Ergonomics in Action Tech Guide 220

USACHPPM
Readiness thru Health

Chapter 1: Issues and Players

Use hoists or other equipment for lifting to make the job easier, faster, and safer.

AN OVERVIEW OF ERGONOMICS

What is "Ergonomics"?
Ergonomics is essentially fitting the workplace to the worker. It involves the application of knowledge about human capacities and limitations to the design of workplaces, jobs, tasks, tools, equipment, and the environment. The goal of ergonomics in the workplace is to—

- Prevent injuries and illnesses by reducing or eliminating worker exposure to occupational hazards. These hazards include awkward postures, repetition, force, mechanical compression, duration, vibration, temperature extremes, excessive noise levels, inadequate lighting, and improper ventilation.
- Reduce the potential for fatigue, error, or unsafe acts.
- Increase effective, efficient work.

This chapter introduces you to the subject of ergonomics, discusses issues relevant to management of an ergonomics program, addresses managing cultural change, and suggests evaluation criteria for issues and players.

The story presented in figure 1-1 is fictional, but the situation is very real and common in U.S. industry today. The story depicts the plight of a worker whose health is adversely affected by a number of ergonomic issues impacting the work force today, including working beyond one's capacity, poor job design, poor workstation design, and poor tool design. In addition, the modern workplace has become more specialized, automated, and production-oriented. Many employees work in companies that have been "downsized" or "rightsized," with little change in output demands. Time issues (such as flextime, shift work, and the compressed workweek) can further the psychological pressures and physiological demands on an aging American work force. Older workers have decreased muscle performance, flexibility, endurance, and joint mobility. All of the above factors have contributed directly or indirectly to the increasing number of job-related disabilities being seen today.

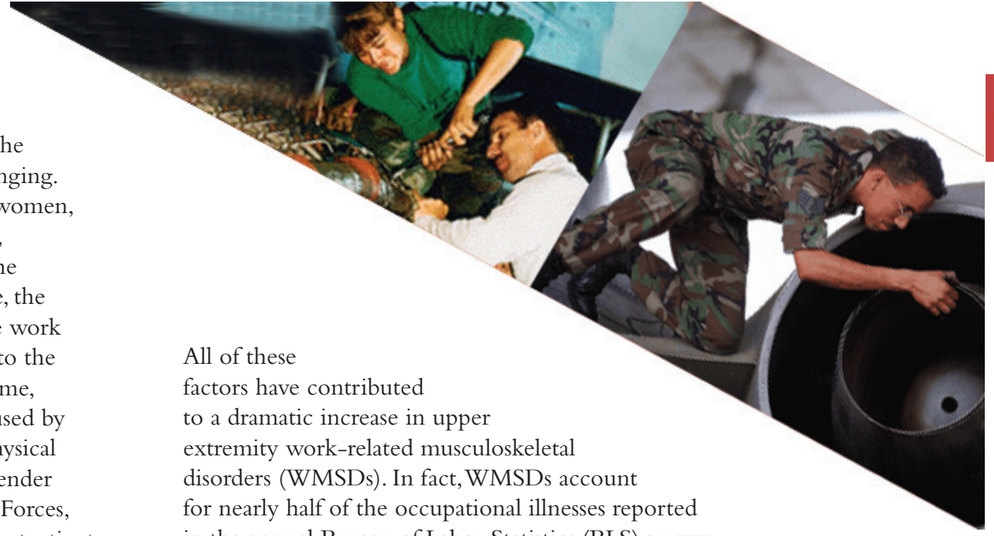
Most of these disabilities can be traced to many years of work and workstation design deficiencies. In the past, many employers were not concerned about the ergonomic design of the workplace. Instead, they relied on a process of "natural selection" similar to that outlined in Darwin's Theory of Evolution, where survival depends on the fitness of the individual and his/her capacity to adapt to changing conditions.

Workers who had lower capacity—whether strength, endurance, or visual abilities—would move out of the more demanding jobs because they could not sustain the effort required for the job. In short, they would be out-competed by their better fit coworkers. Consequently, the difficulty of the job determined what percentage of people starting the job would be able to complete the tasks on a full-time basis.

As a work philosophy, natural selection has not only become outmoded but is an expensive and legally questionable alternative to ergonomic job design. The 1973 Rehabilitation Act prohibits discrimination based on physical abilities as well as preemployment physical capabilities screening. In addition, the Occupational Safety and Health Administration (OSHA) has issued numerous citations against government and private agencies for ergonomic deficiencies under the General Duty Clause.

