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Shipyard Ergonomics

"22 ways to reduce many of your injuries and most of your injury related costs"

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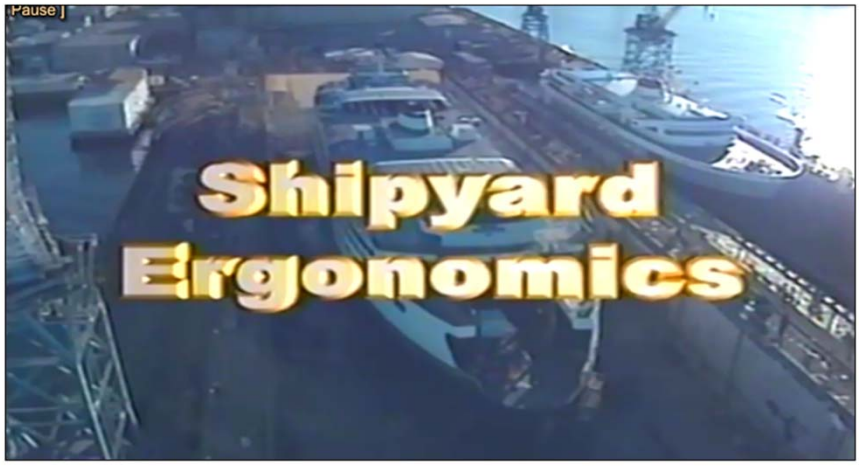
Purpose and Objectives



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1

Course Purpose and Objectives

The purpose of this course is to reduce injuries due to Work-related Musculoskeletal Disorders (WMSDs).

At the completion of this lesson It is expected that all trainees will have the ability to:

- Define WMSD
- List at least 4 causes of WMSD
- Identify at least 4 ways to reduce WMSD in their job
- Identify the common symptoms of WMSD and take corrective action
- Pass the test corresponding to the training material

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Topics

- Understanding OSHA
- Defining Ergonomics
- The Eight Risk Factors and Ways to Reduce These Risks
- Early Symptom Recognition
- Conclusion

OSHA

3

On December 29th, 1970, the Occupational Safety and Health Administration (Federal OSHA) was founded. OSHA is responsible for spreading legally enforceable safety and health standards to protect workers on the job.

The Need for OSHA

Prior to 1970:

- More than 14,000 worker deaths annually
- 2.5 million workers disabled by work-related injuries
- Estimated 300,000 cases of work-related illness

Since 1970:

- Work-related fatalities cut by 62%
- Overall injury and illness rate reduced 67%

There were 4,405 workers who died on the job in 2013

OSHA

4

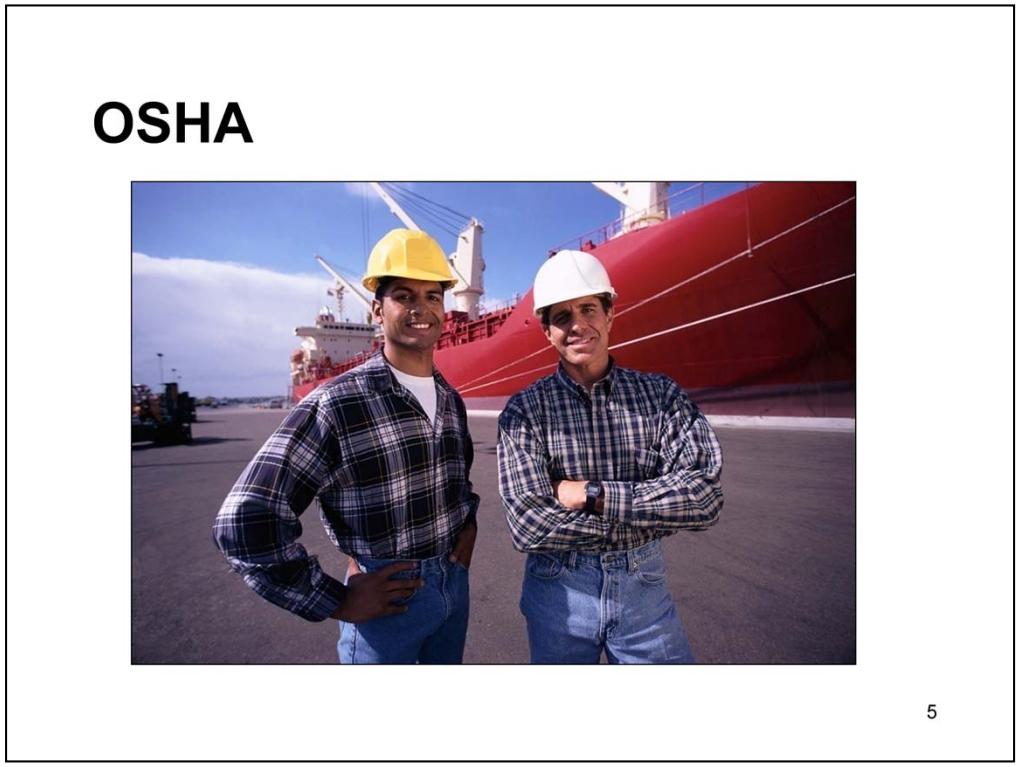
Employee's Responsibilities and Rights

Responsibilities include:

- Complying with OSHA standards
- Wearing required PPE
- Reporting hazards to supervisor
- Complying with your organization's rules and policies

Rights include:

- Reviewing standards
- Receiving training
- Requesting an OSHA investigation (employer or OSHA) and receiving feedback upon request
- Reviewing the OSHA 300 Log



Employer's Responsibility

Employers have certain responsibilities under the OSH Act of 1970. The following list is a summary of the most important ones.

- Provide a workplace free from recognized hazards and comply with standards, rules and regulations issued under the OSHA Act
- Examine workplace conditions to make sure they conform to OSHA standards
- Make sure employees have and use safe tools and equipment and properly maintain this equipment
- Use color codes, posters, labels or signs to warn employees of potential hazards
- Establish or update operating procedures and communicate them so that employees follow safety and health requirements
- Provide medical examinations and training when required by OSHA standards
- Post, at a prominent location within the workplace, the OSHA poster (or the state-plan equivalent) informing employees of their rights and responsibilities.

OSHA

6

More Employer's Responsibility

- Report to the nearest OSHA office within 8 hours any fatal accident or one that results in the hospitalization of 1 or more employees
- Keep records of work-related injuries and illnesses. (Note: Employers with 10 or fewer employees and employers in certain low-hazard industries are exempt from this requirement)
- Provide employees, former employees and their representative's access to the Log of Work Related Injuries and Illnesses (OSHA Form 300)
- Provide access to employee medical records and exposure records to employees or their authorized representatives
- Provide to the OSHA compliance officer the names of authorized employee representatives who may be asked to accompany the compliance officer during an inspection
- Not discriminate against employees who exercise their rights under the Act
- Post OSHA citations at or near the work area involved. Each citation must remain posted until the violation has been corrected, or for three working days, whichever is longer. Post abatement verifications documents or tags
- Correct cited violations by the deadline set in the OSHA citation and submit required abatement verification documentation

No Retribution

Section 11(c) (1) (Cal OSHA 6310) No person shall discharge or in any manner discriminate against any employee because such employee has filed any oral and written complaints.

