

Department of the Army  
Pamphlet 40-21

Medical Services

# Ergonomics Program

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Washington, DC  
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**UNCLASSIFIED**

# ***SUMMARY of CHANGE***

DA PAM 40-21  
Ergonomics Program

This revision--

- o Outlines the goals of an installation ergonomics program and addresses organizational involvement in preventing illnesses and injuries by eliminating or reducing occupational risk factors (chap 1).
- o Outlines ergonomics program requirements (para 1-6) and describes the procedures necessary for implementing the requirements (para 1-9).
- o Discusses development of an ergonomics plan that focuses on the identification and control of improper workplace and work process design (chap 2).
- o Describes in detail the primary ergonomics program functions of worksite analysis (chap 3), hazard prevention and control (chap 4), health care management (chap 5), education and training (chap 6), and ergonomics program evaluation (chap 7).
- o Revises the list of forms to include Occupational Safety and Health Administration Forms 300 (Log of Work-Related Injuries and Illnesses), 300A (Summary of Work-Related Injuries and Illnesses), and 301 (Injury and Illness Incident Report) (para 3-1); and Department of Labor Form CA-2a (Notice of Recurrence) (para 5-2).
- o Expands reporting activities to include ergonomics subcommittee documentation of the results of ergonomic assessments (para 5-8).

## Medical Services

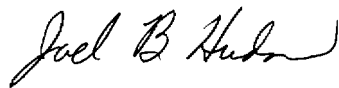
### Ergonomics Program

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By order of the Secretary of the Army:

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**History.** This publication is a major revision.

**Summary.** This pamphlet provides guidance for establishing the ergonomics program component as an integral part of the

Army Occupational Safety and Health Program at all facilities controlled by the Department of the Army.

**Applicability.** This pamphlet applies to the Active Army, the Army National Guard of the United States, the U.S. Army Reserve, and civilian personnel and nonappropriated fund personnel employed by the Army worldwide.

**Proponent and exception authority.** The proponent for this pamphlet is The Surgeon General. The Surgeon General has the authority to approve exceptions to this pamphlet that are consistent with controlling law and regulation. The Surgeon General may delegate the approval authority, in writing, to a division chief within the proponent agency who holds the grade of colonel or the civilian equivalent.

**Suggested improvements.** Users are invited to send comments and suggested

improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Headquarters, Department of the Army (DASG-PPM-NC), 5109 Leesburg Pike, Falls Church, VA 22041-3258.

**Distribution.** This publication is available in electronic media only and is intended for command levels C, D, and E for the Active Army, the Army National Guard of the United States, and the U.S. Army Reserve.

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\*This pamphlet supersedes DA Pam 40-21, dated 15 May 2000.

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## Glossary

## Chapter 1 Introduction

### 1-1. Purpose

This pamphlet provides guidance for establishing the ergonomics program component as an integral part of the Army Occupational Safety and Health (OSH) Program at all facilities controlled by the Department of the Army (DA) as required in Army Regulation (AR) 385-10, paragraph 1-4g; AR 40-5, paragraphs 1-4b and 5-3; and Headquarters, Department of the Army Letter (HQDA Ltr) 40-02-1.

### 1-2. References

Required and related publications and prescribed and referenced forms are listed in appendix A.

### 1-3. Explanation of abbreviations and terms

Abbreviations and special terms used in this pamphlet are explained in the glossary.

### 1-4. Background

a. An effective ergonomics program can—

- (1) Prevent workplace injuries.
- (2) Reduce medical and other associated costs of work-related musculoskeletal disorders (WMSDs).
- (3) Preserve the fighting strength of the armed forces.

b. Effects of WMSDs include—

(1) *Health effects.* Repeated biomechanical stress and microtrauma can cause or aggravate WMSDs. Over time, repeated microtrauma can evolve into a painful, debilitating state involving muscles, tendons, tendon sheaths, and nerves. Examples of WMSDs are tendinitis, tenosynovitis, bursitis, and nerve entrapment syndromes (for example, carpal tunnel syndrome).

(2) *Economic effects.* The expense associated with a poorly designed workplace is considerable and includes both direct and indirect costs.

(a) Direct costs include medical treatment, rehabilitation, and workers' compensation costs.