Bill Jackson flinched as a sharp pain shot down his lower back. He managed to stifle a groan then quickly looked to see if anyone had noticed. At 53, he no longer had the strength or lean figure of his high school football days, but he was still in pretty good shape for his age thanks to the physical nature of his job. Tonight, however, Bill was having difficulty keeping up with his much younger coworkers at Custom Metals and it was starting to take its toll. "What's the matter, old man, can't ya take it?" teased 19-year-old Larry Farkis. "I can take you," answered Bill, fighting to hide the pain as he picked up the next box. The shipment of machine parts was a lot larger than expected. Bill and the rest of the shipping crew, which had recently been downsized from six to four, had been working at a steady pace for over 3 hours, but were progressing slowly because of problems with the equipment. The forklift blades were too short for the oversized pallets and the sleeve extensions were missing, which meant that both trailers had to be unloaded by hand. The conveyor belt motor burned out 1 hour into the job and the roller conveyors, used as back-up, were locked away in a trailer by a worker from the day shift who took home the keys. Topping off the troubles, one of the trailers was a two-decker whose main floor fell below the level of the dock, making it necessary to carry the boxes uphill on a ramp. After unloading, the parts had to be inventoried, processed, and placed in special storage containers so the day shift could meet the company's high production quotas. By break time, Bill was in agony and went to his locker to take a couple of aspirins, which helped dull the pain for the remainder of the shift. At home, a second dose of aspirin failed to calm the nagging ache in his back, and he tossed and turned all night. His wife, Kelly, who worked part-time as a dental assistant, needed to get to sleep and finally moved to the couch. By morning, Bill could hardly get out of bed, and his left leg started feeling numb. Kelly brought her husband some more aspirins and insisted he stay home from work and see the doctor. The company doctor examined Bill and then referred him to a back specialist, Dr. Polaski, who ordered x-rays and an MRI. The test results revealed a herniated disc. "You'll need to stay off your feet for a couple weeks and take your medications regularly," instructed the doctor. "How soon will...I be well enough...to go back to work?" asked Bill hesitantly. "Well, we can't say just yet," replied Dr. Polaski, hedging the question. "We'll need to reevaluate your condition in 2 weeks." Bill's left leg continued to feel strange, and by the time of his next appointment, he couldn't even sit in a chair without excruciating pain. Dr. Polaski recommended surgery. That meant taking more time off work, but Bill was hopeful because at least there was a chance he could eventually return to his job and be free of pain. Unfortunately, the surgery failed to restore his back completely. Physical therapy helped increase his range of motion and medication lessened the pain, but Bill's days at Custom Metals were over and he knew it—there was no such thing as "light duty" at a machine shop, even the foreman had to do some heavy lifting. Dr. Polaski finally declared Bill permanently disabled. Kelly was able to increase her hours to full time and disability provided supplemental income, but Bill wondered how they would manage to pay the mortgage and put their daughter, Vanessa, through college. As a senior man at Custom Metals, Bill depended on the seasonal overtime to provide his family with the comforts they had come to expect. The company offered to help out by paying Bill part of his pension early. But to Bill, being permanently disabled meant more than just adjusting to a lower income, it meant losing his purpose in life; and worst of all, he felt he let his family down and nothing would ever change that.

Save your back for tomorrow. Use material-handling equipment or get help—ask someone to assist you.



The demographics of the workplace are also changing. Today, there are more women, minorities, immigrants, and older workers in the work force. Meanwhile, the physical capacity of the work force is declining, due to the "couch potato" syndrome, the deconditioning caused by automation, and the physical limitations related to gender and age. In the Armed Forces, there is an increase in outpatient visits, physical limitation profiles, hospitalizations, and medical retirements, all of which ultimately result in decreased unit readiness, deployability, and the ability of the unit to complete its mission.

All of these factors have contributed to a dramatic increase in upper extremity work-related musculoskeletal disorders (WMSDs). In fact, WMSDs account for nearly half of the occupational illnesses reported in the annual Bureau of Labor Statistics (BLS) survey, and 50 percent of annual workers' compensation claims and costs—totaling over $50 million per year. WMSDs are also a significant problem for the Department of Defense (DoD) as overall readiness declines and the costs associated with workers' compensation continue to escalate.

Ergonomics should not be viewed as a labor versus management issue. Preventing WMSDs not only protects the work force, but it also makes good business sense. The production-related costs of injured worker are at least 8 to 10 times more than their medical costs. Injured military and civilian employees force units to deal with decreased output, replacement costs, retraining, increased errors, and an increased demand on the rest of the work force.