Discrimination includes:

- Firing or laying off
- Blacklisting demoting
- Denying overtime or promotion
- Disciplining
- Denial of benefits
- Failure to hire or rehire
- Intimidation
- Reassignment affecting future promotions
- Reducing pay or hours
- Cal OSHA includes suspension

OSHA

8

Resolve With Your Company – Follow your chain of command. Go to your Lead, Supervisor or Safety Technician. However, if this fails you should file a valid complaint.

Online - Go to the Online Complaint Form. Written complaints that are signed by workers or their representative and submitted to an OSHA Area or Regional office are more likely to result in onsite OSHA inspections.

Telephone - your local OSHA Regional or Area Office. OSHA staff can discuss your complaint and respond to any questions you have call 1**-800-321-OSHA**. San Diego District Office – **(619) 767-2280**. Fed OSHA San Diego – **(619) 557-7138.**

Telephone Continued – Cal OSHA High Hazard Unit **(714) 567-7100**

Download and Fax/Mail - Download the OSHA complaint form* [En Espanol*] (or request a copy from your local OSHA Regional or Area Office), complete it and then fax or mail it back to your local OSHA Regional or Area Office. Written complaints that are signed by a worker or representative and submitted to the closest OSHA Area Office are more likely to result in onsite OSHA inspections. Please include your name, address and telephone number so we can contact you to follow up. This information is confidential.

OSHA Exercise

Stump the class!

- With a partner, write two questions from this section (pages 3 to 8) that you believe the rest of the class will be challenged in answering correctly. (Questions must be reasonable! If your instructor can't answer, it doesn't count!)

9

Question One:

_____

_____

_____

Question Two:

_____

_____

_____

Shipyard Work

10

Introduction

The shipyard work environment is very complex. Shipyards work on a variety of vessels including tankers, cargo carriers, fishing vessels, military ships, and barges. In addition, shipyards perform different types of work such as new ship construction, repair, maintenance, and demolition (shipbreaking). Shipyard work typically involves fabrication and forming of large steel plates, beams, and pipes, as well as painting and coating operations. In addition, there are outfitting activities such as electrical work, sheet metal work, and work on propulsion systems. Welding is also a common job in shipbuilding, requiring grinding and chipping of welds. Moreover, most shipyard employees work outdoors and are exposed to adverse conditions, such as extreme temperatures.

These work activities, and the environments where they take place, can increase the risk of **Work-Related Musculoskeletal Disorders (WMSD)**

WMSD

Work-related musculoskeletal disorders (WMSDs) are a group of painful disorders of muscles, tendons, and nerves. Carpal tunnel syndrome, tendonitis, thoracic outlet syndrome, and tension neck syndrome are examples.

For the purpose of developing injury prevention strategies, many health and safety agencies include only disorders that develop gradually and are caused by the overuse of the above constituents of the musculoskeletal system. The traumatic injuries of the muscles, tendons and nerves due to accidents are not considered to be WMSDs or are considered separately.

Almost all work requires the use of the arms and hands. Therefore, most WMSD affect the hands, wrists, elbows, neck, and shoulders. Work using the legs can lead to WMSD of the legs, hips, ankles, and feet. Some back problems also result from repetitive activities.

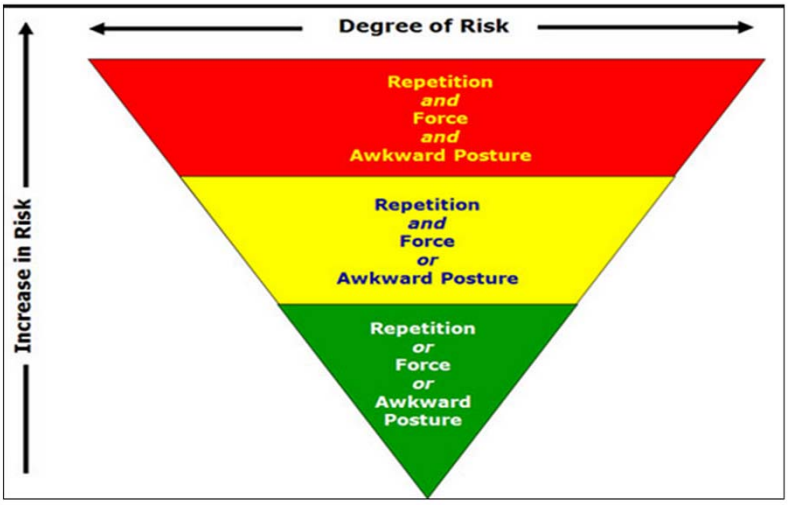
More On WMSD

12

More on WMSD

Some WMSDs develop gradually over time as a result of intensive work. When the work environment requires employees to assume awkward or static body postures for a prolonged period of time, the employees may be at risk of developing WMSDs. Activities outside the workplace that involve substantial physical demands may also cause or contribute to WMSDs. In addition, the development of WMSDs may be related to genetic causes, gender, age, and other factors. Finally, there is evidence that reports of WMSDs may be linked to certain psychosocial factors such as job dissatisfaction, monotony, and limited job. Certain risk factors, that we will discuss shortly, in a job can result in a greater risk of injury. However, the presence of risk factors on a job does not necessarily mean that the employees will develop WMSDs.

More On WMSD



13

Identified disorders, occupational risk factors and symptoms		
Disorders	**Occupational risk factors**	**Symptoms**
Tendonitis/tenosynovitis	Repetitive wrist motions Repetitive shoulder motions Sustained hyper extension of arms Prolonged load on shoulders	Pain, weakness, swelling, burning sensation or dull ache over affected area
Epicondylitis (elbow tendonitis)	Repeated or forceful rotation of the forearm and bending of the wrist at the same time	Same symptoms as tendonitis
Carpal tunnel syndrome	Repetitive wrist motions	Pain, numbness, tingling, burning sensations, wasting of muscles at base of thumb, dry palm
DeQuervain's disease	Repetitive hand twisting and forceful gripping	Pain at the base of thumb
Thoracic outlet syndrome	Prolonged shoulder flexion Extending arms above shoulder height Carrying loads on the shoulder	Pain, numbness, swelling of the hands
Tension neck syndrome	Prolonged restricted posture	Pain

Defining Ergonomics

14

What is Ergonomics?

To reduce the risks of WMSDs shipyard workers and management should implement the principles and practices of Shipyard Ergonomics.

Ergonomics is the science of "designing the job to fit the worker, not forcing the worker to fit the job." Ergonomics covers all aspects of a job, from the **physical stresses** it places on joints, muscles, nerves, tendons, bones and the like, to **environmental factors** which can effect hearing, vision, and general comfort and health.

Ergonomics considers body dimensions, mobility, and the body's stress behavior.

Ergonomics is a practical and critical way to "work smarter not harder".

Defining Ergonomics

15

Based on the Video

What is ergonomics?

- _____

- _____

What shipyard ergonomic practices did you see?

- _____

- _____

What are some of the injuries that can be reduced or eliminated by following ergonomic practices?