(b) Indirect costs include days away from work, days of restricted work, decreased productivity, decreased work quality, retraining costs, and diminished morale.

c. The combined effect of several risk factors in one job or workstation may lead to a higher probability of causing a WMSD. Research identifies the following as occupational risk factors and specific workplace conditions that can contribute to the development of WMSDs:

- (1) Repetitive motions (especially during prolonged activities).
- (2) Sustained static or awkward postures.
- (3) Excessive bending or twisting of the wrist.
- (4) Continued elbow or shoulder elevation (for example, overhead work).
- (5) Forceful exertions or heavy lifting (especially in an awkward posture).
- (6) Excessive use of small muscle groups (for example, pinch grip).
- (7) Acceleration and velocity of dynamic motions (for example, high speed assembly).
- (8) Vibration.
- (9) Mechanical compression (for example, sharp edges on a desk, seat or hand tool).
- (10) Restrictive workstations (for example, inadequate clearances).
- (11) Improper seating or support.
- (12) Inappropriate hand tools.
- (13) Machine-pacing and production-based incentives.
- (14) Extreme temperatures.
- (15) Extended exposure to hazardous or annoying noise.
- (16) Improper lighting.
- (17) Work organization and occupational psychosocial factors (for example, job stress).

d. Ergonomics programs fall under—

(1) The Occupational Safety and Health Act of 1970 (Public Law (PL) 91-596); Executive Order (EO) 12196, section 1-201; and 29 Code of Federal Regulations (CFR) 1960.8(a).

(2) Department of Defense Instruction (DODI) 6055.1.

(3) HQDA Ltr 40-02-1.

### 1-5. Program areas

This pamphlet applies to installation-level ergonomics programs, with respect to worksite analysis, hazard prevention and control, health care management, education and training, and program evaluation at all tables of distribution and

allowances and tables of organization and equipment organizations. Other commands within the Army use ergonomics principles in the process of developing and refining Army systems, specifically in Army-wide initial equipment design, assessment, and related human performance research.

#### **1-6. Minimum ergonomics program requirements**

Following are the minimal requirements for an ergonomics program according to DODI 6055.1 and HQDA Ltr 40-02-1:

- a. Interface with existing programs.
- b. Include a written plan with goals and objectives.
- c. Address the five critical program elements—workplace analysis, hazard prevention and control, health care management, education and training, and program evaluation. The degree of emphasis on each critical program element will vary according to the hazards and concerns at each installation.
- d. Assist in procurement initiatives to ensure ergonomic design criteria are considered.

#### **1-7. Goals**

An emphasis on early identification and prevention of WMSDs and associated risk factors will preserve and protect our military and civilian work force while decreasing related costs. The goals of the ergonomics program are to—

- a. Prevent or control injuries and illness by eliminating or reducing worker exposure to WMSD risk factors.
- b. Reduce the potential for fatigue, error, and unsafe acts by adapting the job and workplace to the worker's capabilities and limitations.
- c. Increase the overall productivity of the work force.
- d. Reduce workers' compensation claims and associated costs.
- e. Improve overall unit readiness.

#### **1-8. Organizational involvement**

A collaborative partnership among all levels of the working community is essential in achieving the goals of the ergonomics program. Command emphasis and commitment by management with demonstrated visible involvement are imperative to provide the organizational resources and motivation needed to implement a sound ergonomics policy. All levels of DA personnel (manager, supervisor, worker, and soldier) are responsible for injury prevention and the identification and resolution of WMSDs and associated risk factors.

#### **1-9. Procedures**

The following procedures are necessary to fulfill an ergonomics program:

- a. Installation commanders—
  - (1) Establish an ergonomics subcommittee under the Safety and Occupational Health Advisory Council (SOHAC) and integrate ergonomics into all phases of the OSH Program.
  - (2) Approve the installation ergonomics policy and plan based on the recommendations of the SOHAC.
  - (3) Support the ergonomics program, demonstrate commitment, and provide necessary resources based on the magnitude of the WMSD problem and local command priorities.
  - (4) Designate an installation ergonomics officer (IEO) selected from the medical assets of the installation or, in the absence of medical assets, from the installation's safety assets or other appropriate personnel.
  - (5) Select members of the ergonomics subcommittee based on recommendations from the supporting medical commander and the IEO.
  - (6) Ensure all tenant activities receive services from the installation ergonomics program as provided by the local installation support agreement.
- b. The supporting medical commander—
  - (1) Advises the installation commander on the selection of the IEO from available medical assets or other available installation personnel as appropriate.
  - (2) Advises the installation commander on appropriate individuals for membership on the ergonomics subcommittee (see appendix B).
  - (3) Ensures that written installation health care management procedures with appropriate metrics are developed for the early recognition, evaluation, treatment, and followup of WMSDs among military and civilian personnel (see chapter 5).
- c. The IEO is a qualified health or safety professional who has received at least 40 hours of formal ergonomics training (see para 6-2a for training standards). The IEO—
  - (1) Chairs the ergonomics subcommittee and provides an interface between the ergonomics subcommittee and the SOHAC.
  - (2) Develops and implements the installation ergonomics policy and plan, with the assistance of the ergonomics subcommittee and approval of the SOHAC.

(3) Ensures ergonomics subcommittee members are trained and take action to identify, assess, control and prevent WMSDs.

(4) Ensures accurate program recordkeeping and periodic evaluation and review of program objectives, and reports results of the evaluation to the SOHAC.

*d.* Based on local personnel resources, the ergonomics subcommittee may consist of representatives from industrial hygiene (IH); safety; health care (physician, occupational health nurse, occupational and physical therapists, physician assistant); human resources; Federal Employee Compensation Act (FECA) claims management; tenant activities; the military chain of command; and local unions. Advisory members may include representatives from engineering and maintenance, contracting, logistics, and information management. The ergonomics subcommittee oversees and participates in—

(1) Identifying existing and potential WMSDs and associated risk factors through workplace analyses that involve both active and passive surveillance.

(2) Setting priorities for abatement of identified WMSDs.

(3) Identifying and implementing corrective actions.

(4) Providing appropriate worker and supervisor training.

(5) Coordinating efforts with medical personnel.

(6) Evaluating effectiveness of corrective actions and documenting the results.

*e.* Tenant activities should be provided ergonomics program support as part of the OSH services provided by the local installation support agreement. This support extends to all tenant activities. The tenant activity appoints an ergonomics subcommittee representative who may be the OSH point of contact for the activity. The representative—

(1) Provides information about problematic work areas to the ergonomics subcommittee.

(2) Coordinates and participates in tenant activity work area assessments, solution identification, employee training and education efforts, and health care management.

(3) Briefs the tenant activity commander on ergonomics program issues, activities and recommendations.

*f.* Key individuals in the military chain of command act as military representatives to the ergonomics subcommittee. The military representatives—

(1) Provide information about problematic work areas to the ergonomics subcommittee.

(2) Coordinate and participate in military work area assessments, solution identification, soldier training and education efforts, and health care management.

(3) Brief the military activity commander on ergonomics program issues, activities and recommendations.

*g.* The Director of Contracting Support, or equivalent, ensures the integration of ergonomic considerations and consults with trained ergonomics personnel concerning the purchase of new equipment.

*h.* The Director of Public Works, or equivalent, integrates ergonomic considerations and consults with trained ergonomics personnel concerning facility modifications and construction.

*i.* The Director of Logistics, or equivalent, ensures the integration of ergonomic considerations and consults with trained ergonomics personnel concerning the purchase of new equipment.

*j.* The Director of Information Management, or equivalent, ensures integration of ergonomic considerations and consults with trained ergonomics personnel concerning the purchase and installation of new information management equipment and technologies.

## **1–10. Technical assistance**

Technical assistance and support in developing and implementing installation ergonomics programs may be requested through command channels from the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), ATTN: MCHB–TS–OER, 5158 Blackhawk Road, Aberdeen Proving Ground, MD 21010–5403 (<http://chppm-www.apgea.army.mil/ergopgm/ergohome.htm>), and from the U.S. Army Safety Center (USASC), ATTN: CSSC–OP, Building 4905, 5th Avenue, Fort Rucker, AL 36362 (<http://safety.army.mil/home.html>).

## **Chapter 2 The Installation Ergonomics Plan**

### **2–1. Focus**

The installation ergonomics plan focuses on the identification and control of improper workplace and work process design to protect personnel from injury and illness due to exposure to occupational risk factors, as defined in paragraph 1–4c.