Implementing and maintaining an effective ergonomics program at your facility means working smarter and safer. Facilities that have implemented successful programs have seen measurable results in terms of protecting the work force, increasing productivity and quality, decreasing workers' compensation expenditures, increasing readiness, and reducing absenteeism and employee turnover.

What are Work-Related Musculoskeletal Disorders?

WMSDs arise from repeated stress to the body encountered in the workplace. Such repeated stress can result in a variety of injuries or illnesses of the muscles, tendons, ligaments, nerves (outside the brain and spine), joints, cartilage (including intervertebral discs), bones, and supporting blood vessels in either the upper or lower extremities or back. Over a period of time, WMSDs can result in permanent damage to muscles, tendons, tendon sheaths, the lubrication mechanism of the tendon sheaths, and the related bones, muscles, and nerves, causing permanent disability. WMSDs result from the cumulative effect of repeated traumas associated with specific workplace risk factors (see figure 1-2) on page 6.

Microtraumas are small, limited area tissue damage or tears. Cumulative trauma occurs when rest or overnight sleep fails to completely heal the microtrauma and residual trauma carries over to the next day, adding to the total system trauma. Prolonged exposure to the associated workplace risk factors can eventually lead to permanent damage and disability (see figure 1-3).

Signs and symptoms of WMSDs vary according to the type of injury/illness but often include:

- Pain that does not cease overnight.
- Numbness and tingling.
- Decreased joint motion/mobility and decreased strength.
- Fatigue.

Related Terms

WMSDs. Other terms and acronyms used for WMSDs include cumulative trauma disorders (CTDs), repetitive strain injuries, repetitive strain disorders, musculoskeletal disorders, and occupational overuse syndrome.

Workplace Risk Factors. The most common term used for workplace risk factors is WMSD risk factors. Others include environmental, generic, biomechanical, and basic risk factors.

Figure 1-3. Performance Over Time

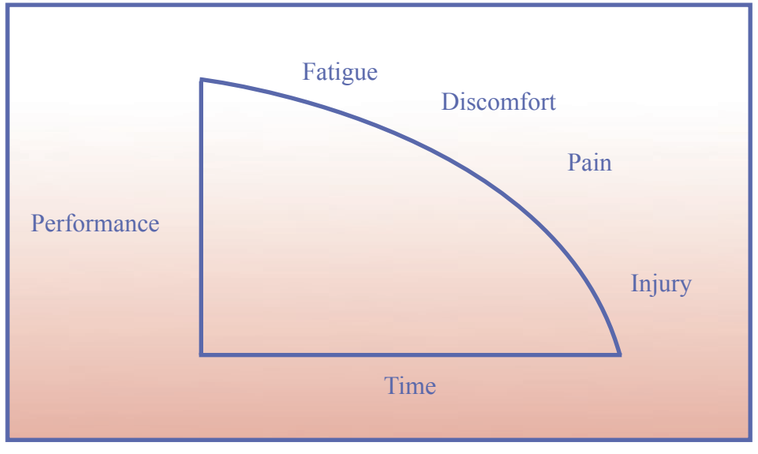


Figure 1-2.
WMSD Workplace Risk and Dose Factors

Risk Factors

Posture. Awkward postures require increased muscle force; contribute to muscle fatigue, tendon fatigue, and joint soreness; and increase forces on the spine.

Repetition. Repeated motions or tasks increase fatigue and muscle-tendon strain. Highly repetitive tasks often prevent adequate tissue recovery time from the effects of awkward postures and force. The level of risk varies by body part.

Force. Forceful exertions increase the physiologic stress to muscles, tendons, and joints. Muscles fatigue faster as the force exerted increases. The force needed to perform a task can be increased by:

- Object weight.
- Load distribution characteristics (shifting or bulky loads require more force exertion).
- Object friction (slippery objects require more force).
- Awkward postures.
- Vibration (localized hand tool vibration increases grip forces).
- Type of grip (a pinch grip places three to four times more force on tendons than a power grip).

Mechanical Compression or Contact Stress. Mechanical compression creates pressure over a small area and interferes with blood flow and nerve function. This compression can be caused by hard or sharp objects, the sharp edge of a desk, or small diameter handles.

Vibration. Localized vibration occurs when a part of the body contacts a vibrating object (e.g., pneumatic, electric, or impact hand tools). The ACGIH (2001) recommends exposures of less than 1 hour for hand vibration in excess of 12 m/sec2.

