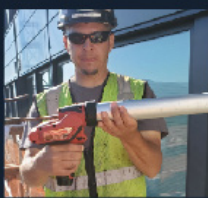
RESUME VIDEO

The correct answer is A. Mortar mixer, which is material handling equipment. While all of these are examples of engineering solutions, a trowel is a tool, while block is a work material solution.

Quiz 1: Equipment Solutions - Allied Crafts

Which do you think is an example of an equipment solution?

Equipment Solutions?

A. Pallet Jack	B. Trowel	C. Caulk Gun
		



Quiz 1: Equipment Solutions

Time: ~2 minutes

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Apprentice
Workbook

PAUSE VIDEO

Ask Apprentices:

Which do you think is an example of an equipment solution?

Instruct allied craft apprentices to look in their workbook for a quiz question specific to them. Give them a minute to record their answer in their workbook.

RESUME VIDEO

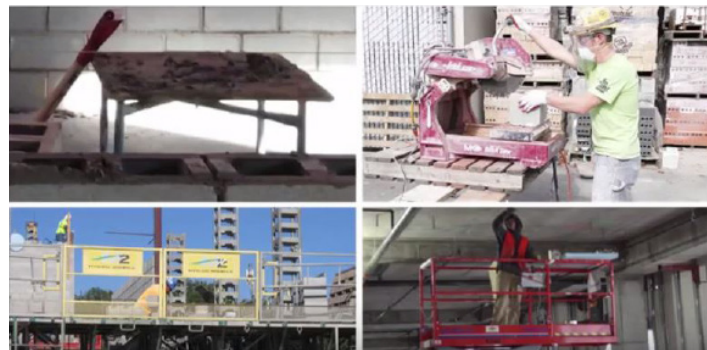
The correct answer is A. A pallet jack is material handling equipment. While all of these are engineering solutions, the trowel in B and the caulking gun in C are both examples of tools, not equipment.

Examples of Engineering Solutions

Platforms and lifts, mortar pan stand, a saw table or a scissor lift are equipment solutions.

More examples of engineering solutions include material handling equipment such as boom lifts, wheelbarrows and power pallet jacks.

Well-designed hand tools are also engineering solutions.



The following section highlights platforms and lifts, material handling equipment, tools, and materials that can all help reduce exposure to injury and cumulative trauma.

Material handling equipment reduces heavy lifting and awkward postures.

Well designed tools help reduce forceful hand exertion and awkward wrist postures.

You can brainstorm other examples of engineering solutions used commonly or that you would want to use for masonry work.



Administrative Solutions

Video Content

Now let's talk about administrative solutions. These have to do with work procedures.

They tend to help manage rather than eliminate hazards.

You may not have much control over administrative solutions that reduce your risk of injury.

Administrative Solutions

- Jobsite layout & materials staging
- Work sequencing
- Ergonomics & safety training



Instructor Notes

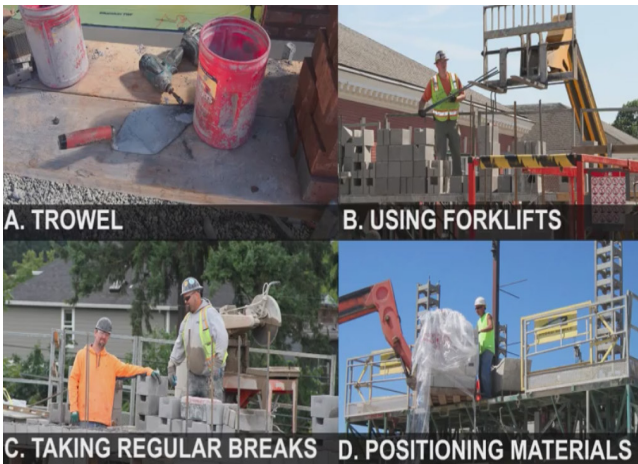
Administrative solutions are less visible than engineering solutions and may be outside of a mason's immediate control. They have to do with work procedures. While effective at reducing a mason's chance of injury, they tend to manage rather than eliminate hazards.

Administrative solutions are moderately effective because they implement best practices for how work is designed.

Point out that an administrative solution for allied crafts might be to rotate workers on jobs that don't have good equipment solutions, such as when using a grinder, carrying buckets, or mixing mortar by hand. Also, taking regular breaks reduces fatigue.



Quiz 2: Administrative Solutions



Quiz 2: Administrative Solutions

Time: ~1 minute

Pg. 40
Apprentice
Workbook

PAUSE VIDEO

Ask Apprentices:

Which is an administrative solution?

Instruct apprentices to record the answers to the quiz question in their workbooks. The correct answer will be explained in the video.

RESUME VIDEO

The correct answers are C and D. Taking regular breaks and positioning materials close to work are both administrative solutions. Though A and B are engineering solutions, a forklift is material moving equipment, while a trowel is a tool solution.



Work Practice Solutions

Video Content

Work practice solutions and PPE are the third category of ergonomic solutions. These solutions are important because they tend to be ones within your direct control on a daily basis.

Work practices fall into 6 categories:

- Transporting materials
- Cutting brick and block
- Laying brick and block
- Housekeeping and maintenance
- Good body postures
- Personal Protective Equipment (PPE)



Instructor Notes

Work practices include using good body postures and personal protective equipment. These are the least effective at reducing the risk of strain and sprain injuries, but they are important and sometimes they are the only solutions available to masons.

Remind apprentices that the good thing about work practice solutions is that apprentices have control over them and can start developing good habits now that will serve them throughout their career.

For allied craft workers, suggest resting weight on knuckles rather than their palm, or gripping a grout float to support body weight when reaching. This supports the back and keeps the wrist in neutral posture. Elevating work reduces stooping and low back stress. Using a mud board instead of getting mud from a bucket, reduces wrist stress. Cutting down pointing tools decreases torque on your wrist.



Quiz 3: Work Practice Solutions - Brick and Block

Which is a work practice solution?

- A) Adjusting the height of scaffolding
- B) Have mortar mixers on site
- C) Ergonomic Training
- D) Lifts available

Quiz 3: Work Practice Solutions

Time: ~2 minutes

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Apprentice
Workbook

PAUSE VIDEO

Ask Apprentices:

Which is an example of a work practice solution?

Instruct apprentices to record the answer to the quiz question in their workbooks. The correct answer will be explained in the video.

RESUME VIDEO

The correct answer is A, adjusting the height of the scaffolding. Mortar mixers and lifts are equipment (engineering solutions, while while ergonomics training is an administrative solution.



Quiz 3: Work Practice Solutions - Allied Crafts

Which is a work practice solution?