- _____

- _____

Defining Ergonomics

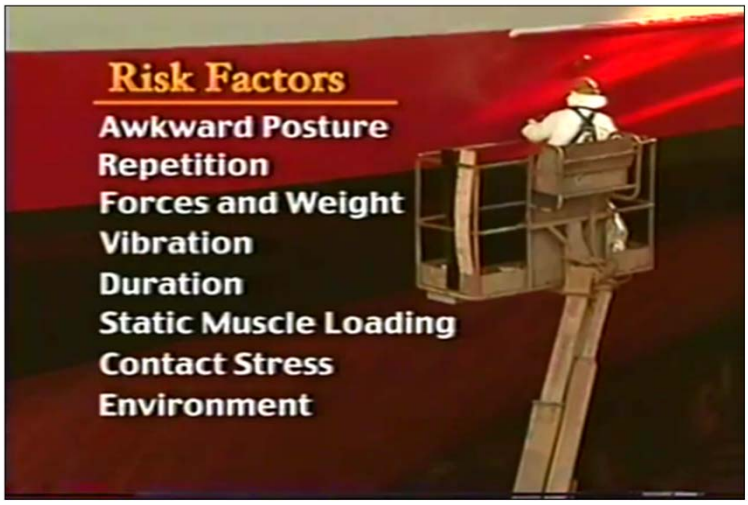
QUIZ!

16

For each statement below circle T for True or F for False.

T	**F**	WMSD stands for Work-Related Muscle Defect
T	**F**	Tendonitis is an example of a WMSD
T	**F**	Most WMSD affect the hands, wrists, elbows, neck, and shoulders.
T	**F**	Ergonomics is fitting the person to the work

Risk Factors



17

The Seven Risk Factors

It is important to understand the risks of the work that you do. Always keep an eye out for these risks factors and do what you can to eliminate them!

We will now take a look at each of these risk factors in detail.

- Awkward Posture
- Repetition
- Forces and Weight
- Vibration
- Duration
- Static Muscle Loading
- Contact Stress
- Environment

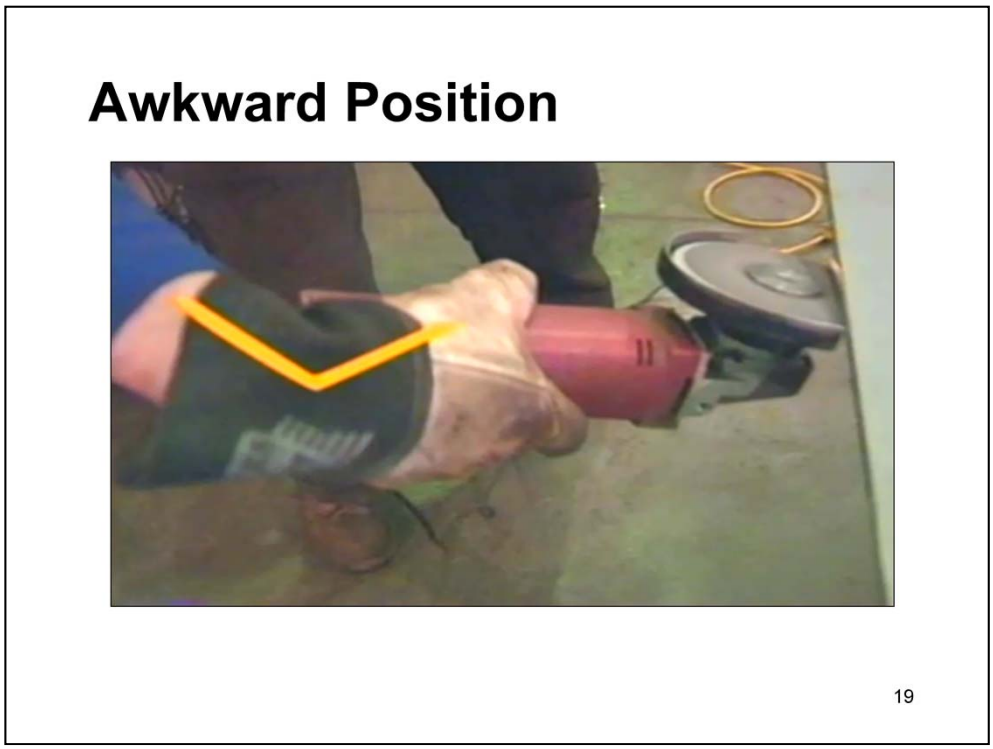
Awkward Position

Any body position can cause discomfort and fatigue if it is maintained for long periods of time. Standing, for example, is a natural body posture, and by itself poses no particular health hazards. However, working for long periods in a standing position can cause:

- sore feet
- general muscular fatigue
- low back pain.

In addition, improper layout of work areas, and certain tasks can make workers use unnatural standing positions.

In addition to standing for long periods of time, lifting, particularly improper lifting, can put undue pressure on the back.



Awkward Position

A muscle's force is reduced if it is put in a position that is too long or too short.

Muscles get tired faster if they are forced to work in a non-neutral position and tired muscles become overused more quickly than muscles that are rested.

Neutral Positions (Power Zone)

Neutral Position

The human body functions best in the neutral position also known as the “power zone.”

Awkward Positions

21

Based on the Video

What does “preserve the curve” mean?

- _____

- _____

What is the first rule of lifting or lowering an object?

- _____

- _____

List some ways we can protect our back while doing our work.

- _____

- _____

Proper Lifting

Below are things you can do to prevent back injury while lifting or lowering an object	
Use lifting aids	Lock stomach muscles
Get help	Keep head up
Plan your lift	Stay under control-don’t rush
Stay close to the load	Don’t reach
Sure footing and grip	Don’t twist
Warn people on corners	Plan the task

Proper Lifting Exercise

Rate the person lifting, walking and lowering the object 1 (low) to 5 (high)	
Use lifting aids **N/A**	Lock stomach muscles
Get help **N/A**	Keep head up
Plan your lift	Stay under control-don't rush
Stay close to the load	Don't reach
Sure footing and grip	Don't twist
Warn people on corners	Plan the task

Other Awkward Positions

Body Parts At Risk	Best Practices
Hands	Vary Positions
Wrists	Plan Tasks
Elbows	Arrange Tools
Neck	Pause From Work To Stretch
Shoulders	Stay in Neutral Position
Legs	Reposition Work or Body
Hips	Support Body Weight
Ankles	Switch Hands
Feet	PPE

The Work You Do Exercise

In the column below, list work that you do that is often done in an awkward position	
1.	
2.	
3.	
4.	
5.	
6.	
7.	

Implementation

26

Examples

The following pages will illustrate and describe some recent shipyard ergonomic improvements.

Rigging Attachments

Before

After

27

Before	After
Rigging attachments that vary in weight from 50 to 70 pounds are being lifted from ground level	Added flat bar on crane to allow storage of attachments at waist height. Employees not lifting heavy rigging attachments in an awkward ground level position but connecting attachments with the overhead crane in a neutral body positions

Working at a Bulldozer

Before

After

28

Before	After
Working at a bulldozer requires leaning down to have the right line of sight and this can fatigue the lower back	Have small stool to be able to keep your back straight and be in a more neutral position

Manual Grinding

Before

After

29

Before	After
Repetitive manual hand grinding below knee level is a potential risk to the hands, back and knees	Working with a small prep walk-bend grinder designed for small jobs and tight-to-reach spaces in blocks and on-board ships. What risks are reduced?

Installing MLP Trays

Before

After

30

Before	After
Mechanics had difficulty installing long MLP trays without help from co-workers.	Using large magnets to hold one or both sides of the tray reduces fatigue, prevents injury and saves money!