Temperature. Prolonged contact between the bare hand and metal surfaces below 59°F (15°C) may impair dexterity, and contact with metal surfaces below 44.6°F (7°C) may induce numbness. Exposure to temperatures below these levels may—

- Reduce the dexterity and sensitivity of the hand.
- Increase grip force.
- Exacerbate the effects of localized vibration.

Cold temperatures also decrease circulation and reduce tissues' ability to recover from physiologic stress. The time it takes to heal or recover from an injury is increased as well.

Dose Factors

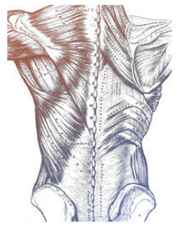
Severity of Exposure.

Frequency of Exposure (e.g., hourly, daily, monthly, etc.).

Duration of Exposure (e.g., 1 hour, 8 hours, etc.). Duration is the amount of time the worker is exposed to the risk factor. Prolonged exposure increases local and generalized fatigue and tissue stress. As the duration of exposure increases, the required recovery period increases proportionally.

Common WMSDs

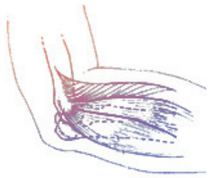
WMSDs are not diagnoses; they are work-related disorders with similar characteristics. Common WMSDs are listed below.



Low back pain, the most common WMSD, is caused by repeated bending, lifting, or twisting of the lower back; sitting for long periods of time; standing on hard surfaces; or experiencing vibration over a long period of time. This "cumulative trauma" weakens the tissues in the back. When an aggravating event occurs—even a minor one such as a slip, trip, fall, or awkward lift—the low back pain intensifies because the weakened back tissue can't handle the stress.

Carpal tunnel syndrome (CTS) can lead to permanent disability if not detected early and treated properly. Figure 1-4 provides detailed information on CTS.

Tendonitis is an inflammation of a tendon resulting from repeated tensing of that muscle/tendon group.



Lateral epicondylitis (tennis elbow) is an inflammation of the tendons attached on the outside of the elbow caused by activities that have jerky throwing motions, repetitive twisting at the wrist, or impact (e.g., turning a screwdriver).

Medial epicondylitis (golfer's elbow) is an inflammation of the tendon attachments on the inside of the elbow resulting from activities that require repeated or forceful rotation of the forearm and bending of the wrist at the same time.

Tenosynovitis is an inflammation of the tendon and the lining of the smooth sheath surrounding the tendon, resulting from repeated movement of the tendon in the sheath.

Synosynovitis is an inflammation of the inner lining of the membrane surrounding a joint.

Stenosing tenosynovitis of the finger, sometimes referred to as "trigger finger," results from a tendon surface becoming irritated and rough. If the tendon sheath also becomes inflamed and presses on the tendon, a progressive constriction of the tendon can occur, resulting in a loss of free movement in that joint area.

de Quervain's disease is a stenosing tenosynovitis affecting the tendons on the side of the wrist and base of the thumb. Constriction of these tendons tends to pull the thumb back away from the hand, causing severe pain and limited thumb movement or use. This condition may also cause an ulnar deviation of the wrist (i.e., side bending toward the small finger).

Raynaud's phenomenon (white finger or vibration syndrome) is caused by the reflexive constriction of the small arteries, which causes the fingers to become white (pale) and feel cold, numb, and tingly.

Figure 1-4. Carpal Tunnel Syndrome

How Carpal Tunnel Syndrome Develops

CTS is one of the most common WMSDs and can lead to permanent disability if not detected early and treated properly. To understand how this disorder develops, you need to know something about the structures within the forearm, wrist, and fingers.

- When you perform a task using your hand, your wrist and fingers are flexed by muscles located in your forearm.
- Those muscles are connected to your wrist and fingers by tendons (bands of tough, nonstretchable, flexible fibers that connect the muscles to the bone).
- These tendons enter your wrist through a U-shaped cluster of eight bones, the carpal bones, which form the "back" and "sides" of the wrist.
- Across the "top" of the wrist is a tough, strong ligament (similar to a tendon, but linking two bones together at a joint).
- This ligament forms the arch of the carpal bones, or the "roof" of the carpal tunnel. The median (middle) nerve of your forearm also runs through this tunnel to your palm and some of your fingers.
- The median nerve is compressed when your wrist is forced into an unnatural posture (such as typing on a straight keyboard) or by direct pressure on the median nerve from hard, sharp edges of work surfaces or tools.
- The median nerve runs through the carpal tunnel among the tendon sheaths (tubular sacs lined with a thin layer of tissue and a layer of an oily and lubricating fluid).