- A) Grasping a grout float to support body weight
- B) Having a power caulking gun
- C) Ergonomic Training
- D) Lifts available



Quiz 3: Work Practice Solutions

Time: ~2 minutes

Pg. 41
Apprentice
Workbook

PAUSE VIDEO

Ask Apprentices:

Which is an example of a work practice solution?

Instruct allied craft apprentices to look in their workbook for a quiz question specific to them. Give them a minute to record their answer in their workbook.

RESUME VIDEO

The correct answer is The correct answer is A, grasping a grout float to support body weight, rather than having your palm on the ground is a work practice that keeps the wrist in a neutral posture. B and D are equipment (engineering solutions) while C, ergonomic training, is an administrative solution.

Work Practice: Good Body Postures

Body postures are a work practice solution that refer to using your body in the safest, most efficient way possible. Neutral postures are safe body postures.



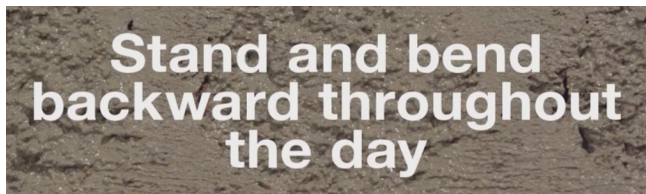
Remind apprentices that body postures are especially important when other ergonomic solutions are not available.

Arch slightly &
contract your stomach
before lifting

Activity 1: Back Extension

Video Content

Since you spend a lot of time bending forward, every once and awhile you should put your hands on your hips and bend backwards a few times to counteract forward bending.



Instructor Notes

Since masons spend so much time bending forward, it's a good idea to frequently stand and bend backwards to counteract the bending

Activity 1: Back Extension
Time: ~3 minutes

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Apprentice
Workbook

PAUSE VIDEO

1. Have apprentices stand with their hands on their hips and bend backwards until they feel a stretch in the front for their trunk. Hold a few seconds.
2. Repeat 5 to 10 times.

Bending backwards does a couple of things: first it takes the stretch off of the low back muscles and lets them rest briefly. Second, it allows the squishy center section of the disc to reposition.

Remind apprentices that repeatedly bending forward can push disc material back toward the nerves of the spine. Bending back allows the disc to be repositioned, sparing the disc and preventing sciatic nerve pain in the leg.

RESUME VIDEO

More About Work Practices

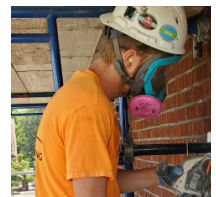
Video Content

PPE is worn on the body to protect you from all types of injuries, as well as protection from dust, scrapes and burns.



Instructor Notes

PPE masons should use regularly includes hardhats, gloves, safety goggles, earplugs, knee pads, & steel-toed boots.



PPE for allied crafts also includes: respirators, appropriate gloves for materials, eye protection, knee pads, long sleeves when exposed to epoxy, and ear muffs for noise.



Discussion 1: What is wrong?

Video Content

Now let's see if you've been paying attention. In an earlier video, the masons were not using the correct PPE. What is wrong here?



Instructor Notes

This discussion focuses on using the correct PPE.

Discussion 1: What is wrong?

Time: ~2 minutes

PAUSE VIDEO

Ask apprentices:
What is wrong here?

Apprentices should point out that the mason on the left is not wearing gloves.

RESUME VIDEO

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Apprentice
Workbook

Wrap-up

ERGONOMICS SOLUTIONS

- Engineering
- Administrative
- Work Practices



To summarize, there are many ergonomic solutions that will help keep you safe and minimize the chances of an injury at work. These include...

- Engineering
- Administrative
- Work practice solutions

Engineering solutions are most effective but administrative and work practice solutions are important and should always be included.

As an apprentice, you have the most control over your personal tools and equipment, using good body postures and some work practices, such as raising and lowering scaffolding to keep the work between your knees and shoulders.

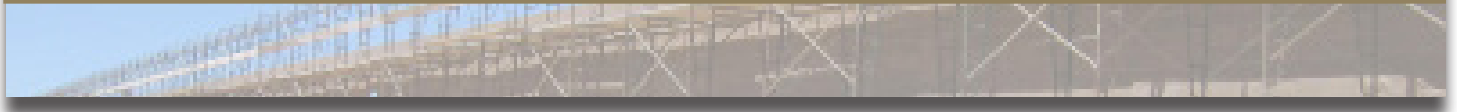
This completes *SAVE Unit 6: Ergonomic Solutions*

Continue to discuss any content you want to highlight from the unit or answer any questions from apprentices as time permits.

Proceed to *SAVE Unit 7: Solving Safety Problems*.

SAVE UNIT 7

SOLVING SAFETY PROBLEMS WITH SOLUTIONS



PREPARATION

1. Prior to teaching, watch the video *SAVE Unit 7 -- Solving Safety Problem With Solutions* while referring to the following instructor notes. Make your own additional notes to help you guide apprentices through unit.
2. Note the discussions and activities.

MATERIALS NEEDED:

None

LEARNING OBJECTIVES

1. Understand the concept of PASS: Problem, Advice, Safety, Solution.
2. Analyze a potential hazard to identify root causes.
3. Understand the factors to consider for making a choice about a solution.
4. Develop a plan for selecting safety solutions.

PROCEDURE

1. Welcome apprentices.
2. Make sure that each apprentice has their own workbook to follow along with the video. You will ask them to write their individual responses in the workbook for any discussion or activity.
3. Start the video for *SAVE Unit 7 – Solving Safety Problem with Solutions*.
4. Be prepared to pause the video by pressing the space bar.
5. Have fun!

TOTAL VIDEO TIME: 12 minutes

Please note: The following Instructor Notes do not contain every detail of the video. They are meant to provide you with the instructions you need to lead discussions and activities. Key video content is in the left column and corresponding instructions and notes in the right column.

INSTRUCTOR NOTES

SAVE UNIT 7

History of Ergonomics and Masonry

Video Content



Instructor Notes

- Unit 7 opens with a video about Frank Gilbreth, considered the father of ergonomics. Mr. Gilbreth's goal was to make work more efficient and productive.
- However, productivity and ergonomics go hand-in-hand, and he also made mason's work less stressful.
- Not only do ergonomic solutions improve efficiency but they spare the worker's body.

- Ergonomics is a win-win situation.

Discussion 1: Block Cutting



This may look like a typical day on a worksite.

But what if you notice that something doesn't seem right. Something is not safe.



- This example of a mason using his foot to hold a block while cutting can demonstrate problem solving.

Discussion 1: Block Cutting

Time: ~3-5 minutes

PAUSE VIDEO

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Apprentice
Workbook

Ask the apprentices:

What is going on here?

If you saw this happening at a jobsite, what would you do?