Hand Grab

Before

After

31

Before	After
Entering and exiting the 1529 cable trunk at deck level was unsafe and put stress on the arms and back due to awkward positioning.	Adding the hand grabs inside and outside of the trunk access allowed for the use of arm muscles to reduce awkward positioning.

Working on the Overhead

Before

After

32

Before	After
Mechanics working on overhead for extended periods reported soreness in the neck and shoulders.	A neck pillow was used to relieve the stress on the neck and proper shoulder exercise helped avoid chronic injuries.

Your Turn! (Exercise)

From page 25 list your ergonomic improvements to reduce the risk of awkward positioning.	
1.	
2.	
3.	
4.	
5.	
6.	
7.	

Awkward Positioning

34

For each statement below circle T for True or F for False.

T	**F**	The “neutral zone” and the “power zone” are the same thing.
T	**F**	When lifting you should always keep your head down.
T	**F**	Awkward positioning only applies to the back.
T	**F**	A best ergonomic practice is to stay in the same position.

Repetition–Forces/Weight–Vibration

35

Based on the Video

Which work better, warm or cold muscles?

- _____

- _____

What usually bears the brunt of our abuse?

- _____

- _____

Should we grasp tools tightly?

- _____

- _____

Repetition

36

Repetition

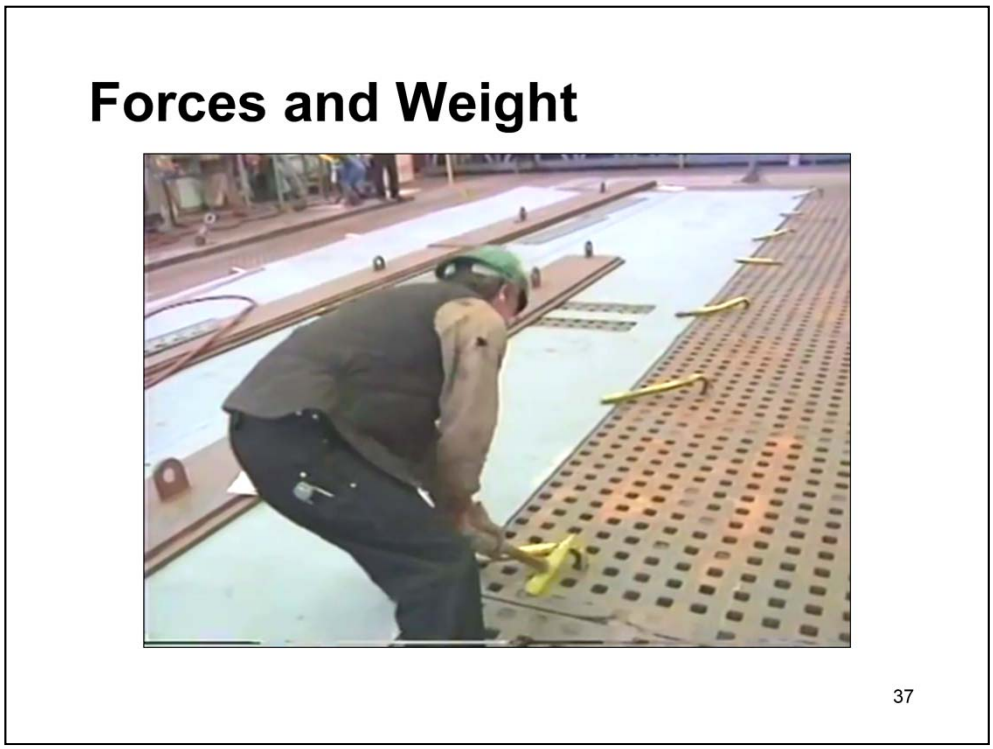
Repetitive motion injuries are tissue injuries that occur as a result of repeating the same body movement. They are among the most common injuries in the United States. All of these disorders are made worse by the strains of daily living.

Simple everyday actions, such as throwing a ball, scrubbing a floor, or jogging, can lead to this condition.

The most common types of repetitive motion injuries are tendinitis and bursitis, injuries to tendons and bursae, respectively. These disorders are difficult to distinguish and often coexist.

Repetition Index

Low		Medium		High	
0 hands idle most of the time; no regular exertions	**2** consistent, conspicuous long pauses; or very slow motions	**4** slow steady motion/ exertion; frequent brief pauses	**6** Ssteady motion/ exertion; infrequent pauses	**8** rapid steady motion/ exertion; infrequent pauses	**10** rapid steady motion or continuous exertion, difficulty keeping up



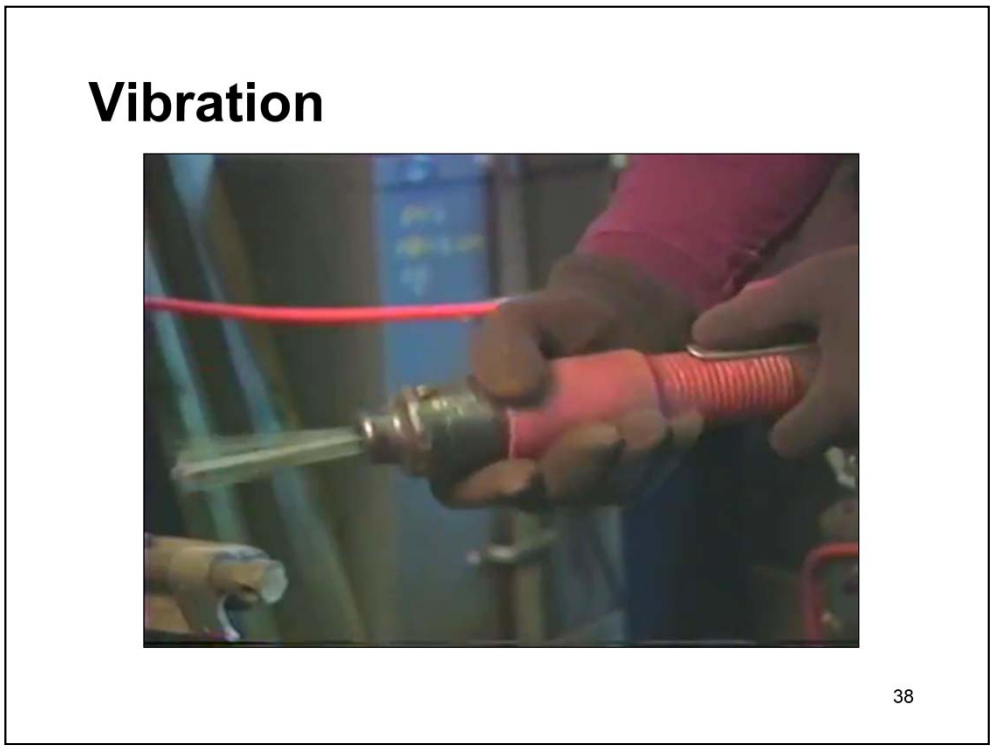
Forces and Weight

Muscles can be overloaded to a certain point, that's what makes you stronger. Strength increases when muscles repair themselves. Beyond this point, however, muscles get over used. We are all different, so each persons over-use point is different. We all suffer the consequences the same way, the muscles and joints bear the brunt of the abuse and potential for injury.

