

Since 2001, AMARC has provided Targeted Pro-Active Injury Prevention Services for many DOE sites. . We focus on the prevention and elimination of costly Musculoskeletal Disorder (MSD's) injuries through the implementation of pro-active MSD injury prevention programs.

MSD's are injuries of the muscle, nerves, tendons, ligaments, joints, cartilage, or spinal discs. MSD's are not typically the result of any instantaneous or acute event (like a slip, trip, or fall) but reflect a more gradual or chronic development.

Other expressions that are commonly used to describe MSD's include:

- Repetitive Strain Injuries (RSIs)
- Cumulative Trauma Disorders
- Overuse Injuries
- Repetitive Motion Injuries/Disorders (RMIs/RMDs)

Medical terms used to describe MSDs to various parts of the body include low back pain, tendonitis, bursitis, carpal tunnel syndrome, epicondylitis, trigger finger, thoracic outlet syndrome, carpet layers knee, and degenerative disc disease.

Mechanism of MSD injuries:

MSD injuries begin with worker fatigue, this fatigue if ignored over a period of time will lead to discomfort, discomfort ignored over a period of time will lead to pain, and if the pain continues to be ignored will ultimately result in an INJURY!

Below we describe the impacts of these types of injuries, our services, our prior work experience, and the benefits of these types of programs.

The What, Where, Who, and Why, of MSD's in the Workplace

- ◆ Injuries and illness cause pain and suffering for workers and slash the bottom line for companies.
- ◆ MSD injuries are the most common injury problem in the construction/manual labor industry. They account for over one-third of all lost workday injuries and produce about one-half of all compensation claims.
- ◆ According to the Bureau of Labor Statistics (BLS), sprains and strains (in 2001) continued to be the leading nature, or physical effect, of injury and illness in every major industry division. More than 4 out of 10 injuries and illness resulting in days away from

work in 2001 were strains and sprains, most often involving the back. (See Table 1).

Number of Injuries and Illness (all industries) Involving Time Away From Work By Selected Nature (2000)	
Nature of Injury or Illness	Thousands
Sprains, strains	728
Bruises, contusions	151
Cuts, lacerations	121
Fractures	116
Back pain	46
Carpal tunnel Syndrome	27
Heat burns	24
Tendonitis	14
Chemical burns	9
Amputations	9

Source: Bureau of Labor Statistics

Table 1

- ◆ Of the 1.3 million reported lost-time injuries and illnesses in 2003, BLS states, sprains and strains topped the chart with, 43 percent. Of this 43 percent, BLS reports, most were back related.
- ◆ Back injuries account for the greatest percentage of disability days (25.5%) and the greatest percentage of claim costs (21.3%). The average disability duration is 46 days. Manual labor has the highest incident rate for back injuries (51.2 lost-time injuries per 10,000 full time workers in 2004).
- ◆ It's not only the workers who suffer, but employers as well. Companies must compensate injured workers during their absence and often must pay for their treatment. According to Liberty Mutual (the largest workers' compensation insurance provider in the U.S.) overexertion injuries – lifting, pushing, pulling, holding, carrying, and throwing an object, currently *cost employers \$13.4 billion every year* (up from \$11.9 billion as reported in 2003 and table 2).
- ◆ The indirect costs of these preventable MSD's & RMI's are 3 to 5 times the total direct cost. Indirect cost for workplace injury and illness include:
 - Lost Productivity, including
 - ◆ Job shutdown at time of incident
 - ◆ Injured worker at time of incident
 - ◆ Injured worker's reduced capacity upon return to work
 - ◆ Co-workers at the time of incident (watching and helping)
 - ◆ Co-workers who are short handed following the incident.

- ◆ Co-workers who must train a replacement worker
- ◆ Management time for hiring and training a temporary or replacement worker
- ◆ Management time for investigating and reporting the incident (to government, insurance, and sometimes the media)
- Fines
- Production delays
- Repairing or replacing damaged equipment
- Lawsuits
- Damage to company image and reduced company competitiveness
- Reduced employee morale
- Higher workers compensation premiums and EMR rating.

Leading Causes Of Workplace Injuries and Illness (all industries) By Direct Cost (2000)	
Cause	Direct Cost (Billions)
Overexertion	\$11.9
Falls on same level	\$5.4
Bodily reaction	\$4.4
Falls to lower level	\$3.6
Struck by object	\$3.5
Repetitive motion	\$2.8
Highway accident	\$2.3
Caught by equipment	\$1.8
Struck against object	\$1.7
Assaults & violent acts	\$0.5
<i>Source: Workplace Safety Index, 2003, Liberty Mutual</i>	

Table 2

- ◆ A recent survey reported that 40 percent of construction workers said “working while hurt” is a major problem. Working while hurt not only reduces productivity but also will ultimately result in a disabling injury that can end a career and close the doors on a business. Pain is not all in a hard days work!
- ◆ These injuries and the costs associated with them are the easiest to prevent and eliminate from your company. MSDs are preventable, overexertion is preventable, repetitive motion is preventable, the rising costs, the decreased productivity, the decreased employee morale can all be mitigated. The cheapest and most effective way to do this is through the commitment, development, and implementation of effective pro-active MSD focused

injury prevention programs. By implementing programs targeting these injuries now, you can eliminate paying the price later.