Continued pressure and tendon activity on the tunnel can cause inflammation, which puts pressure on the nerve and eventually results in nerve damage or CTS.

Symptoms of Carpal Tunnel Syndrome

When the median nerve is compressed, the following CTS symptoms typically appear:

- Burning pain.
- Numbness.
- Tingling in the thumb and first two or three fingers.

These symptoms may radiate to the forearm. Sufferers frequently feel these symptoms at night, and many find performing simple tasks, such as tying their shoelaces, difficult because of weakness or numbness.

Occupational Factors Associated with Carpal Tunnel Syndrome

Occupational factors associated with CTS include—

- Hands held in fixed positions over prolonged periods.
- Repeated wrist and finger flexion.
- Light, highly repetitive wrist and finger movements such as typing or data entry.
- Repeated flexion or hyperextension (wrist and hand bent back) of the wrist.
- Prolonged strenuous use of the hands.
- Repeated pinching or grasping.
- Vibration, particularly that associated with power tools.
- Bending the wrist toward the little finger.
- Speed and repetition of motions.

MANAGEMENT ISSUES

Establishing the Installation Program

To avoid work-related musculoskeletal injuries and illnesses at your facility, an ergonomics program should be implemented. The goal of an ergonomics program is to eliminate or reduce worker exposure to conditions that:

Do not meet military and civilian employees' capabilities.
Do not consider military and civilian employees' limitations.
Lead to WMSDs and related injuries and illnesses.

Ergonomics Program Elements

Five critical program elements must be accomplished to successfully implement an ergonomics program at a DoD installation:

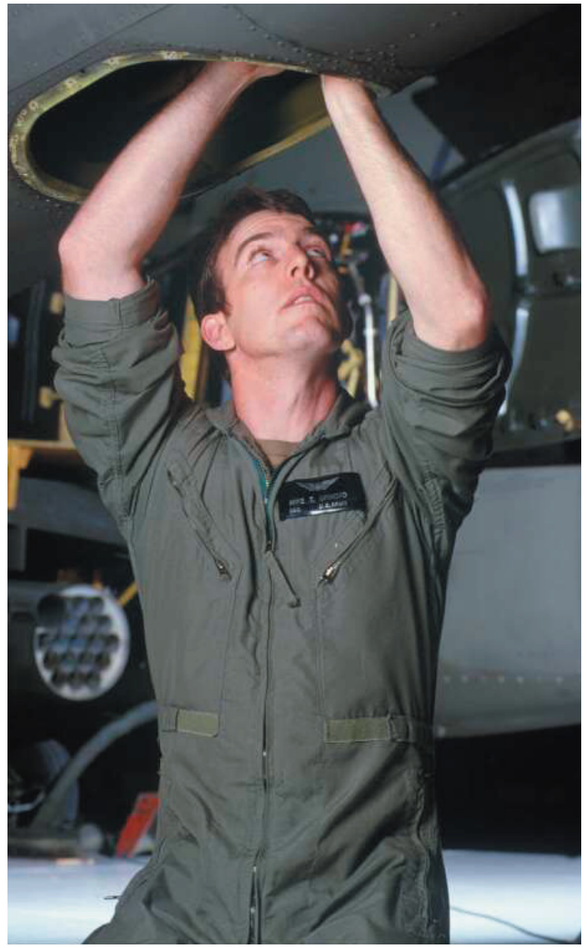
Worksite Analysis. Conduct an organized, orderly, and guided analysis of all work sites.

Hazard Prevention and Control and Acquisition. Assess job hazards, provide corrective solutions, and procure facilities and equipment to reduce ergonomic injuries.

Health Care Management. Establish and implement a written plan for the systematic evaluation, treatment, and follow-up of workers with signs and symptoms of WMSDs.

Education and Training. Organize a program of education and training on the various aspects of ergonomics applicable to your installation. Update the program and the workers as work conditions change or new information becomes available.

Ergonomics Program Evaluation. Assess the effectiveness of your ergonomics program by using a variety of evaluation methods at least annually.



Key Ingredients for a Successful Program

To implement an effective ergonomics program, it requires—

- Commitment by top management.
- Worker involvement.
- A written program plan.
- Regular program review and evaluation.
- Commitment by Management. The most important factor in the prevention of WMSDs is the support and commitment to the ergonomics program by all commanders, upper management, and front-line supervisors.

Managers should—

- Show personal concern for worker safety and make the elimination of ergonomic hazards a priority.
- Consider safety and health to be as important as production.