Common forceful exertions include:

- Grasping
- Sliding equipment and materials
- Moving
- Assembling
- Holding
- Resisting

To reduce the risk; avoid the lift if you can, reduce the weight, plan your work, organize your work, make simple changes or get help.



Hand-Arm Vibration Syndrome (HAVS)

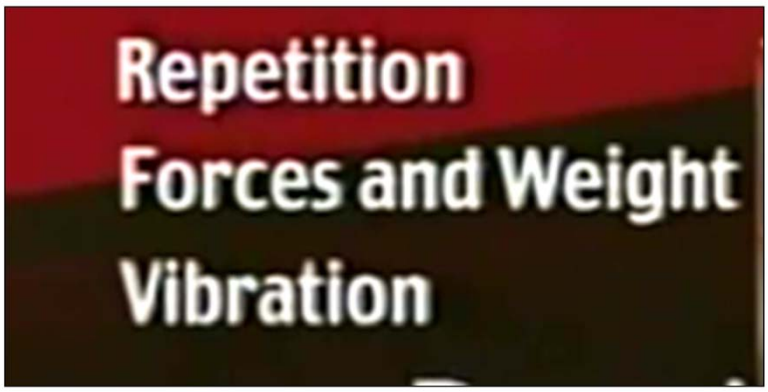
Hand-arm vibration syndrome (HAVS) causes numbness and weakness in fingers, hands and arms, as a result of using vibrating tools.

It is not clear how vibration causes the condition. It is probably due to slight but repeated injury to the small nerves and blood vessels in the fingers. Over time these may gradually lose some of their function and cause symptoms.

The following steps are thought to help prevent HAVS:

- Hold tools as loosely as possible, and in varying positions.
- Ensure that tools are well-maintained.
- Use tools correctly, and use the right tool for the job. The aim is not to need to use excessive grip, nor to use a tool for longer than necessary.
- Take regular breaks of at least 10 minutes away from the tool. Short bursts of work are better than long periods of work without a break.
- Keep warm while at work - especially your hands.

The Work You Do Exercise



In the column below, list work that you do that relates to Repetition, Forces and Weight and Vibration	
1.	
2.	
3.	
4.	
5.	
6.	
7.	

Implementation

40

Examples

The following pages will illustrate and describe some recent shipyard ergonomic improvements.

Testing Water-Tight Bulk Heads

Before

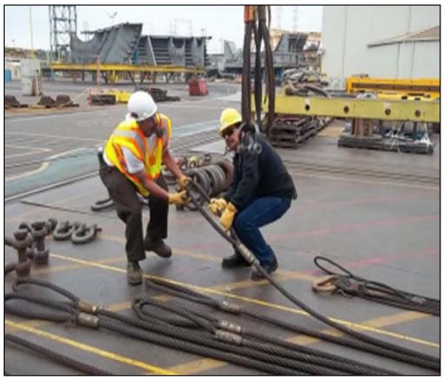
After

41

Before	After
Using a spray bottle with Leak Detector for testing of water-tight bulk heads requires continuous repetitive finger movement as well as stooping forward. This can lead to hand, finger, and back injury.	Using a lawn and garden pump the same task can be accomplished with much less risk. You are squeezing with a power grip versus a finger grip. With the pump positioned in a backpack you can spray in a standing position versus stooping forward. What other risk is being reduced in addition to repetitive motion?

Rigging Slings

Before



After

42

Before	After
Rigging Slings that vary in weight from 500 to 1,000 lbs. are being lifted from ground level	Sling wedge is now used to raise the attachment point. Employees are not lifting heavy slings in an awkward position but connecting the sling in a neutral position. What other risk is being reduced in addition to forces and weight?

Cylinder Lifts

Before

After

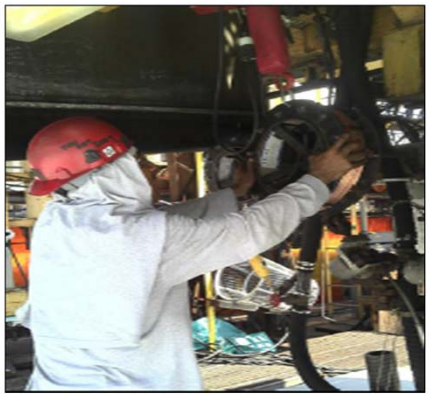
43

Before	After
High pressure gas cylinders used on board ships were lifted and carried by hand to be into racks. They had to be “hugged” and muscled into racks risking injury.	Using Gas Grab two employees can team lift the cylinder. Both employees lifting within the Neutral (Power) Zone.

Welding Wire Spools

Before

After



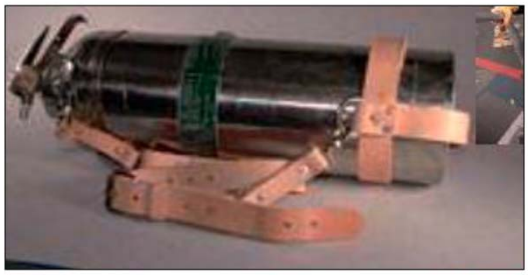
44

Before	After
Welding wire spools on FCB weighing 55 pounds were manually lifted over the shoulder for installation. This required welders to lift away from the Neutral Zone creating a strain on upper and lower back and shoulders.	Electric Hoist is in place to lift wire spools.

Carrying Fire Bottles

Before

After



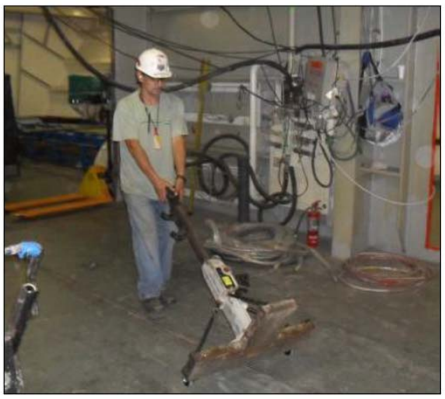
45

Before	After
Fire-Watches carried fire bottles on-board to job-sites on a daily basis. They navigated through P-Ways and steep ladders carrying these awkward bottles weighing about 28 pounds each.	This durable all-weather strap is being used allowing for employees to safety transport fire bottles to their work areas. This takes pressure off the hands, wrists and arms and allows the worker to use safety railings.

Moving Cable Jacks

Before

After



46

Before	After
Heavy cable jacks were usually dragged through the main deck to various locations on-board.	Wheels were installed on the jacks that will only engage when the jacks are titled sideways.

Turning Reels

Before

After

47

Before	After
Heavy reels take several mechanics to turn by hand when the forklift is not available.	Using furniture sliders turn the reels with far less effort and strain.

Overhead Grinding

Before

After

48

Before	After
Frequent overhead grinding in a static position for a long period of time using a heavy grinder. This grinder produces significant vibration and puts weight on the arms, shoulder and upper back.	Replaced the heavy grinder with a light weight grinder to accomplish the same task with less vibration and less stress on arms shoulder and upper back.