- Apprentices may be able to see multiple hazards.
- One of the hazards is that the mason is using his foot to hold the block while he cuts it on the ground. See if the apprentices can recognize one or two hazards.
- If not don't worry as this is covered more fully later.
- Discuss any identified hazards or if apprentices think the practice in the picture is OK. At this point in the video, either answer is fine and you can continue the video to analyze this scenario further.

RESUME VIDEO

Problem Solving

Video Content

Now we are going to get into how to problem solve safety issues.

It's kind of like solving a puzzle. You have to analyze the problem and imagine appropriate solutions before you act.

Rather than complaining, you will be raising concerns.

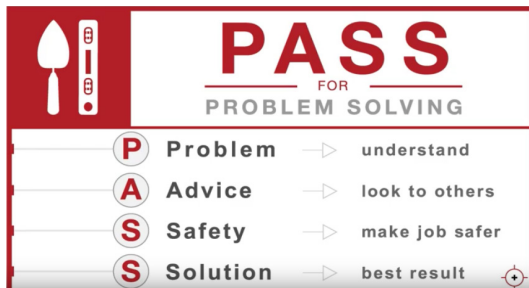


Problem solving is your PASS to speak up.

Problem - fully understand what you want to raise concerns about.

Advice - looking to others for information may help.

Safety and Solution - find your safety solution. What is the best result to make the job safer?



You're going to have to use all your knowledge and skill to find the root of the problem.

MASONRY SKILLS **SAFETY**
ERGONOMICS **HEALTH**
WORKER RIGHTS



WORKPLACE KNOWLEDGE

Instructor Notes

It is important to emphasize that problem solving is key to having a safety voice. Problem solving allows masons to share their concerns about safety and about what can be done to improve safety.

PASS is an acronym to help apprentices remember the steps of problem solving.

Problem solving will integrate apprentices' workplace, knowledge, masonry skills, ergonomic knowledge, and communication skills.

Use your workplace knowledge!

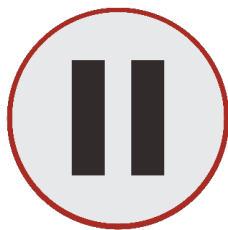
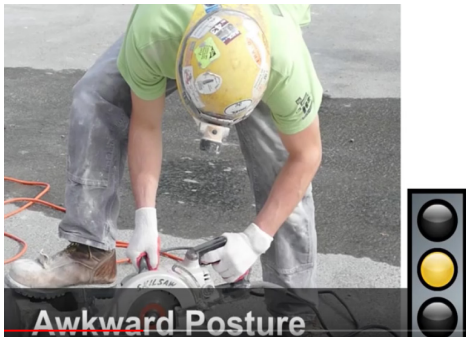
Discussion 2: Issues

Video Content

To practice identifying safety problems with this task, we need to get to what we call “the root cause” of the hazard.

Let’s break this down and dig a little deeper to get to the root. There is more than one problem here so we’re going to discuss each problem.

For each issue, let’s brainstorm why the problem is happening.



PAUSE

Sometimes, a solution is not so apparent and you may need to get more information or advice.

Instructor Notes

This discussion helps apprentices dig deeper in thinking about a problem. First, apprentices should consider WHY things are done a certain way. They can then decide what could be done differently.

Discussion 2: Identify the Problem

Time: ~3-5 minutes

Pg. 44
Apprentice
Workbook

PAUSE VIDEO

Ask apprentices:

Why is this mason breathing in dust?

Due to their posture, their face is just above the cutting surface so the dust could be in their breathing zone. If they are not wearing a respirator, they will be breathing in dust.

Why is this mason in an awkward, stooped posture?

Because the block is on ground, they must bend over to cut.

Remember, this is a yellow zone posture and a risk for injury.

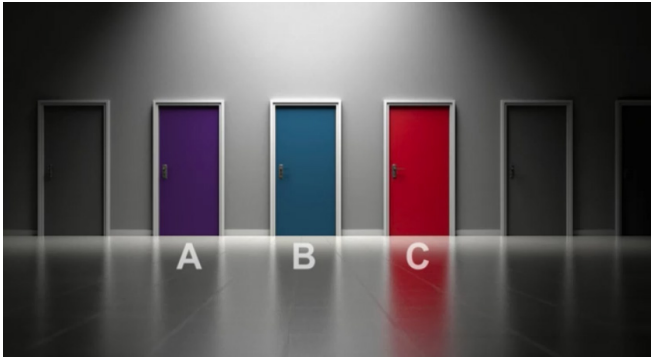
Why is this mason’s foot in danger?

They are using their foot to hold the block in place. This is dangerous and any slip could result in the saw blade cutting their foot or injuring them.

RESUME VIDEO

Plan to Choose a Solution

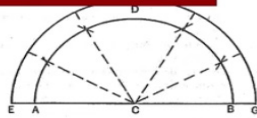
Video Content



Let's learn some strategies to help us decide what would improve safety and what's the most viable solution.

If you have several options, you need a strategy or plan to choose the best one.

YOU NEED A PLAN



Instructor Notes

All work takes planning. Just as masons use plans for building walls and arches, apprentices can plan to make safety decisions and use problem solving skills.

Discussion 3: Decisions

Let's look back at our cutting block example. There are several solutions that could control dust.



This example is about how to decide on a best solution.

Discussion 3: Decisions

Time: ~3-5 minutes

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Apprentice
Workbook

PAUSE VIDEO

Ask the apprentices:

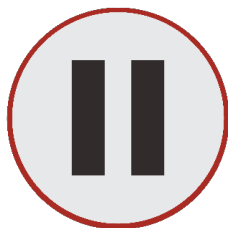
How would you decide what is best?

What factors do you need to consider to make the best choice?

To further prompt, ask apprentices what would be important for the solution to be successful? They may say the cost, the time it takes to get the solution to the worksite, or the time necessary to use the solution.

You may think of other factors on a job site that would be good to consider that you can share with the apprentices.

RESUME VIDEO



PAUSE

Problem Solved

Video Content

The mason knows he can request a wet saw table for the project since he has to cut many blocks and knows the contractor has one. After asking his supervisor, he learned that the water prevents the dust from going everywhere.

He learned that a saw with dust collection would be harder to get and that respirators are uncomfortable and hot, so those two options are not always the best.

Also, respirators are part of a respiratory protection program which requires fit testing, training, and medical evaluations.

Knowing all this, he decides that his goal is to use a wet saw table.

Instructor Notes

This section reviews some details of the solutions that you may have discussed.



Tips: Short term vs Long term



Just because a solution would be an immediate fix, doesn't mean it's necessarily the best.

Sometimes a short term solution is OK when you have to wait to put a long term solution into effect.

If you can't fix something right away, make it a goal to reach for in the future. Plan ahead.