### **2–2. Practical effects**

Implementing an effective installation ergonomics plan will help reduce the number of WMSDs and related medical

compensation claims, resulting in improved product quality, productivity, and personnel morale as well as decreased costs.

### **2-3. Development and approval**

a. The IEO and the ergonomics subcommittee develop, document, and maintain the installation ergonomics plan. They may—

(1) Solicit input to the plan from health care providers, including physicians, nurses, occupational therapists, physical therapists, and physician assistants.

(2) Integrate the plan with the installation or activity health promotion and wellness program coordinator as appropriate.

(3) Request technical assistance on plan development from USACHPPM (para 1-10).

b. The installation SOHAC recommends the installation ergonomics plan to the commander for approval and communicates the plan to all managers, supervisors, and workplace personnel.

### **2-4. Outline**

a. The installation ergonomics plan should reflect the needs and requirements of the individual installation. *The IEO and the ergonomics subcommittee may use the structure and content provided in this pamphlet in developing an installation ergonomics plan that addresses each of the elements.* At a minimum, the ergonomics plan should contain the following elements:

(1) Program goals and objectives.

(2) Program interface with existing programs.

(3) Specific critical program elements for ergonomic intervention, to include—

(a) Worksite analysis (chap 3).

(b) Hazard prevention and control (chap 4).

(c) Health care management (chap 5).

(d) Education and training (chap 6).

(e) Ergonomics program evaluation (chap 7).

b. The extent of involvement in each of the five critical program elements in paragraph 2-4a(3) will vary according to the hazards and concerns at each installation; however, some degree of activity in each of the five critical program elements is required for an effective program.

## **Chapter 3 Worksite Analysis**

### **3-1. Problem identification**

Use the following procedures of systematic passive and active surveillance to identify jobs or worksites with WMSD risk factors.

a. *Systematic passive surveillance.* This procedure involves the analysis of data provided in existing monthly or quarterly reports. This analysis can identify WMSD problems, set evaluation and intervention priorities, and organize the ergonomics effort. The office or organization responsible for maintaining the records, logs, or reports should perform the systematic passive surveillance and communicate the results to the IEO and the ergonomics subcommittee. Sources of data include—

(1) Routine military and civilian injury and illness reports.

(2) Occupational Safety and Health Administration (OSHA) Form 300 (Log of Work-Related Injuries and Illnesses) (see 29 CFR 1904).

(3) OSHA Form 300A (Summary of Work-Related Injuries and Illnesses) (see 29 CFR 1904).

(4) OSHA Form 301 (Injury and Illness Incident Report) (see 29 CFR 1904).

(5) FECA claims.

(6) DA Form 285 (U.S. Army Accident Report) and DA Form 285-AB-R (U.S. Army Abbreviated Ground Accident Report (AGAR)).

(7) Safety records.

(8) Medical records.

(9) Clinical workload reports (for example, Ambulatory Data System summaries).

(10) Health hazard inventory reports.

(11) Work force reports (including civilian and active-duty personnel and pay reports of lost duty time as a result of injury or illness) and suggestions.

b. *Systematic active surveillance.* This procedure involves focused and active efforts to gather information about



WMSD hazards at worksites and to identify workers or groups of workers at risk of developing a WMSD. Trained ergonomics personnel should perform active surveillance in conjunction with IH or safety surveys or regular training.

(1) Examples of active surveillance procedures include—

(a) *Questionnaires and surveys.* Supervisor and worker questionnaires and symptom or body part discomfort surveys provide information about WMSD hazards, often before actual injuries occur (USACHPPM Technical Guide (TG) 220). Trained ergonomics personnel can administer these surveys during walk-through surveys or as part of regular training.

(b) *Observation.* Direct observation by trained ergonomics personnel conducting regular walk-through IH or safety surveys can identify WMSD hazards (USACHPPM TG 220). Worker interviews during these surveys can identify tasks or situations that are uncomfortable and may indicate WMSD risk factors. For example, workers note that cold temperatures make it difficult to grip hand tools.

(c) *Sentinel event or incident reporting.* Specific health or performance events, such as wrist pain, back pain, or increased errors, may be indicative of WMSD risk factors. A specific reporting procedure should be developed to facilitate transmission of information.