Safety and health protection should be built into daily production activities. An effective ergonomics program also requires a team approach, led by the commander and top management. All managers, supervisors, and workers should be—

- Informed of their responsibilities for various aspects of the program.
- Given the authority and resources to meet their responsibilities.
- Held accountable for carrying out their responsibilities.
- Encouraged to work together to promote good ergonomic design in the workplace, thereby improving production, product quality, and morale while decreasing the costs associated with absenteeism, turnover, training, and replacement.

Worker input is essential for well-designed and effective ergonomic solutions. The front-line workers know the job better than anyone else in the organization and can address particular nuances of the job in developing solutions. In addition, worker participation improves "buy in" and ultimate commitment to the solution.

The issue of WMSDs pertains directly to productivity. Workplace risk factors do more than cause WMSDs; they also create worker fatigue and poor work performance. This cuts into productivity and quality. WMSDs are more than an injury issue; they are also a productivity issue.

This guide is not just a guide for injury prevention. It is a guide for boosting the performance of your military and civilian workers. It is the performance of your workers that will determine productivity and quality of the output in your work area, which is the ultimate measure of your success as a manager. Address WMSD issues with your workers since the results will benefit you, your workers, and the entire installation.

Military and Civilian Worker Involvement

Workers should be encouraged to participate in the ergonomics program and in decisions that affect their safety and health. They should:

- Have a procedure for complaints or suggestions.
- Be allowed to bring their concerns to management without fear of reprisal.
- Have a procedure to report signs and symptoms of WMSDs so they may be evaluated and treated.
- Participate in safety and health committees that make recommendations for corrective action when they receive and analyze information on ergonomic problem areas.
- Be encouraged to identify and analyze jobs for ergonomic stress and recommend solutions.

Written Program Plan

Effective implementation of the ergonomics program requires a written plan for job safety and health that is—

- Endorsed and advocated by the commander and top management.
- Suitable for the size and complexity of the workplace.
- Communicated to and understood by all personnel.

The written plan should outline goals and objectives and include an implementation schedule for worksite analysis, hazard prevention and control, health care management, and education and training.

Regular Program Review and Evaluation

The ergonomics team should review the ergonomics program regularly to evaluate its success in meeting stated goals and objectives. Management's review should be in the form of a written progress report and should be shared with all workers. Any new or revised goals should also be shared with the workers. Any deficiencies should be identified and corrective action taken. Procedures and mechanisms to evaluate the program and monitor its progress include:

- Analyzing trends in injury/illness rates.
- Surveying military and civilian employees.
- Surveying and evaluating the job/worksite before changes occur and after they are implemented.
- Reviewing results of workplace evaluations.
- Maintaining up-to-date records or logs of problems/concerns, identifications, assessment results, action plans, and results of attempted or implemented job improvements.

A team approach to ergonomics helps to integrate the various elements of the program and focuses the key players on the same goals. Use the following guidelines to build your ergonomics program:

Form an ergonomics team with a qualified health or safety professional serving as the chair. Other members may include, but need not be limited to: occupational health nurse, occupational medicine physician, occupational therapist, physical therapist, industrial hygienist, safety professional, civilian personnel specialist (e.g., claims officer), engineering and maintenance personnel, and representatives from the union, Contracting, Public Works, and Logistics.

- Provide ergonomic training to improve the team's knowledge of ergonomics and explain how each member fits into the overall ergonomics plan.
- Include team building in the overall training package. Incorporate periodic updates from current ergonomic issues and methodology into the team's training schedule.
- Allow the team access to necessary management information, such as the incidence of WMSDs by job series or work area, so they can focus and prioritize their efforts.
- Build in mechanisms for team accountability, ergonomic project documentation and tracking, and communication with all employees.
- Empower the team to make ergonomic changes within specific budgetary constraints.

When faced with an ergonomics problem, members of the ergonomics team will form an action team to identify and correct hazards in the workplace.

Table 1-1 addresses six critical issues in the team problem-solving approach as identified by the National Institute for Occupational Safety and Health (NIOSH). Recommendations for each issue are also provided.