The next section is focused on tips for figuring out solutions. Things you should consider when problem solving include:

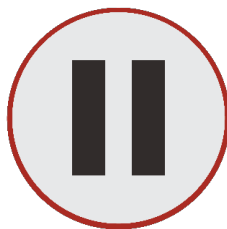
- Timing: short term vs long term
- Who has control of solution
- Effectiveness of solution
- Barriers for the solution to be successful

You may think of other tips or issues to consider that you can discuss with apprentices.

Activity 1: Sphere of Control

Video Content

Now let's talk about who has control. Some solutions you have more control over, such as work practices, while other solutions you can't do much about – yet.



PAUSE

Instructor Notes

Apprentices may get frustrated because many solutions are not within their control. While this is true, they should be aware of all of the solutions available and advocate for the best solutions.

Activity 1: Sphere of Control

Time: ~5-7 minutes

**Pg. 47-48
Apprentice
Workbook**

PAUSE VIDEO

1. Have apprentices read the Sphere of Control Activity worksheet for their craft.
2. Explain that they should be concerned about safety in all their work activities. However, they have varying degrees of control over work tasks. For some tasks they have a lot of control, this inner circle is their Sphere of Control, the outer ring is where they have no control, and the interface between the circles is their Sphere of Influence where they have some control.
3. Point out that at the bottom of the worksheet is a list of the solutions to ergonomic risk factors that were covered in the units.
4. Explain that their task is to decide if the solutions are within their control, and if so, how much?
5. Ask them to write each of the 17 solutions (or it's number) in the appropriate place on the Sphere of Control to reflect their amount of control – a lot, none or 'some influence'.
6. Have them spend a couple of minutes doing this and encourage them to work with a partner.
7. For example, most of the time they can refrain from using awkward stooped postures, but sometimes a tight work space might require them to stoop to lay brick or block. In this case they might write 'stooped posture' halfway between the center of the sphere and the outer edge showing that they have influence over using stooped postures but not total control.
8. Then review the solutions and discuss what they can and cannot control and why.

RESUME VIDEO

Activity 1: Sphere of Control Worksheet - Brick and Block

SPHERE OF PERSONAL CONCERN

Everything about work that has an impact on you whether or not you can change it.

SPHERE OF CONTROL

Those aspects of work that impact you and you can change

liftng CMU less frequently

hold materials close to body

lift with arch in back

squat lift

adjusting how fast you lay brick

bend backward break

stepping rather than twisting

2 hands

stay fit

good fitting gloves

light weight block

using mortar silos

having carts and lifts

stretching before work

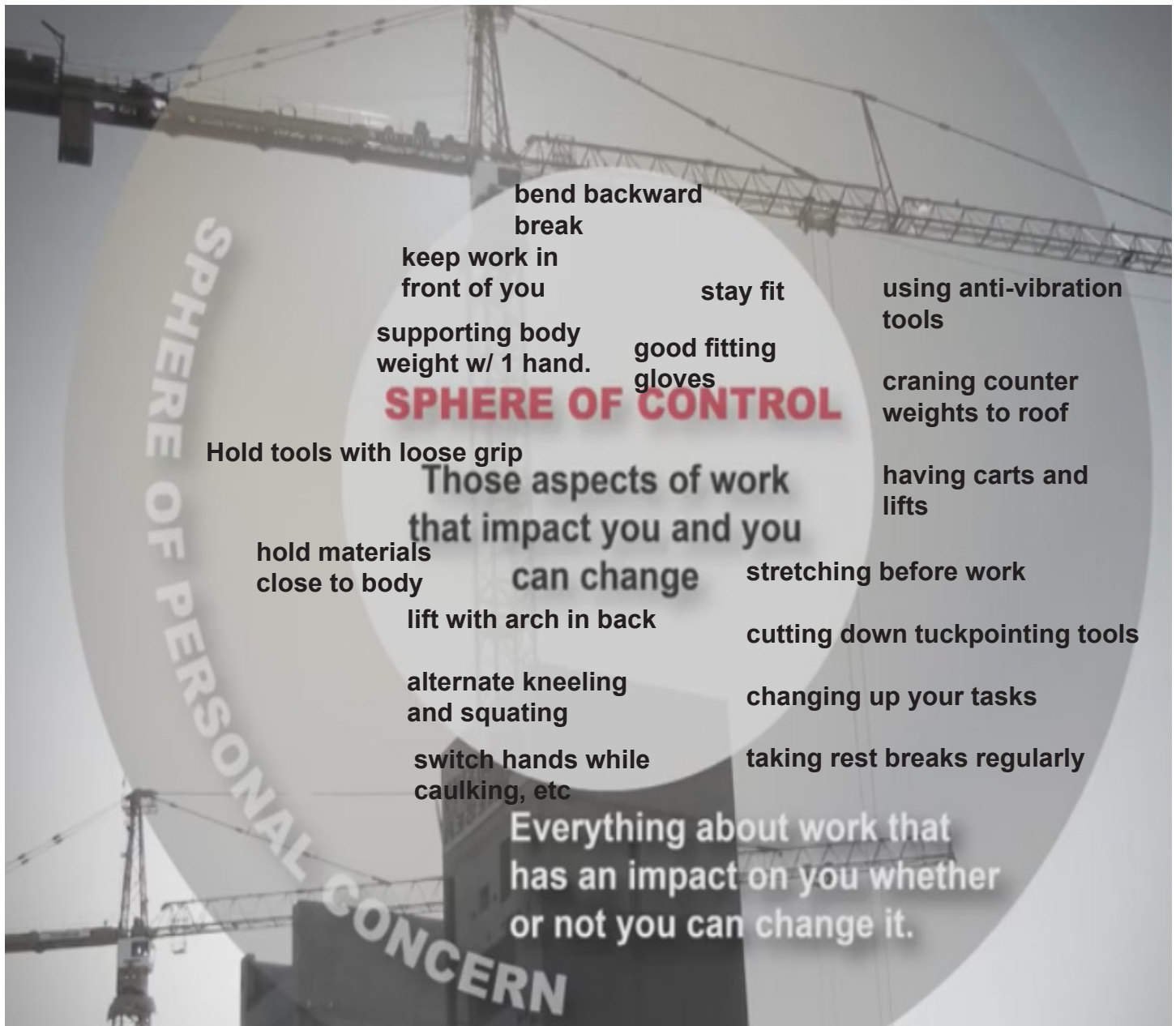
adjusting scaffolding height

changing up your tasks

taking rest breaks regularly

1. Using 2 hands to place CMU instead of 1
2. Taking 'bending backwards' breaks
3. Lifting with a slight arch in your back
4. Staying fit
5. Adjusting scaffolding height
6. Adjusting how fast you lay brick/block to pace yourself
7. Good fitting gloves
8. Stepping rather than twisting when lifting
9. Laying light weight block
10. Holding materials close to your body
11. Lifting CMU less frequently during the day
12. Using mortar silos
13. Stretching before work
14. Using a squat lift
15. Taking rest breaks regularly
16. Having carts and lifts available
17. Changing up your tasks