Walk-Behind Grinder

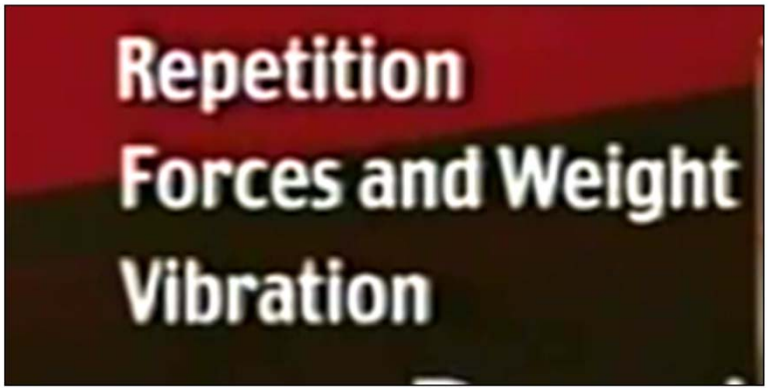
Before

After

49

Before	After
Repetitive manual hand grinding below knee level a potential ergonomic risk to the hands, back and knees.	A small surface prep walk-behind grinder is designed for small jobs and tight-to-reach spaces in blocks and on-board ships. This grinder eliminates the need to perform grinding talks on hands and knees. The tool is not in your hand thus the vibration risk is significantly reduced.

Your Turn! (Exercise)



From page 39 list your ergonomic improvements to reduce the risk of Repetition, Forces and Weight and Vibration.	
1.	
2.	
3.	
4.	
5.	
6.	
7.	

For each statement below circle T for True or F for False.

T	**F**	Repetitive Motion Syndrome is one of the most common injuries in the United States.
T	**F**	HVAS stands for Hand Arm Vocational Syndrome.
T	**F**	Common forceful exertions include sliding equipment and materials.
T	**F**	We should grasp our tools lightly but firmly.

Duration – Static Muscle Loading – Contact Stress

52

Based on the Video

What is duration?

- _____
- _____

What happens when you contract a muscle and don't let it relax?

- _____
- _____

What causes contact stress?

- _____
- _____

Duration

The duration of a job task is another ergonomic concern. Duration is defined as the length of time you perform a task during a work shift. The duration of the job task and the length of time our body is exposed to any of the risk factors we have been discussing, have a direct relationship to the potential for injury. The longer the exposure, the greater the risk of over-use. When workers do the same task for a long period of time or work long shifts fatigue becomes a factor and even more attention must be paid to the duration of the task.

Solutions:

- Varying the task
- Rotating the crew
- Making work as easy and comfortable as possible

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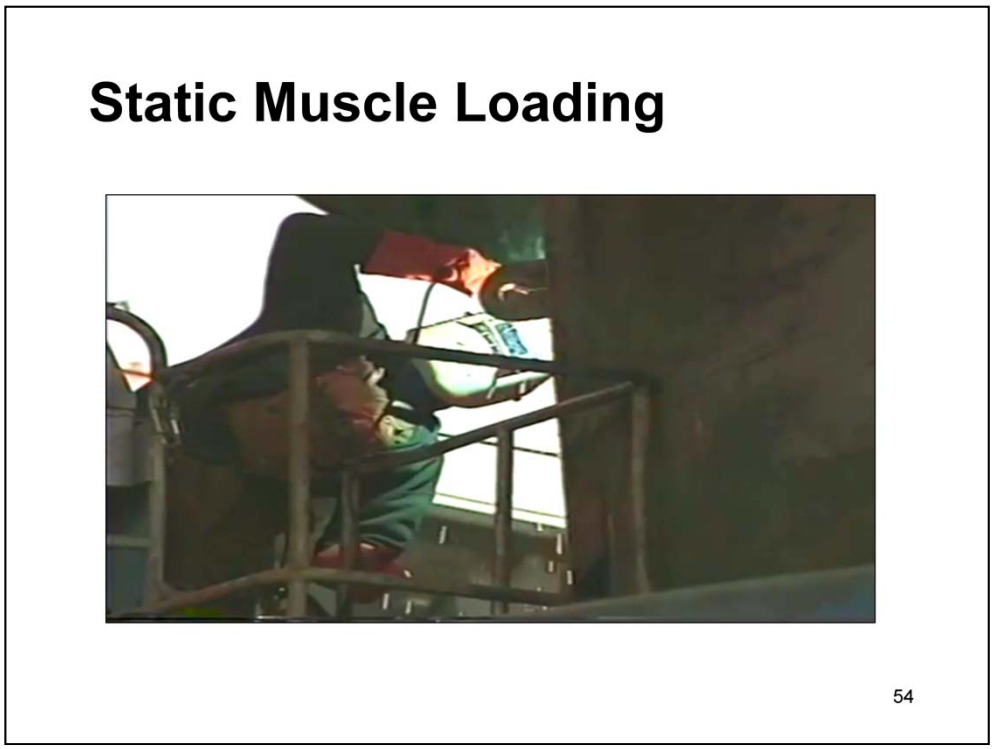


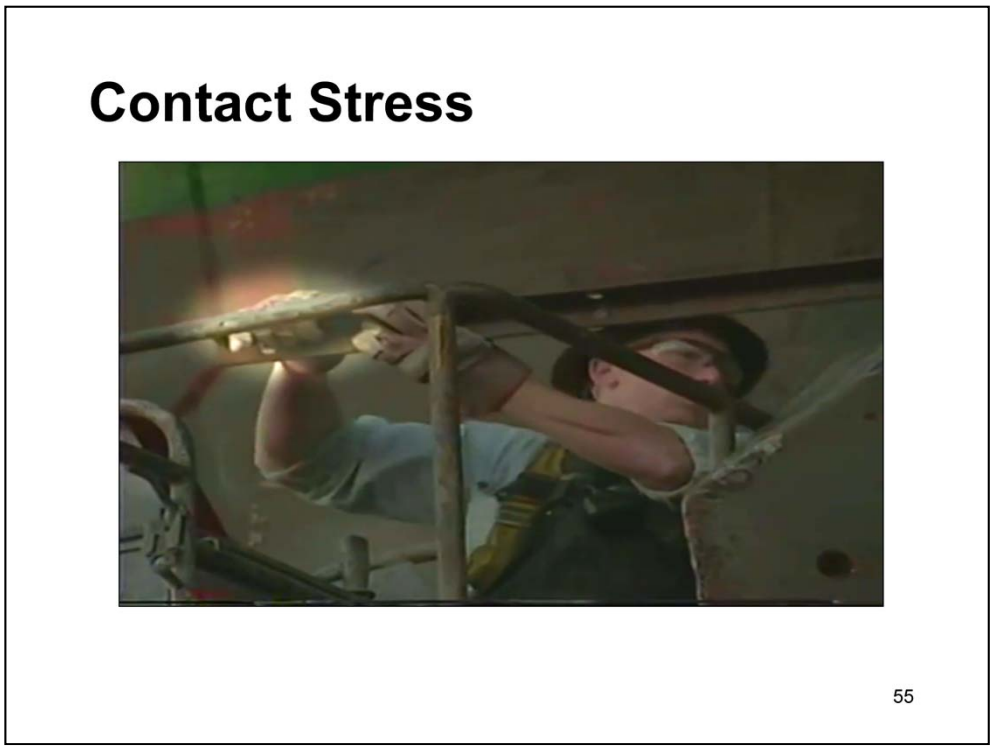
Static Muscle Loading

Static postures (or "static loading") refer to physical exertion in which the same posture or position is held throughout the exertion. These types of exertions put increased loads or forces on the muscles and tendons, which contributes to fatigue. This occurs because not moving impedes the flow of blood that is needed to bring nutrients to the muscles and to carry away the waste products of muscle metabolism. Examples of static postures include gripping tools that cannot be put down, holding the arms out or up to perform tasks, or standing in one place for prolonged periods.