(d) *Case referrals.* Case referrals should be used to identify a work area with potential WMSD risk factors. For example, a laboratory technician seeks medical care for hand and wrist pain and provides an occupational history that indicates possible worksite risk factors.

(2) The presence of one WMSD should trigger an active surveillance survey using appropriate questionnaires or surveys (USACHPPM TG 220). Trained ergonomics personnel should perform systematic active surveillance at all worksites at least once per year. Also, trained ergonomics personnel should perform walk-through surveys for any new or significantly changed job, process, equipment, or method.

(3) In many cases, corrections to the WMSD hazards or risk factors are simple, quick, on-the-spot workplace changes. Trained ergonomics personnel conducting regular walk-through surveys can identify and implement solutions immediately. Chapter 4 provides information on hazard prevention and control. More complex problems require prioritization and detailed analysis.

(4) If a worksite or job is identified as high risk, special medical surveillance may be indicated. See chapter 5 for information on health care management.

### **3–2. Prioritization**

a. The ergonomics subcommittee or the appropriate subcommittee member (for example, IH, safety, health care, and so on) should prioritize worksites for further detailed analyses or intervention using the passive and active surveillance information to develop risk assessment codes (RACs) (USACHPPM TG 220). The RAC prioritization may be based on incidence rates, the number of workers affected, direct costs, days away from work, days of restricted work, or severity of cases. Calculate incidence, severity, and prevalence rates by unit, work section, or job series to identify high-risk areas. Use FECA claims information to identify high-cost injuries and high-risk work areas.

b. Results of worksite assessment, prioritization and subsequent hazard prevention and control, health care management and training plans and activities should be reported to affected supervisors and workers as indicated.

c. Use the following information when calculating rates. Figure 3-1 shows how to calculate incidence, severity, and prevalence rates.

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Incidence (new case) rate (per 100 worker-years per year):

$$\frac{\text{Number of new cases during the past 12 months} \times 200,000 \text{ hours}}{\text{Number of work hours during the past 12 months}}$$

Severity (lost workdays) rate (per 100 worker-years per year):

$$\frac{\text{Number of lost workdays during the past 12 months} \times 200,000 \text{ hours}}{\text{Number of work hours during the past 12 months}}$$

Prevalence (all cases during period) rate (per 100 worker-years per year):

$$\frac{\text{Total number of cases in the past 12 months} \times 200,000 \text{ hours}}{\text{Number of work hours during the past 12 months}}$$

**Figure 3–1. Calculating incidence, severity, and prevalence rates**

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(1) Use incidence rates, if possible, since the incidence rate measures new cases occurring over a period of time, while prevalence rates give a "snapshot" picture of the number of individuals affected at a specific point in time. Incidence rate and severity rate allow monitoring of changes over time, rather than recounting chronic problems throughout the duration of the illness or injury.

(2) Consistency in reporting is important; therefore, one should use either incidence, severity, or prevalence rates for purposes of comparison.

(3) If the specific number of work hours during the past 12 months is not available, multiply the number of full-time equivalent employees in each area by 2,000 hours to obtain the denominator.

### **3–3. Detailed analysis**

*a.* To further evaluate those jobs or worksites having WMSD risk factors as determined by systematic passive and active surveillance, complete a more detailed analysis. When conducting the detailed analysis, trained ergonomics personnel should systematically—

- (1) Consider the concept of multiple causation (see glossary) and the degree of WMSD risk.
- (2) Look for trends, including age, gender, work task, and time of injury.
- (3) Identify the work tasks or portions of the process that contain risk factors.
- (4) Identify both problems and solutions.

*b.* The following data, analysis tools, and methods may be helpful during a detailed analysis:

(1) Incidence and severity rates; accident and injury reports; and days away from work, days of restricted work, or absenteeism reports by job, unit, department, or facility.

- (2) Checklists, questionnaires, and interviews (USACHPPM TG 220).
- (3) Direct observation, videotape analysis, and job analyses (USACHPPM TG 220).
- (4) Assessment methodologies, such as—
  - (a)* National Institute for Occupational Safety and Health (NIOSH) 94–110 and NIOSH 97–117.
  - (b)* Static and dynamic strength testing.
  - (c)* Timed activity analysis.
  - (d)* Biomechanical analysis.
  - (e)* Cardiovascular measurements.