Activity 1: Sphere of Control Worksheet - Allied Crafts

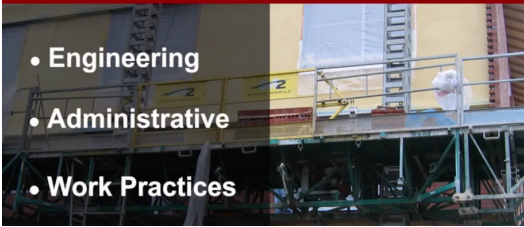


1. Supporting body weight with one hand gripping trowel or float
2. Taking 'bending backwards' breaks
3. Lifting with a slight arch in your back (neutral spine)
4. Staying fit
5. Cutting down tuckpointing tools to reduce wrist stress
6. Practicing switching hands when caulking, tuckpointing or 'demoing'
7. Good fitting gloves
8. Keeping the work in front of you
9. Using anti-vibration tools
10. Keeping work close to your body
11. Letting tools 'float' in your hand with a loose grip
12. Craning counter weights to roof
13. Stretching before work
14. Alternating kneeling with squatting postures
15. Taking rest breaks regularly
16. Having carts and lifts available
17. Changing up work tasks

Tips: Effectiveness of Solution

Video Content

NOT ALL SOLUTIONS ARE EQUAL



- Engineering
- Administrative
- Work Practices

Instructor Notes

- Remind the apprentices of the hierarchy of solutions.
- Engineering solutions are the best and administrative solutions are second best. Work practice solutions are the least effective and should complement engineering and administrative solutions.

Tips: Barriers



- Cost, time and training may be barriers for some solutions. You may think of others that apprentices should consider. Any barrier needs to be assessed to determine if it can be overcome.

Activity 2: Solution Plan

This activity brings together several of the skills taught in SAVE.

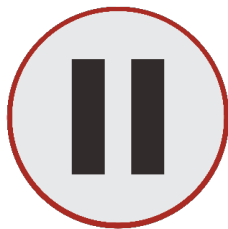
Activity 2: Solution Plan

Time: ~10 minutes

Pg. 50
Apprentice
Workbook

YOUR PLAN:

- Timing
- Control
- Effectiveness
- Barriers



PAUSE

PAUSE VIDEO

1. Have apprentices go to the “Solution Plan” worksheet in their workbooks that applies to their craft (shown on following pages with suggested answers). If multiple crafts are present break them into groups to work on scenarios by craft.
2. Explain that the purpose of the activity is to develop a plan that considers several potential solutions. Apprentices should work in pairs and consider the scenario, write down the risk factors associated with the scenario, and list 2 or more potential solutions. Then, for each solution, have apprentices fill in the worksheet to assess timing, control, effectiveness, barriers. Finally, have apprentices make an overall decision on the best ergonomic solution. If time permits they can do more than one scenario or have different groups focus on different scenarios.
3. Review and discuss as a class. Remind apprentices that they can speak up on jobsites if they can identify appropriate solutions.

RESUME VIDEO

Activity 2: Brick and Block Masons Solution Plan

Instructions: Guide brick and block apprentices in considering the issues in this scenario and developing ergonomic solutions. This activity is meant to help apprentices integrate all the knowledge they've learned in these units. Have them consider questions in the list below. Then, lead a class discussion to address the issues and their recommendations for implementing the best solution.

SCENARIO 1 Brick and Block Masons

You are starting work on a new US Post Office. Due to security concerns you are required to lay 10" block with rebar 8" on center, with a 4' lap. This requires you to lift 60 pound block over tall rebar with each block placed.

1. Ask apprentices 'what are the physical risk factors masons face in this situation?'
Remind them that this activity combines three risk factors: heavy lifting, awkward overhead postures, and repetition. Combining risk factors increases their chances of injury.
2. Have apprentices describe 2 or more solutions that should be considered to complete this job safely. Have them record their ideas in their workbook.

Possible Solutions	Solution 1 High lift grouting	Solution 2 2 person lift teams	Solution 3 Use the Mule
Short or long term solution?	Long term: truck for grout, clean out holes needed during construction	Short term: discuss with foreman in terms of timing, no long term issues	Long term solution
Who has control?	Masonry contractor	Apprentices, masonry contractor, union contract	Masonry contractor
Type of solution? How effective is it?	Work practice solution Moderately Effective	Work practice solution Somewhat Effective	Equipment Solution Very Effective
What are the barriers?	Familiarity with process, scheduling truck for grout	Perception that it takes more time	Cost of mule

Notes for instructor: High lift grouting and lift teams are excellent alternatives to masons lifting above their heads when there is heavy block and a tall lap. Other solutions you can explore include use of H-block, light weight block (LWB) and the Mule to lift block. In some parts of the U.S. H-block is readily available. In other areas, the ends of CMU are knocked out. Using H-block and high lift grouting require grouting all cells. LWB, such as pumice block, must be specified for the job. Frequently, it isn't because specifiers think it isn't as strong, but LWB meets the same ASTM standards as regular CMU. Mules are becoming more common but cost over \$70,000, which could be prohibitive, though they can be rented.

Recommendations: If lift teams are the solution the group selects then the recommendation might be something like: Lift teams should be implemented at the start of the job, but masons will advocate for using high lift grouting, H-block or lighter weight block on future jobs.



Activity 2: PCC Masons Solution Plan (1 of 2)

Instructions: Guide PCC apprentices in considering the issues in this scenario and developing ergonomic solutions. This activity is meant to help apprentices integrate all the knowledge they've learned in these units. Have them consider questions in the list below. Then, lead a class discussion to address the issues and their recommendations for implementing the best solution.

SCENARIO 2 PCC Masons

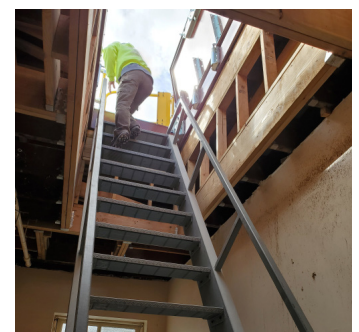
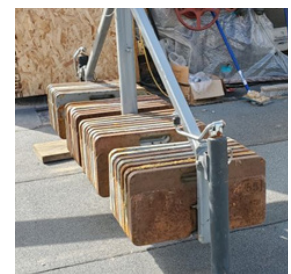
You are starting restoration of exterior brick on an 8 story building. You'll be setting up several outriggers. You'll need to carry dozens of 50-lb counter weights to the building roof. The last set of stairs leading to the roof are very narrow and steep. The usual practice is to carry weights manually, 2 weights at a time, one in each hand.