The effects on the body from doing tasks that require long reaches are exacerbated where the reaches must be maintained for more than a very few seconds. Holding extreme postures places very high static loads on the body, resulting in rapid fatigue.

Solutions:

- Let up on the force
- Change positions
- Relax the muscle



Contact Stress

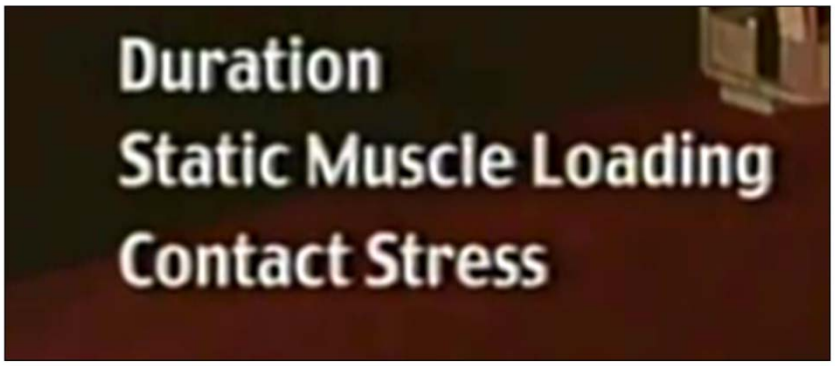
Contact Stress occurs when something hard or sharp comes into prolonged contact with your body. Its significance as an injury factor increases as the force increases and the size of the affected area decreases, concentrating the stress.

It could be caused by sharp edges or short tool handles.

Solutions:

- Floor mats
- Knee pads
- Longer handled tools
- Padded stools
- Padded handled

The Work You Do Exercise



In the column below, list the work you do that relates to Duration, Static Muscle Loading and Contact Stress	
1.	
2.	
3.	
4.	
5.	
6.	
7.	

Implementation

57

Examples

The following pages will illustrate and describe some recent shipyard ergonomic improvements.

The Wrapping Process

Before

After

58

Before	After
With the turntable set on one pallet, the employee was bending, working on knees and in awkward positions for an extended length of time.	Raising the turntable by setting it on 3 pallets reduced the duration the employee was bending, eliminated working on his or her knees and reduced the time he was in awkward positions.

Moving Cable Jacks

Before

After

59

Before	After
Cable jacks are heavy and were dragged through the main deck to various locations.	Wheels were installed on the jacks that only engage when the jacks are tilted sideways. This both reduces the amount of time there is stress on the body and the stress itself. 

Welders Recovering Flux

Before

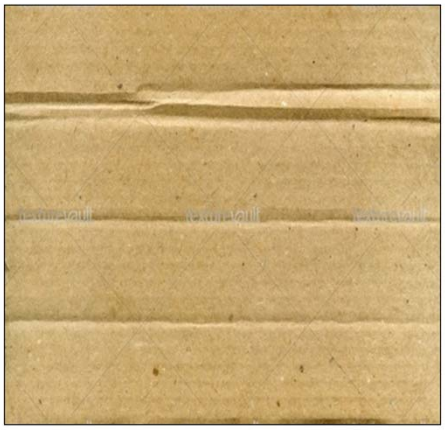
After

60

Before	After
Welders sat on a hard bucket to collect flux.	Instead of using a bucket, welders use a stool/chair with wheels to reduce the contact stress to the back side!

Workers Sitting On Steel Plates

Before



After

61

Before	After
Workers that needed to kneel or sit on hot steel plates for long periods would use card board boxes.	This 12 x 12 inch pad is flame resistant and significantly reduces the contact stress on the back side.

Workers Moving Heavy Materials

Before

After

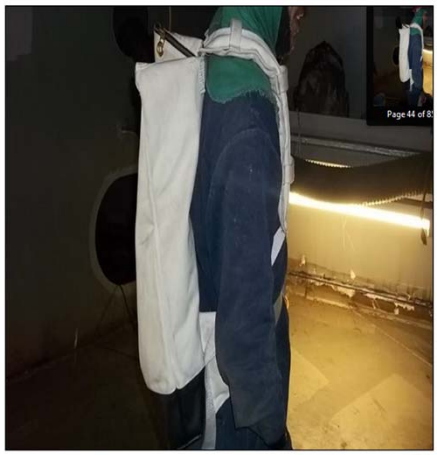
62

Before	After
Workers teaming up to move heavy materials. Note the contact stress placed on the fingers.	Transferring materials using material carts reduces the contact stress.

You Write The Text Below!

Before

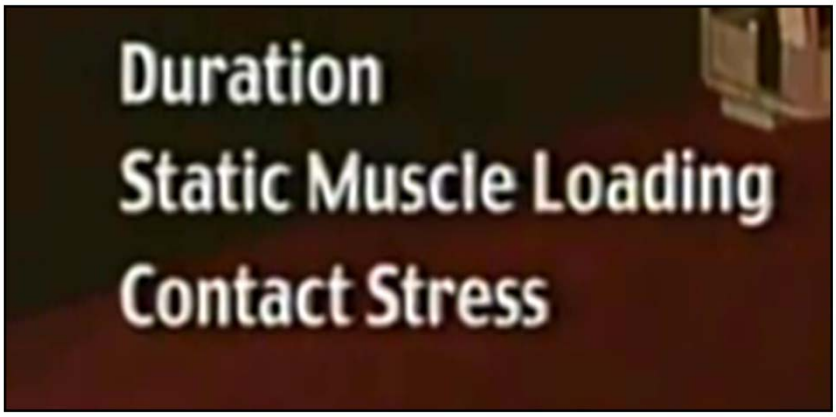
After



63

Before	After
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Your Turn! (Exercise)



From page 56 list your ergonomic improvements to reduce the risk of Duration, Static Muscle Loading and Contact Stress.	
1.	
2.	
3.	
4.	
5.	
6.	
7.	

Duration, Static Muscle Loading, Contact Stress

65

For each statement below circle T for True or F for False.

T	**F**	One way to avoid an injury due to “duration” is doing the task the exact same way without any variance.
T	**F**	Static postures (or "static loading") refer to physical exertion in which the same posture or position is held throughout the exertion.
T	**F**	One solution to “static muscle loading” is to relax the muscle.
T	**F**	The significance of a “contact stress” injury factor increases as the force increases and the size of the affected area also increases.

Environment

66

Based on the Video

What are some of the environmental considerations?

- _____
- _____

How does temperature impact the body (hot and cold)?

- _____
- _____

How could inadequate lighting impact the back and neck?

- _____
- _____

Environment – Hard Surfaces

67

Environment

Environmental considerations include:

- Quality of flooring
- Noise Levels
- Temperature
- Lighting

Hard Surfaces

Hard surfaces take their toll on knees, hips and lower back especially during work tasks characterized by long periods of standing.

Solutions:

- Avoiding jumping on hard surfaces, lower yourself down
- Use floor convers and/or mats
- Vary the task or personnel
- Wear proper footwear with shock Absorption.

Environment – Noise Levels and Temperature

68

Environment

Noise Levels

Excessive noise levels could cause hearing loss and a distracting annoyance. The best solution is to reduce the noise. When this cannot be done it is required that you wear hearing protection.