AMARC’s experienced professionals assist companies in the successful execution of this mission.

AMARC’s staff fully understands the body, how it works, and how it breaks down. This expertise in human movement, posture, and the musculo-skeletal system is essential to effectively assess and implement programs to target and eliminate these types of injuries.

AMARC Services

AMARC can provide various levels of program support services, from complete turnkey development, implementation, and management of an MSD focused injury prevention program, to the support of only certain elements of the program, to providing consultation on an as-needed basis, and all areas in between.

Below is a list of some of the services we provide:

- ◆ MSD focused pro-active injury prevention program development, implementation, and management
- ◆ Employee and management MSD injury prevention training
- ◆ MSD focused job site risk analysis
- ◆ MSD Hazard Identification
- ◆ Baseline employee physical capacity screening and task specific recommendations.
- ◆ Functional Back Evaluations
- ◆ Employee Lifting Analysis
- ◆ Ergonomic work station analysis
- ◆ Development, implementation, and management of employee MSD peer review groups
- ◆ Physical job requirement analysis
- ◆ MSD program and ergonomic consulting
- ◆ PPE, tool, and equipment analysis and assessments
- ◆ MSD injury case management
- ◆ Employee endurance/conditioning program development, implementation, and management
- ◆ Transitional/modified duty program development, assessment, implementation, and management
- ◆ All services and programs are customized and specific to address both the company and the workers needs and all are available on-site.

MSD Focused Injury Prevention Program Benefits

- ◆ Implementing effective MSD focused injury prevention programs are low cost and have been proven to save money in the long run.
- ◆ Decreased lost workdays

- ◆ Increase Productivity and in turn increased company profits.
- ◆ Decreased workman's compensation insurance rates
- ◆ Increased employee morale and worker satisfaction
- ◆ Fewer injuries leading to steady increase in bottom line

According to a survey of business executives performed by Liberty Mutual they report the following:

- ◆ 95% of business executives report that workplace safety focused on these issues has a positive impact on their company's financial performance.
- ◆ 61% believe they receive better than a 3 to 1 return on their investment.
- ◆ 93% recognize a relationship between direct and indirect costs of workplace injuries.
- ◆ 40% agree indirect costs are 3-5 times direct costs.
- ◆ 25% see employee training as an important element of an effective program.
- ◆ 22% see management's commitment as the most important element of an effective program.
- ◆ Employee and management MSD injury prevention training

Both employers and employees play a role in the prevention of MSD's and receive the benefits of a successful program. Workers benefit through delivering a hard days work without feeling pain or fatigued and without becoming injured, which in turn benefits the employer with a motivated and more productive worker that ultimately increases the company's bottom line.

MSD focused pro-active injury prevention safety programs are a win-win for everyone.

Project Specific Experience

- ◆ **K-25/K-27 Hazardous Materials Abatement Project**
 - Developed a customized specific complete MSD focused pro-active injury prevention program, recognized by Bechtel Jacobs Company and the US Department of Energy (DOE) in the "Green/Good Work Practice Lessons Learned Report" titled "Pro-Active Safety Activities To Prevent Musculo-Skeletal, Repetitive Motion, and Cumulative Trauma Injuries" dated December 9, 2002.
 - Implemented a four step approach to target and eliminate MSD injuries, which included conducting baseline employee physical capacity screenings of all project personnel, on-site job task MSD risk analysis, comprehensive employee and management MSD prevention training, and injury case management
- Implemented and managed program
- Implemented and managed employee MSD peer review groups which assisted with problem solving, reported and provided input to management of MSD issues and/or concerns identified by fellow workers, and who independently implemented and managed the employee requested pre and post work day stretching program.
- Provided PPE, tool, and equipment analysis and assessments
- Performed physical job requirement analysis, and MSD Hazard assessments.
- Provided program and injury case management consulting services.
- ◆ **WESKEM – Oak Ridge Reservation and Paducah DOE Facilities**
 - Provided ergonomic workstation assessments for office workers at OR X-10 facility.
 - Provided ergonomic and MSD injury prevention consulting services.
 - Provided MSD job site risk analysis.
 - Performed project specific back injury prevention training for employee's at all OR project locations and all employees' supporting Paducah project.
 - Performed project specific repetitive motion injury prevention training for all employees at each OR project site.
- ◆ **ORNL – Facilities Management Division**
 - Performed baseline employee physical capacity evaluations for a selected group of employees.
 - Provided MSD injury prevention consulting services.
 - Conducted interviews of management and workforce to determine and analyze problems and develop solutions and prioritize needs.
 - Conducted job site MSD focused risk assessments.
 - Reviewed and analyzed job descriptions and physical demands of jobs to enhance physical requirements sections of job descriptions.
 - Assisted PrSM in performing an analysis and study of previous employee work related injury and illness trends.
 - Prepared job specific employee MSD injury prevention training specific to individual employee job tasks.