1. Ask apprentices 'what are the physical risk factors they face in this situation?'
Remind them that this activity combines risk factors: carrying heavy weights, awkward postures getting weights up the steep stairs, and repetition. Combining risk factors increases their chances of an injury.
2. Have apprentices describe 2 or more solutions that should be considered to complete this job safely. Have them record their ideas in their workbook.

Possible Solutions	Solution 1	Solution 2	Solution 3
	Carry 1 weight at a time (instead of 2) to reduce low back stress	Use a pulley system to pull the weights up the stair case	After the first outrigger is in place, use a crane to transport remaining counterweights to the roof.
Short or long term solution?	Short term	Long term for job duration	Long term for job duration
Who has control?	Worker	Worker and contractor	Worker and contractor
Type of solution? How effective is it?	Work practice solution; mildly effective, safer then carrying two	Work practice and equipment solution: moderately effective, very safe	Equipment solution: very effective and safe
What are the barriers?	Takes time, more trips	Need pulleys	Have to carry counterweights until outrigger in place

Notes for instructor: As with many masonry job duties, this is a difficult job task with no stellar equipment solutions. There is high risk for injuring the lower back, mid back or shoulders. Solutions include using pulleys to pull weights up the steep stairway, transporting weights on the outrigger or a crane, when available. Are there other solutions?

Recommendations: If carrying weights is the chosen solution, discuss the practicality of carrying one weight at a time, which means more trips. Perhaps suggest using a system of passing weights from one worker to the next: i.e. one person at bottom of stairs carries to the top and hands off to person with a cart (if possible). If it's a bigger job with different trades talk to the general to see if moving weights can piggyback with another trade. ie roofing deliveries.



Activity 2: PCC Masons Solution Plan (2 of 2)

Instructions: Guide PCC apprentices in considering the issues in this scenario and developing ergonomic solutions. This activity is meant to help apprentices integrate all the knowledge they've learned in these units. Have them consider questions in the list below. Then, lead a class discussion to address the issues and their recommendations for implementing the best solution.

SCENARIO 3 PCC Masons

You are preparing to work on a PCC site with swing stage scaffolding suspended from the roof. You have been told there will be a “crossbeam stirrup assembly” with an ‘A’ type stirrup mounted several feet from the ends of the platform. You know with this set-up the hoist blocks your ability to easily access work on both sides of the stirrup.

1. Ask apprentices ‘what are the physical risk factors they face in this situation?’ Remind them that this activity combines risk factors: repetitive, awkward postures when bending and reaching to work around the motor. Combining risk factors increases their chances of an injury.
2. Have apprentices describe 2 or more solutions that should be considered to make this job safer. Have them record their ideas in their workbooks.

Possible Solutions	Solution 1	Solution 2
	Pre-stock materials (i.e. sausages, rags equipment) on both sides of hoist motor	Request foreman or project manager get ‘walk-thru,’ ‘pass-by’ or ‘end mounted’ stirrups that create a safer work space on the platform
Short or long term solution?	Short-term solution and has to be implemented daily	Long-term solution for the duration of the project and beyond
Who has control?	Masons	Foreman or Project Manager
Type of solution? How effective is it?	Work practice solution, moderately effective and safe	Equipment solution, very effective and safe
What are the barriers?	Taking the time to pre-stock	Foreman or Project Manager might not want to order it; cost; getting it in time; technical barriers

Notes for instructor: There may not be a single ‘best’ solution. Masons need to consider the optimal solution, but also the best solution for their situation, given time, costs, technical barriers, and available resources. Your hardest task is helping them learn how to advocate for these solutions in an appropriate, mature, and effective way.

Recommendations: Either of these solutions reduce ergonomic injury risk. However, remind them that when walking past the hoist their lifeline could get tangled in the wire rope for the hoist, which would be dangerous if there was a failure of the hoist ropes.

Assist apprentices in thinking about the ‘most’ effective, long term solutions but also short term solutions. The issue isn’t limited to getting by the motor, but also working in the tight space between the motor and the wall, this can force the mason into awkward body postures and often times requires one worker pushing the entire stage away from the wall while the other worker is performing the work. Is this safe?



Activity 2: PCC Masons Solution Plan (2 of 2)

Recommendations: Why are cross beams being used in this situation? Is there a better method? Is there permanently installed equipment on the roof such as cell phone antennas or HVAC units that won't accommodate certain swing stage lengths with end stirrups?

Have them consider other types of stirrup assemblies that could be used: end stirrups, low overhead stirrups, and walk-thru stirrups. What are the pros and cons of each type, and which is the most appropriate and safest for the work situation?

For example, low-profile stirrups on the outside of the swing stage make it easier to move about, but might create awkward postures to control the hoist. Walk-thru stirrups create more space for movement but reduce the load capacity on the modular swing stage. The crossbeam assembly weighs 59 lbs while the walk-thru stirrup weighs 140 lbs. The owner might not have these other stirrups readily available. They might think purchasing them is unimportant since the current method has been working just fine. Or, there might be rigging limitations on the roof, such as obstacles like cell phone antennas or HVAC units. How can they be convinced otherwise? Finally, in some parts of the U.S. high-low drill motors might be common, what problems arise with their use?



Cross beam swing stage scaffolding

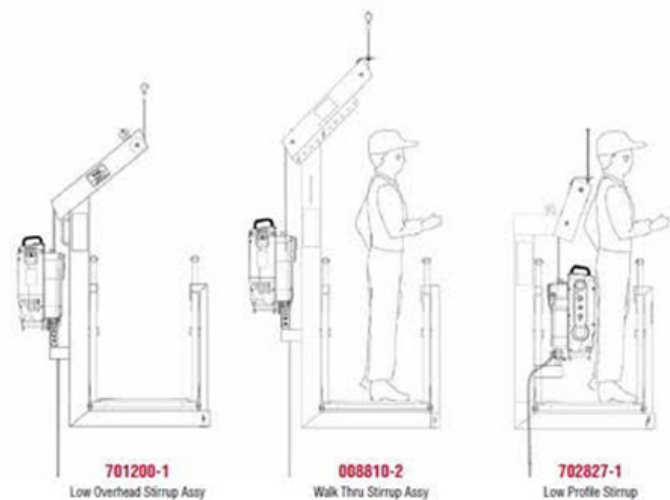


Walk-thru 'C' stirrup on swing stage scaffolding



End 'A' type stirrup assembly

Stirrup Options for Cantilevered Platforms



Specifications:	701200-1	008810-2	702827-1
Weight:	110 lb (49.9 kg)	140 lb (63.5 kg)	108 lb (49 kg)
Dimensions:			
Width:	49 5/16 in. (1.3 m)	49 1/4 in. (1.3 m)	36 in. (0.9 m)
Height from platform deck to uppermost point on stirrup	68 1/16 in. (1.7 m)	86 1/4 in. (2.2 m)	56 15/16 in. (1.5 m)

Activity 2: Tile Masons Solution Plan

Instructions: Guide tile apprentices in considering the issues in this scenario and developing ergonomic solutions. This activity is meant to help apprentices integrate all the knowledge they've learned in these units. Have them consider questions in the list below. Then, lead a class discussion to address the issues and their recommendations for implementing the best solution.