## Chapter 4 Hazard Prevention and Control

### 4-1. Intervention hierarchy

The primary method of preventing and controlling exposure to WMSD hazards is through effective design (or redesign) of a job, job tasks, or worksite. Paragraphs 4-2 through 4-7 define intervention methods in order of priority. In situations deemed to have multiple causation, each risk factor should be evaluated separately for control methodologies.

### 4-2. Process elimination

Elimination of the demanding process essentially eradicates the WMSD hazard. For example, the use of the hand-held bar code scanner by logistics/inventory management personnel may be eliminated by providing an automatic bar code scanner.

### 4-3. Engineering controls

Ergonomic engineering controls redesign the equipment or worksite to fit the limitations and capabilities of workers. Equipment or worksite redesign typically offers a permanent solution—for example, a video display terminal workstation that can be adjusted to a wide range of anthropometric dimensions.

### 4-4. Substitution

Substituting a new work process or tool (without WMSD hazards) for a work process with identified WMSD hazards can effectively eliminate the hazard. For example, hand tools that require awkward wrist positions (extreme wrist flexion, extension, or deviation) can be replaced with tools that allow a neutral wrist posture.

### 4-5. Work practices

Practices that decrease worker exposure to WMSD risk factors include changing work techniques, providing personnel conditioning programs, and regularly monitoring work practices. Also included are maintenance, adjustment, and modification of equipment and tools as needed.

*a.* Proper work techniques include methods that encourage—

- (1) Correct posture.
- (2) Use of proper body mechanics.
- (3) Appropriate use and maintenance of hand and power tools.
- (4) Correct use of equipment and workstations.

*b.* Personnel conditioning refers to the use of a conditioning or break-in period. New and returning personnel may need gradual integration into a full workload, depending on the job and the person. Supervisors, trained ergonomics personnel, and health care personnel should identify those jobs that require a break-in period. Health care personnel should evaluate those personnel returning from a health-related absence and define the break-in period for each individual person.

*c.* Regular monitoring of operations helps to ensure proper work practices and to confirm that the work practices do not contribute to WMSD or hazardous risk factors.

*d.* Effective schedules for facility, equipment, and tool maintenance, adjustments, and modifications will reduce WMSD hazards. This includes ensuring proper working conditions, having sufficient replacement tools to facilitate maintenance, and ensuring effective housekeeping programs. Tool and equipment maintenance may also include vibration monitoring.

### 4-6. Administrative controls

Use administrative controls to limit the duration, frequency, and severity of exposure to WMSD hazards. Examples of administrative controls include, but are not limited to—

*a.* Reducing the number and speed of repetitions by reducing line or production speed or by having worker input regarding production speed (that is, using worker-based rather than machine-based production speed).

*b.* Limiting overtime work and modifying production rate requirements to reduce the number of repetitions.

*c.* Providing rest breaks to relieve fatigued muscle-tendon groups. Determine the length of the rest break by the effort required, total cycle time, and the muscle-tendon group involved.

*d.* Increasing the number of personnel assigned to the task (for example, lifting in teams rather than individually).

*e.* Instituting job rotation as a preventive measure, with the goal of alleviating physical fatigue and stress to a particular set of muscles and tendons. Job rotation must not be used in response to symptoms of WMSD; this can contribute to symptom development in all personnel involved in the rotation schedule rather than preventing problems. Trained ergonomics and health care personnel should conduct an analysis of the jobs used in the rotation schedule.

*f.* Providing modified- or restricted-duty assignments to allow injured muscle-tendon groups time to rest, which assists in the healing process. Every effort should be made to provide modified- or restricted-duty assignments when

physical limitations (as identified by a health care provider) allow the worker to return to work performing less than his or her normal work requirements. In regard to modified- or restricted-duty assignments—

(1) A health care provider should specifically identify assignments or job tasks for the individual worker based on his or her symptoms, capabilities, and limitations.

(2) Health care providers with specific knowledge in both occupational demands and cumulative trauma injuries should cooperate with trained ergonomics personnel to develop a list of jobs with low WMSD risk.