LESSONS LEARNED DATABASE

Title: Pro-Active Safety Activities To Prevent Ergonomic Injuries

Identifier: G-2002-OR-BJCETTP-1202

Date: 2002-12-09

Lesson Learned Statement:

Pro-active measures should be taken to evaluate the potential for musculo-skeletal injuries, repetitive motion injuries, and cumulative trauma injuries and taking steps to eliminate the causes of these type injuries.

Discussion:

The K-25/K-27 Hazardous Material Abatement Project presents some unique hazards for over 40 workers doing physically demanding work that involves significant bending and crawling on their knees for long periods of time. Performance Abatement Services, Inc. (PAS), a Bechtel Jacobs Company subcontractor doing Hazardous Material Abatement, has taken proactive steps to address potential musculo-skeletal injuries, repetitive motion injuries, and cumulative trauma injuries that could be associated with this work. PAS hired AMARC, a safety consulting company that specializes in targeting and eliminating these type injuries.

Analysis:

PAS and AMARC implemented a four step approach that includes conducting baseline employee physical capacity evaluations, on site job analysis, worker and management training, and injury management.

Recommended Actions:

This program has shown significant success and led to increased performance in safety, productivity and increased employee morale. Highlights of the program include:

1. Baseline Employee Physical Capacity Evaluation - Comprehensive musculo-skeletal

examinations are conducted for each employee. This evaluation provides management with an objective determination of the individual's physical abilities and allows them to ensure employees are not placed in positions where the demands of the job could exceed their maximum physical capabilities causing unnecessary musculo-skeletal disorder (MSD) injuries. The examination includes:

- An interview with the employee concerning relevant past medical history to identify any old or existing injuries/problems that could lead to employee discomfort or place the employee at high risk for a MSD if exposed to a particular job task on a continuous basis.
 - Range of motion testing of all joints in all planes.
 - Manual muscle testing.
 - Posture analysis.
 - Lifting analysis.
 - Body mechanic awareness testing.
 - Balance assessment.
 - Endurance assessment.
 - Dexterity testing.
 - Flexibility assessment.
 - MSD sign and symptom testing for any physical limitations or weaknesses that may increase the employee's risk for job related musculo-skeletal disorders.
2. Job-Site Analysis - MSD injuries often arise from poor workstation/job design and cause significant work loss requiring expensive medical treatment. AMARC visited the worksite and performed several job-site analyses at the start of the project. The objective of this analysis was to observe workers performing their tasks, evaluate the worker's body mechanics and lifting techniques, and study the environment in which they are working to determine if there are changes that could be made to eliminate excessive hazards that can cause MSD injuries. AMARC also evaluated the hand tools, safety equipment, personal protective equipment, and job functions. Recommendations included:
- Holsters for the screw guns used by the transite removal crew. This eliminated the continuous bending over to pick the gun up after removing a screw or a piece of transite.
 - Replacing the manual wire mesh cutting tool with powered shears.
 - Adding wrist supports to personal protective equipment (PPE) for certain work tasks to provide extra wrist support and alleviate wrist fatigue and discomfort that can lead to carpal tunnel syndrome.
 - Providing employees with a 5-gallon bucket to carry their equipment to the work area and allowing the employee to sit when the job tasks allows, limiting the need for excessive kneeling.
 - Organizing the employee's daily job tasks to allow for rotation of job tasks on a regular basis.
3. Training - Improper body mechanics and unsafe work practices that arise because of a worker's lack of understanding or a lack of instruction in proper posture and body mechanic training may contribute to a significant number of injuries. Both workers and frontline management receive training that includes lectures on proper lifting techniques, back injury prevention, and heat stress. Frontline management also receives an additional six hours of training focusing on normal musculo-skeletal structure and function, the disease process and mechanism of injury, how to

identify MSD hazards in the work environment, early signs and symptoms of MSD injuries, worker motivation and empowerment techniques to use for prevention of injuries, how the attitude they present to the worker can effect the injuries in the workplace, ergonomics recognition, and how to properly manage the worker who complains of fatigue and /or discomfort to prevent that from becoming a MSD injury.

4. Injury Management - If an injury occurs injury management works closely with medical treatment personnel to ensure proper disposition and potential reassignment of personnel is accomplished to allow the employee to return to the job safety and without additional aggravation of the injury.

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None

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DOE Function / Work Categories:

Decontamination & Decommissioning
Human Factors
Occupational Safety & Health - General

ISM Category:

Analyze Hazards

Hazard:

Ergonomics / Lifting

End of Lesson!

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