SCENARIO 4 Tile Masons

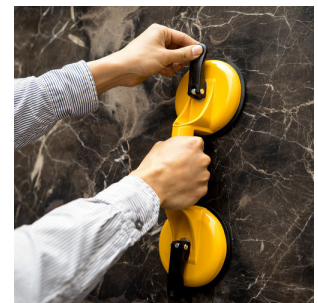
Masons are to tile a new hotel lobby using 36' x 36' marble tiles. This is a large project and each tile weighs over 50 pounds. Some younger apprentices want to muscle through it and lift the tiles by themselves without equipment.

1. Ask apprentices 'what are the physical risk factors they face in this situation?'
Remind them that this activity combines risk factors: carrying heavy weights, awkward postures while moving tile and repetition. Combining risk factors increases chances of injury.
2. Have apprentices describe 2 or more solutions that should be considered to complete this job more safely. Have them record their ideas in their workbook.

Possible Solutions	Solution 1 Lift tiles with 2-4 other workers	Solution 2 Use suction cup or rack system
Short or long term solution?	Short term	Long term
Who has control?	Workers who do lifting and must use good body mechanics	Contractor responsible for getting equipment, workers for proper use
Type of solution? How effective is it?	Work practice, somewhat effective but not the safest practice	Equipment and work practice components, very effective and safe
What are the barriers?	Awkwardness and heaviness make injury risk great	Contractor must purchase equipment; workers must coordinate effort

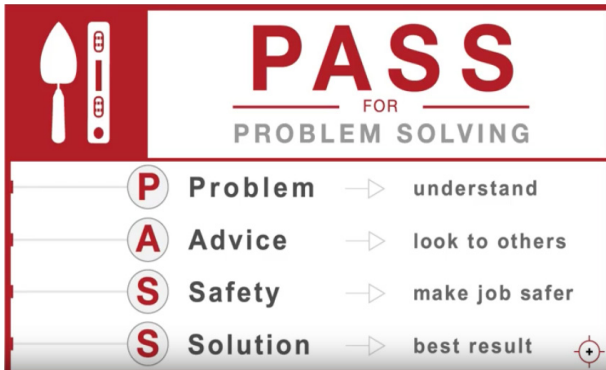
Instructor notes: Carrying large tiles individually is common, but risky for the worker due to awkward postures and heavy lifting. If a suction cup system isn't available, hand-held suction cups can be used along with carts. If no equipment available, a solution would be moving tiles in 2-4 person teams.

Recommendations: If 2-4 person teams are the chosen solution, discuss how this can be done safely, such as by coordinating the lift and planning the move. Also, help apprentices explore how to go about getting equipment, for the current job, or the next.



Recap of PASS and HARP

Video Content



PASS
FOR
PROBLEM SOLVING

P	Problem	→	understand
A	Advice	→	look to others
S	Safety	→	make job safer
S	Solution	→	best result



H	→	Heavy Lifting
A	→	Awkward Postures
R	→	Repetitive Activities
P	→	Prolonged Postures

Instructor Notes

- This section is a brief reminder of the main points in the SAVE program.
- Problem solving is the apprentices' PASS to speak up.
- There are four main risk factors that can be summarized by HARP. Finding ergonomic solutions can reduce these risks.

The End

Be proactive and be a safety leader!



- As you conclude this last SAVE unit, remind apprentices that they can learn to use their SAVE skills as they learn their trade. This will improve their health and safety, and prolong their productive careers.
- Thank you for teaching your apprentices SAVE.

SAVE GLOSSARY

ABC MODEL – Ask questions, Brainstorm solutions, Choose the best solution is the ABC model for conflict resolution.

ACUTE TRAUMA – Damage to your body's tissue that happens immediately after a trauma.

ACTIVE LISTENING – Listening takes a conscious effort to hear and understand what a person is saying to you. To actively listen you must be prepared to pay attention, keep an open mind and not jump to any conclusions before you have heard everything.

ADMINISTRATIVE SOLUTION – Eliminating or minimizing the risk of injury in the workplace by changing work procedures. Examples include job site layout and materials staging, work sequencing and scheduling, and ergonomics programs and training.

ANATOMY – The science concerned with the structure of the body.

ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE) – A private, non-profit membership organization that coordinates voluntary standards activities. ANSI standards are used by engineers and specifiers to choose masonry materials. For example, light weight block meets the same ANSI standard as regular weight CMU.

AWKWARD POSTURE – Awkward posture is the position of the joint and its connecting limbs that deviates from neutral posture. Awkward posture of the body is associated with an increased risk for injury.

BACK INJURIES HAZARD ALERT – A Hazard Alert is a short, image-driven material that delivers a simple and direct message for protections against health and safety hazards. CPWR provides a hazard alert to prevent back injuries.

CARPAL BONES – Eight small bones that make up the wrist.

CARPAL TUNNEL SYNDROME – A condition in which the nerves that pass through the wrist becomes irritated and inflamed causing pain and numbness in the hands.

CHOOSE HAND SAFETY – Hand injuries can impact the quality of work, productivity and even end careers. Understand the risks. Learn how to protect your hands, including what to look for when choosing and using hand tools & gloves. Visit choosehandsafety.org for more information.

CONFLICT RESOLUTION – A process for preventing and resolving conflicts in a professional and respectful manner.

CONTROL – The power to direct the tools, equipment or work practice. You have control to select and use some solutions, but some things you may not have any control over but can still use your safety voice to advocate for a solution.

CPWR - Is an acronym for the Center for Construction Research and Training.

CUMULATIVE TRAUMA – Damage to your body tissues leading to injury that occurs slowly over time. The duration can be a few days, weeks or even years. Examples include carpal tunnel syndrome, tendonitis and muscle strains and ligament sprains.

DISC – Fibrous spacer that rests between two vertebrae in the spine, made up of an outside ring of strong fibrous bands and a center filled with a jelly-like material.

DISC HERNIATION – A more severe form of disc protrusion in which the injury to the intervertebral fibers are severely torn and some of the jelly-like center contacts and irritates the nerves. Also known as a “slipped disc”.