Table 1-1. Critical Issues in Team Problem-Solving

Issues	Recommendations
Management	· Management commitment and the support and cooperation of lower-level supervisors, union officials, and recognized worker leaders are critical. · Policy declarations must require follow-up for credibility. · Mid-level supervisors' roles should be redefined as mentors to workers, promoting ideas for work improvement and ways to implement ideas.
Commitment	· Additional training is needed for workers, management staff, work team, task group, or committee. Workers' training should improve communication skills and group problem solving. Managers' training should improve listening and feedback skills. · The additional training must include the technical skills to assess the targeted work site problems. This training may require the assistance of outside experts or consultants. · Training should address relevant issues and active instruction. Consider the learning issues (e.g., language barriers) of the audience.
Composition	· No single form of worker participation will fit all needs. The choice of participation depends on the problem(s); the number of worker groups, areas, or operations affected; the work force abilities and characteristics; and the organizational climate. · Action teams should represent the workers or units affected by the problem, including workers, management, and technical personnel. · Supervisors/managers, specialists, and consultants should be prevented from dominating or intimidating frontline workers the team.
Information Sharing	· The ergonomics team must have access to information relevant to the problems and issues being addressed. · The team must share information with action team members because they may be from different operational units or staff levels. · Management must be open in communicating support and acknowledging the consequences of proposed actions. Worker concerns for job security must be addressed.
Activities and Motivation	· Orderly and systematic methods for problem clarification, data gathering and analysis, solution development, and implementation planning should be established. · Goals should be set and frequent feedback provided to mark the action team's progress and motivate performance. · Team leader commitment to the team objectives must be ensured. · Management must recognize and reward action team success to reinforce and sustain continued interest and commitment.
Evaluation	· The action team's performance must be evaluated using appropriate process or outcome measurements. · Substitute evaluation criteria should be used if data is not available for directly relevant evaluations.

Authority for Creating an Ergonomics Program

DoD ergonomics program requirements and procedures are outlined in Enclosure 6 of DoDI 6055.1, DoD Safety and Occupational Health Program (19 August 1998):

Written Plan. Each DoD component shall prepare a written plan for a comprehensive ergonomics program. As a minimum, such programs will include goals and objectives; program interface with existing illness and injury prevention and medical programs; and the six critical elements for ergonomic intervention—workplace analysis, hazard prevention and control, health care management, education and training, program evaluation and review, and acquisition. The degree of emphasis in each critical element will vary according to the specific hazards and concerns at each DoD installation.

Workplace Analysis. Systematic passive and active surveillance will be used to identify musculoskeletal disorders and to evaluate workplace risk factors. Where there is convincing evidence that musculoskeletal hazards exist, active surveillance will be used to identify, evaluate, and reduce the associated risks.

Musculoskeletal disorders shall be evaluated to identify occupational risk factors, potential work relatedness, and other workers potentially at risk.

Systematic passive surveillance shall include analyzing data provided in existing reports and data sources such as routine injury and illness reports, log and summary of occupational injuries and illnesses, Federal Employees Compensation Act claims, medical and safety records, medical boards for military members, worker complaints, hazard reports, installation hazard abatement logs, grievances, and suggestions.

During workplace visits, personnel will look for musculoskeletal risk factors, and identify the need for an ergonomics workplace analysis and intervention. Individual Services and Defense Agencies have their own implementing regulations and guidance.

Hazard Prevention and Control. Effective design or redesign of a task or workstation is the preferred method of preventing and controlling harmful stresses. The methods of intervention, in order of priority, are process elimination, engineering controls, substitution, work practices, and administrative controls (e.g., adjustment of work-rest cycles, slowing work pace, or task rotation). When appropriate, musculoskeletal hazards shall be assigned a RAC using the safety RAC scoring system and entered into the installation hazard abatement plan.

Health Care Management. Each component shall develop and implement written guidelines for early recognition, evaluation, treatment, assignment to light or restricted duty, and follow-up for employees with WMSDs. These guidelines shall be used at the local level to develop written health care management protocols.

Education and Training. Each component shall develop, implement, and integrate ergonomic guidelines and standards into existing SOH training programs at the local level.

Program Evaluation and Review. Each component shall be responsible for evaluating its ongoing ergonomic effort to measure the effectiveness of interventions and level of participation.

Acquisition. Each component shall consider ergonomic design criteria during procurement of weapon systems, facilities, and equipment to help reduce the life-cycle costs due to ergonomic injuries. The DoD does not recognize back support belts or wrist splints as personal protective equipment, or the use of these devices in the prevention of back or wrist injuries. These devices are considered medical appliances and may be prescribed by credentialed health care providers who are responsible for medical clearance, monitoring, and proper fit. Computer/Electronic Accommodations Program (CAP) Individuals with visual, hearing, dexterity, and cognitive disabilities may be provided assistive equipment for specific work situations at no cost to the worker. CAP assists the DoD components in their efforts to educate personnel on ergonomic hazards and to prevent musculoskeletal impairments.

