

While the topic of this AEU Safety Bulletin is Shipyard Ergonomics, many of the same principles and methods apply with equal force to marine cargo handling operations. This bulletin provides the basics to implement an effective shipyard ergonomics program.

Anyone who has spent time around one of America's shipyards will agree, the work environment is one of the most rigorous, labor intensive, and unforgiving of any heavy industry. Every day, huge pieces of steel are shaped, lifted, fitted, and welded together to eventually become a ship, barge, or some other waterborne vessel.

Shipyard workers must use several pieces of personal protective equipment that can be burdensome to wear, but are necessary to fend off the daily ambient hazards of the shipyard environment. Work is often performed in small, cramped spaces that have little or no air flow and not much room to stretch out. Or, workers are positioned on a scaffold that requires sophisticated fall prevention systems to prevent workers from serious injury. Since much of the work is outside, weather is a factor in the work environment. Temperature extremes range from frying-pan hot to sub-arctic temperatures. Employee turnover and the shrinking labor supply can also lead to inefficient and unsafe behavior.

To address labor shortages and quality of worker performance, shipyards have embraced and implemented new production technology to increase worker quality and productivity. This new technology has reduced some of the physical burden of shipyard work and the need for large numbers of workers. Despite that effort, there still remain a large number of shipyard tasks that are labor intensive and physically demanding. In an effort to address the remaining physically demanding jobs, shipyards have taken a close look at work place ergonomics.

What to look for: awkward postures, repetitive motions, forceful exertions, pressure points, static postures

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Ergonomics is the discipline of matching human activities to the correct tools, tasks, and procedures of the work environment. In other words, ergonomics tries to make the job fit the worker, rather than making the worker fit the job. The intent is to reduce or eliminate work place activities that require the injurious, repetitive use of muscles or body parts and physically demanding activities before they result in injuries. Injuries frequently associated with repetitive body movements and strenuous activities are classified as cumulative trauma disorders or musculoskeletal injuries.

Cumulative trauma disorders and musculoskeletal disorders usually involve pain and damage to muscles, tendons, and nerves in the back, neck, shoulders, wrists, hands, and elbows. Discomfort can be mild and periodic, or severe and long lasting. Typical ailments include: Tendinitis, "Tennis Elbow," Trigger Finger, and lower back pain.

These disorders are caused by repeating the same motion over and over, staying in one position too long, or working in awkward positions. They also result from working with tools that don't fit the body, using a great deal of physical force, and exposure to long periods of heavy vibration. Some examples of work activities that may cause related disorders are:

- Holding heavy tools, such as grinders, drills, needle guns, or other tools that create vibrations and muscle strain, over head for long periods of time
- Working in the same position in cramped or awkward spaces for long periods of time
- Repeatedly lifting heavy loads from levels below the knees
- Exerting excessive force while using wrenches, pry bars
- Pushing and pulling heavy material in and out of machines
- Using the same arm to tighten or loosen ratchets, chain falls, or come-a-longs
- Reaching or extending arms while holding heavy tools
- Sitting in one position for extended periods of time, such as operating a crane or other equipment
- Working on knees for extended periods of time
- Repeatedly bending over or stooping

These examples are just a few of the more obvious ergonomic hazards that occur in shipyard operation. There may be several more work activities not mentioned above.

Types of  
Ergonomic  
improvements:  
engineering  
improvements  
and  
administrative  
improvements

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So, how do we address these issues and prevent injuries? The first step is to develop a comprehensive work place ergonomic program. Developing an ergonomic program is simple and doesn't require massive expenditures. Most programs can be developed by following these simple steps:

- Secure top management support for the process. Make sure senior management is advised of efforts and progress as the process is developed.
- Review past and current injury reports to identify injuries that are associated with muscle strains caused by work place activities.
- Identify tasks and operations that have caused or have the potential to cause strains and other ergonomic related disorders.
- Identify solutions and corrective action to eliminate or reduce activities that put workers at risk for injury. Take the team approach and get employees involved who are currently performing the tasks identified as at risk. Ask them for ideas on preventative action.
- Provide training to all employees including supervisors, managers and senior management on basic ergonomic principles, identification of at risk work activity, and how to develop corrective action.
- Monitor performance. Keep track of injuries caused by overexertion and repetition and take action to address the causes. Follow up on corrective action to ensure the action taken was effective.

So, what should employers expect to gain from establishing a comprehensive work place ergonomic program? The end result of implementing an ergonomics overhaul will be a work place that has been designed for worker comfort, efficiency, and safety. This will result in reduced worker fatigue, reduced injuries and increased work quality and productivity. Employee turnover should also improve. Workers will be less inclined to leave a job when improvements are made to make the work place less burdensome.

Musculoskeletal disorders often involve strains and sprains to the lower back, shoulders, and upper limbs

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On September 11, 2007, the Occupational Safety and Health Administration (OSHA) published draft guidelines that could help employers and their employees in the shipyard industry prevent musculoskeletal injuries. The draft guidance, Ergonomics for the Prevention of Musculoskeletal Disorders: Guidelines for Shipyards <http://www.osha.gov/dsg/guidance/shipyard-guidelines.pdf> , provides recommendations for employers to reduce the number and severity of workplace injuries in their facilities by identifying, evaluating and controlling hazards and using best practices that have been successful in shipyards. Procedures for submitting comments are outlined in the on September 11, 2007 (Volume 72, Number 175) Federal Register. [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=FEDERAL\\_REGISTER&p\\_id=19920](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=FEDERAL_REGISTER&p_id=19920)

Eliminating work place ergonomic hazards and activities requires some extra effort on the part of all workers, but the benefits are well worth the effort. Ergonomic improvements to the work place will preserve employee well being and allow workers to go home to their families at the end of the day in the same condition as when they arrived at work.

If you have comments or questions concerning the contents of this Safety Bulletin or if you need further information, contact a member of the AEU Loss Control staff.

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**Other resources:**  
[www.cdc.gov/niosh/topics/ergonomics](http://www.cdc.gov/niosh/topics/ergonomics), or  
[www.osha.gov/SLTC/ergonomics/guidelines.html](http://www.osha.gov/SLTC/ergonomics/guidelines.html)

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