DISC PROTRUSION – An injury to the intervertebral disc in which the fibers are torn and some of the jelly-like center is pushed backward onto the spinal nerves.

ENGINEERING SOLUTION – A way of eliminating or minimizing the risk of injury in the workplace by using equipment, tools, and work materials that are most ergonomic. Engineering solutions are the most effective way to reduce chances of injury.

ERGONOMICS – The study of people’s efficiency in their working environment. Interaction between the worker, the work & the work environment.

FORCE – The amount of muscle effort applied to move an object. Sometimes referred to as the ‘weight’ of the object. The higher the force, the greater the risk of injury.

FUNCTIONAL LIMIT – The range of motion within the body in which you will not likely be injured and which minimizes the cumulative trauma to your body.

HARP – Reminder of the 4 risk factors for strain/sprain injuries: Heavy Lifting, Awkward Postures, Repetitive Activities, & Prolonged Postures.

HIERARCHY – Every local has their own communication line and directions on who you should talk to about safety concerns once you are on a jobsite. Know this hierarchy and your line of communication.

HIERARCHY OF CONTROL – A method to rank ergonomic solutions by effectiveness. At the top of the hierarchy for most effective are engineering solutions, at the bottom of the hierarchy of control are work practice solutions.

LIGAMENT – Fibrous tissue that connects one body to another bone. Ligaments allow proper movement of the joints.

LONG TERM SOLUTION – A solution that might take days or weeks to implement rather than hours or a day. Such a solution might be something that the contractor or owner has to take care of or something that needs to be delivered to a site or ordered.

MUSCLE ASYMMETRIES – A condition in which some muscles become stronger and others weaker so that a group of muscles does not work together as a unit. For example, weak buttock muscles can cause back muscles to work too hard which increases the chance of injury.

MUSCULOSKELETAL DISORDERS (MSD) – Injuries and disorders of the muscles, nerves, tendons, ligaments, joints, cartilage & spinal disc.

NEUTRAL POSTURE – Postures that put the least amount of stress on the muscles and joints. Neutral posture is standing erect, head facing forward, with the arms at the sides.

NON-VERBAL COMMUNICATION – Hand signals, postures, facial expressions and eye contact can communicate a lot.

PASS – A mnemonic that outlines the steps for problem solving in the workplace. Problem (you must fully understand the problem you are raising concerns about), Advice (look to others and information for help), Safety & Solution (find your best safety solution).

PELVIS – The large bony ring structure at the base of the spine to which the hips attach.

PINCH ZONE – A tunnel-like region of the shoulder in which the rotator cuff muscles can be pinched when the arm is raised to the side 90°

PPE – Personal protective equipment.

PROBLEM SOLVING – Using an orderly method to find solutions to a problem. Like solving a puzzle, there are steps to problem solving that include identifying your problem, getting advice, and determining the best solution.

PROLONGED POSTURES – Body positions that a person stays in for more than a few seconds at a time; also called static postures. Prolonged postures increase the chances of an injury.

REFLECT AND CLARIFY – Reflecting is repeating back what you heard to ensure you understand. It can help clarify if you misunderstood.

REPETITION – The number of similar exertions performed during a task. Can be associated with injury and worker discomfort.

RISK FACTOR – Actions or conditions in the workplace that can cause a work related injury or MSD; examples include heavy lifting, awkward postures, repetitive activities, and prolonged postures.

ROTATOR CUFF – A collection of four shoulder muscles that provide movement and keep the shoulder joint sturdy and stable. These muscles can be injured from reaching overhead and when the arms are used repeatedly in the pinch zone.

SAFETY VOICE – Speaking up to fix safety hazards. Knowing how to speak up appropriately and effectively is a skill that can be learned.

SAFETY HAZARD – Unsafe conditions that can cause injury, illness or death.

SAFETY TOOLBOX – ICE BAC has a website site resource called safety toolbox with links to information on hand safety, silica, mast climbers, gloves, hand tools, cutting masonry, reducing back injuries and noise and hearing loss

SCIATIC NERVE – A large nerve that runs down the back of your leg. This nerve can be injured by disk problems in the low back.

SHORT TERM SOLUTION – Immediate fix for a worksite problem.

SLIPPED DISC – The same as a disc herniation.

SPRAIN – An injury to a ligament in which the fibers are stretched or damaged.

STRAIN – An injury to a muscle or tendon in which fibers are stretched or damaged.

TENDONITIS – An injury to a tendon in which the fibers are stretched, damaged, or irritated.

TENDON – Fibrous tissue that attaches muscles to bone.

TRUNK – The body minus the head, arms and legs.

VERTEBRA – An individual bone out of the series of bones that make up the spine.

VERBAL COMMUNICATION – Talking in person or over the phone, emailing, texting or messaging are all forms of verbal communication.

WORK PRACTICE SOLUTIONS – A way of eliminating or minimizing the risk of injury in the workplace by improving work tasks using ergonomic principles.

SAVE RESOURCES

ERGONOMICS

ERGONOMICS GUIDES AND CHECKLISTS

WWW.CPWR.COM/RESEARCH/ERGONOMICS-GUIDES-CHECKLISTS

SOLUTIONS TO CONTROL HAZARDS

WWW.OSHA.GOV/SLTC/ERGONOMICS/CONTROLHAZARDS.HTML

ERGONOMICS AND CONSTRUCTION — THE SMART MOVE

WWW.LHSFNA.ORG/INDEX.CFM/OCCUPATIONAL-SAFETY-AND-HEALTH/ERGONOMICS/

ELECTRONIC LIBRARY OF CONSTRUCTION SAFETY AND HEALTH

WWW.ELCOSH.ORG/

RETURN ON INVESTMENT (ROI) OF ERGONOMIC INTERVENTIONS AND PROGRAMS (2019),
BLAKE MCGOWAN: WWW.CDC.GOV/NIOSH/PROGRAMS/MSD/WEBINAR.HTML

FOUNDATIONS OF SAFETY LEADERSHIP

WWW.CPWR.COM/FOUNDATIONS-SAFETY-LEADERSHIP-FSL

VARIOUS SAFETY TOPICS

CHOOSE HAND SAFETY

[HTTPS://CHOOSEHANDSAFETY.COM](https://CHOOSEHANDSAFETY.COM)

MAST CLIMBERS

WWW.CPWR.COM/RESEARCH/MAST-CLIMBERS

NOISE INFOGRAPHICS

WWW.CPWR.COM/RESEARCH/PREVENTING-HEARING-LOSS-NOISE-INFOGRAPHICS

TOOLBOX TALKS

WWW.CPWR.COM/PUBLICATIONS/TOOLBOX-TALKS

HAZARD ALERTS

WWW.CPWR.COM/PUBLICATIONS/HAZARD-ALERT-CARDS