Culture Change

The term "culture change" has several different meanings. Within the context of ergonomics it means transforming an unhealthy work environment into a new, improved work environment for safe, comfortable, and effective human use. More important, it means getting everyone in the organization—from the commander to the frontline workers—to cooperate with this global change.

Creating an ergonomic environment may call for a radical shift in "business as usual," depending on how your facility currently operates. For example:

Many organizations manage from the top down, that is, decisions affecting the day-to-day operation of the business (such as production quotas, methods of production, workplace design, etc.) are made by top and middle management, with perhaps some input from frontline supervisors.

The workers, who actually perform the daily work tasks, must then conform to the management decisions that affect their jobs. However, creating an ergonomic environment requires fitting the job to the worker, rather than the worker to the job. Consequently, input from the frontline workers can offer the greatest help in identifying and resolving many of the work conditions that can lead to WMSDs.

In an ergonomic environment, the flow of decisions regarding work conditions must flow in both directions, up and down, within the organization.

Although the ultimate goal of creating an ergonomic environment may be understandable and agreeable to everyone, even positive change can create stress. Personnel will be better equipped to break old habits if you teach them new routines. Training builds confidence, competence, and a willingness to change. If you provide personnel with new techniques, you put them in a position to contribute to the overall program.

Provide a well-rounded orientation on the circumstances driving the creation of ergonomic work environments within the DoD. Give credit to the "old culture" for its achievements. Honor the past. Then help people see how the transformation is the necessary next step to take. For example, consider the DoD's heritage of using new strategies and technology for protecting people around the world. It follows that the DoD should use the latest advances in the field of ergonomics to protect its own people by designing safe jobs and safe workstations, while educating its personnel on the various aspects of ergonomics that affect their health and well-being.

Use chapter 5 as your guide for educating and training your workforce.

EVALUATING ISSUES AND PLAYERS

Table 1-2 presents general program management evaluation criteria. Statements about a program's structure and process are only suggestions. A valuable assessment should be tailored to meet the issues and priorities of individual facilities.

Structure refers to the relatively stable characteristics of the ergonomics program in terms of policies, tools, resources, organizational linkages and management criteria. Included in this definition are the resources of the organization (financial, physical, personnel), the distribution of these resources, the mix of the resources (e.g., personnel qualifications and staffing mix), administrative policies and procedures - to include program assessment, and the organizational structure. Structure assessments provide an indirect reflection of the program performance in that certain structural features either increase or decrease the probability of good performance. Structure is of great importance in program administration as it involves the planning, design, and implementation of ergonomics program systems. Structure as an evaluation tool is a "blunt instrument" in program assessment due to its lack of specificity and sensitivity and the ill-defined relationship between structure and performance. Structure assessment is most important in developing ergonomics programs.

Process is the actual day-to-day conduct of the ergonomics program. Included in this are such features as the timeliness or delays of passive and active surveillance and interventions, the use of appropriate assessment tools, choice and use of hazard prevention and control measures, selection of training modalities, medical management and communication with the ergonomics team, and follow-up. Process assessment also evaluates the adherence to established structure procedures. Evaluations of process features in ergonomics program assessments require some sort of causal validity linkage, evidence that specified processes produce specified outcomes under specified conditions. Process assessments are appropriate for established programs over one year in existence.

Table 1-2. General Program Management

Structure	Yes (2)	In Progress (1)	No (0)	Process	Yes (2)	In Progress (1)	No (0)
Management endorsement of ergonomics team.				Ergonomics team holds regular meetings.			
Resources allocated (personnel and funds).				Records are kept on meeting minutes, discussions, and decision summaries.			
Installation ergonomics officer/ergonomics team chairperson identified.				Records are kept on action items/hazard abatement tracking log.			
Major players identified and duties assigned (including the record keeper).				Ergonomics team provides feedback/status information to management and employees.			
Ergonomics team formed.				Employee involvement/ suggestions sought.			
Employee representative on ergonomics team (may be union).				Employees are given credit for ideas.			
Written policy in place.				Managers' performance reviews include ergonomic issues.			
Policy to consider ergonomics in plant/ equipment planning process.				Information on ergonomics program is disseminated (e.g., bulletin boards, posters, and newsletters).			
				Ergonomics program elements implemented and integrated with other activities (e.g., Health Promotion and Wellness, Civilian Personnel and related committees, regular IH and safety inspections, purchasing, and design).			
				Periodic program/policy review (annual) to set/reset priorities.			
Score: _____ of possible 16				Score: _____ of possible 20			
Remarks:							