Temperature

Temperature is another environmental stress factor. Cold temperatures inhibit muscles and tendons from working at their maximum capacity. Many of the risk factors previously discussed are aggravated by the cold. When work must be done in cold or wet conditions adequate insulation and/or foul weather gear become part of the workers PPE.

High temperatures, especially with high humidity, can cause fatigue and hear-related disorders. In these conditions it is imperative that workers drink a substantial amount of water and take breaks as necessary to avoid heat-related injury.

Environment – Improper Lighting

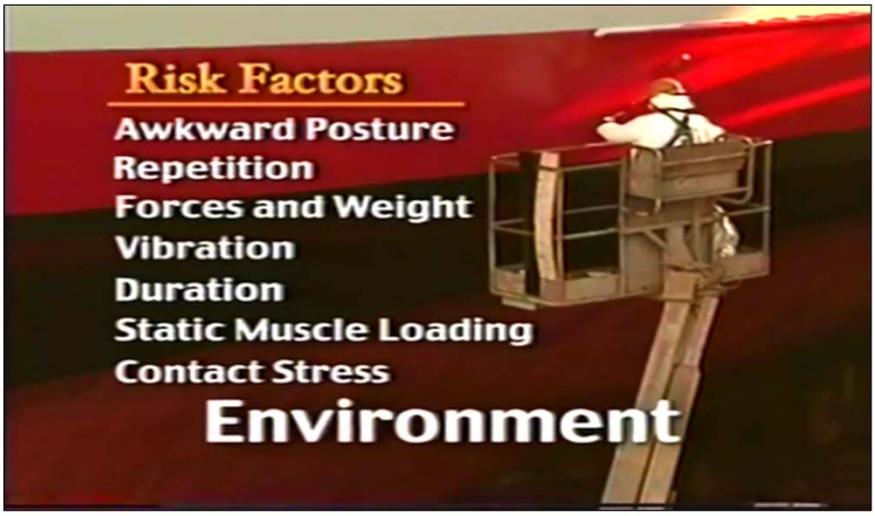
69

Environment

Improper Lighting

Improper lighting is another risk factor. Lack of light or too much light can cause eye strain. Inadequate lighting can also cause strain on the back and neck as workers get closer to the work to see what they are doing. Our posture is often affected by our vision. The best place to position the work is where the worker can see it without having to bend or stretch.

The Work You Do Exercise



In the column below, list the work you do that relates to your work environment?	
1.	
2.	
3.	
4.	
5.	
6.	
7.	

Implementation

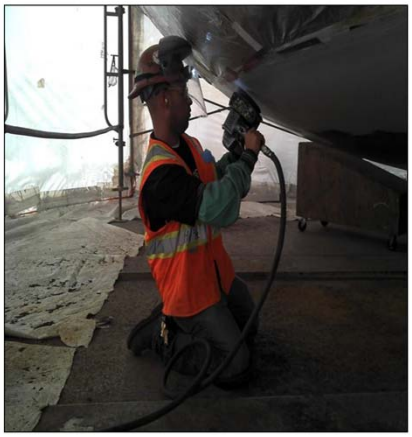
71

Examples

The following pages will illustrate and describe some recent shipyard ergonomic improvements.

Building a Mast Stem

Before

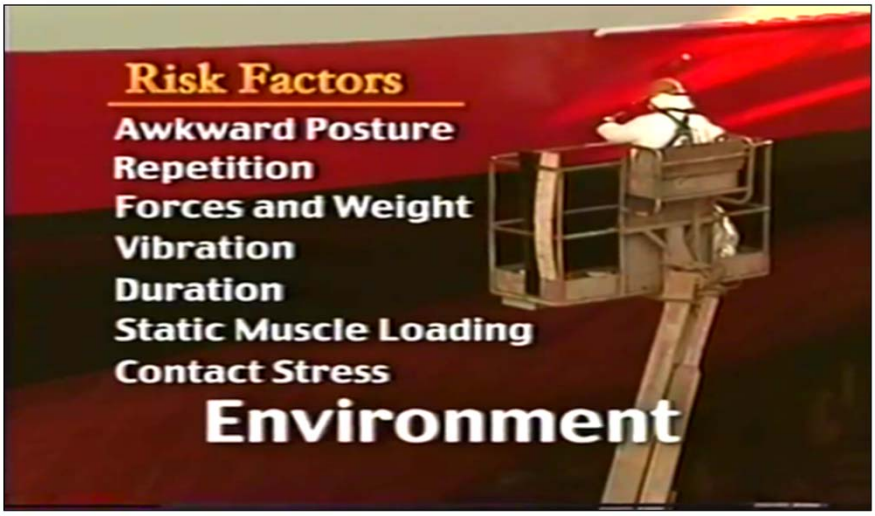


After

72

Before	After
Work completed on employees knees on the hard surface.	Work completed using an adjustable “rolling “chair.”

Your Turn! (Exercise)



From page 70 list your ergonomic improvements to reduce the risk of Duration, Static Muscle Loading and Contact Stress.	
1.	
2.	
3.	
4.	
5.	
6.	
7.	

Environment Risk Factors

74

For each statement below circle T for True or F for False.

T	**F**	The temperature where you do work can be a risk factor.
T	**F**	Poor lighting rarely leads to other risk factors
T	**F**	Jumping on a hard surface strengthens the back and actually reduces back injuries.
T	**F**	The best solution to reduce the risk factor from noise is wearing hearing protection.

Early Symptoms – Conclusion

75

Based on the Video

How do you know when you are at risk in suffering an overuse injury?

- _____
- _____

What are some guidelines to follow when you experience early symptoms?

- _____
- _____

What else have you learned?

- _____
- _____

Early Symptoms of WMSD

Pain is the most common symptom associated with WMSDs. In some cases there may be joint stiffness, muscle tightness, redness/swelling of the affected area. Some workers may also experience sensations of "pins and needles," numbness and skin color changes.

WMSDs may progress in stages from mild to severe.

Early stage: Aching and tiredness of the affected limb occur during the work shift but disappear at night and during days off work. No reduction of work performance.

Intermediate stage: Aching and tiredness occur early in the work shift and persist at night. Reduced capacity for repetitive work.

Late stage: Aching, fatigue, and weakness persist at rest. Inability to sleep and to perform light duties.

Not everyone goes through these stages in the same way. In fact, it may be difficult to say exactly when one stage ends and the next begins. The first pain is a signal that the muscles and tendons should rest and recover. Otherwise, an injury can become longstanding, and sometimes, irreversible. The earlier people recognize symptoms, the quicker they should respond to them.

Early Symptoms Continued

77

What You Should Do!

The sooner you treat the symptoms of WMS the sooner they will go away.

Symptom	Action
Muscles Tensing Up	Stretch Them Out
Swelling or numbness that persists for 24 hours or more	Report it
Pain or stiffness that lasts more than 24 hours.	Report it

Other actions you can take:

- Ice the area
- Stretch
- Look for improvement opportunities!

Conclusion

Overuse injuries are a constant hazard, but they can be controlled.

Take Action:

- Be on the look out for risk factors
- Pay attention to symptoms
- Address symptoms
- Look for improvement opportunities
- Share your knowledge with others

Work Smarter…. Not Harder!

Questions?

79