(3) Civilian personnel representatives and supervisors, in conjunction with health care personnel, should identify modified-duty assignments and tasks and write descriptions for these assignments and tasks that conform to documented requirements. A combination of tasks from one or more jobs can be used as a modified-duty assignment. *The description for each modified-duty assignment should include WMSD risk factors and muscle-tendon groups required to perform the job.*

#### **4–7. Personal protective equipment**

Personal protective equipment (PPE) is not necessarily recommended for controlling exposure to WMSD hazards, since little research has been conducted to support claims of its usefulness.

*a. Appliances, such as wrist rests, back belts, back braces, and so on, are not considered PPE.* Before purchasing such devices, discuss their effectiveness with trained ergonomics personnel. DOD does not support the blanket use of back belts as a back injury preventive measure. Antivibration gloves are an example of PPE that addresses WMSD hazards.

*b. Consider WMSD hazards when selecting PPE. The PPE should—*

- (1) Be properly worn or used according to manufacturers' or Army specifications.
- (2) Be available in a variety of sizes.
- (3) Accommodate the physical requirements of personnel and the job.
- (4) *Not* contribute to WMSD hazards.

#### **4–8. Communication and coordination**

Communication and coordination of identified hazard prevention and control options with the affected supervisor and military and civilian personnel are essential. This communication and coordination ensure that the ergonomic intervention is appropriate and tailored for the work area.

#### **4–9. Worksite followup analysis**

Once controls are identified and implemented, the IEO and the ergonomics subcommittee establish a schedule to conduct followup worksite analyses. The purpose of the followup analysis is to verify that controls are effective and being maintained. The number, frequency and extent of followup analyses will be dependent on site conditions and the judgment of the IEO and the ergonomics subcommittee.

## **Chapter 5 Health Care Management**

### **5–1. Written health care management procedures**

Health care personnel should develop written procedures for the early recognition, evaluation, treatment, and followup of WMSDs. This chapter provides the structure and much of the content of those procedures. The procedures include communication with supervisors and military and civilian personnel to identify worksite problems and implement recommendations. Health care personnel should tailor the procedures to their specific installation and provide them to the ergonomics subcommittee for review.

### **5–2. Early evaluation of patients**

Early recognition and health care management of WMSDs are critical to reduce the impact of injury on both personnel and employer.

*a. Common symptoms of WMSDs can include (but are not limited to) pain, tingling, numbness, stiffness, and weakness in the neck, shoulders, arms, hands, back, and legs. Other symptoms can include headaches and visual fatigue.*

*b. Soldiers and civilian personnel with symptoms of WMSDs should report to health care personnel for a timely evaluation.*

- (1) Active-duty soldiers should report to their primary care provider.
- (2) Civilian personnel should be encouraged to report to the supporting occupational health clinic for evaluation of WMSDs. Civilians who elect to be evaluated by their private health care providers need to follow up at the clinic when returning to work.

(3) Civilian personnel should follow local procedures for filing workers' compensation claims for medical care costs or compensation benefits related to WMSDs—for example, U.S. Department of Labor (DOL) Form CA-2 (Notice of Occupational Disease and Claim for Compensation) and DOL Form CA-2a (Notice of Recurrence) for all WMSDs except acute back injuries, which require DOL Form CA-1 (Federal Employee's Notice of Traumatic Injury and Claim for Continuation of Pay/Compensation) and DOL Form CA-16 (Authorization For Examination And/Or Treatment)—to authorize evaluation and care for an acute traumatic injury; DOL Form CA-16 may not be used if more than 10 days have passed since the injury event.

c. Supervisors or personnel at any level should not place disincentives as an impediment to military or civilian personnel reporting WMSDs.

### **5-3. Medical evaluation**

The initial medical evaluation of a patient with a possible WMSD should include a detailed medical and occupational history and a physical examination. A standardized questionnaire is a useful tool for obtaining the history (USACHPPM TG 220). Health care personnel, within their approved scope of practice, should—

a. Complete a medical and occupational history that includes—

- (1) Military occupational specialty, job title or series, and number of years and months at that job.
- (2) Prior work history.
- (3) A detailed description of current job tasks and the amount of time normally spent on each task.
- (4) A detailed description of symptoms to include location, character (such as burning, sharp, dull, pins and needles), severity, onset, duration, and exacerbating and relieving factors.
- (5) Days away from work, days of restricted work, or transfer to another job due to symptoms.
- (6) Prior evaluation, diagnosis, and treatment of symptoms.
- (7) Other existing medical conditions and history of trauma and surgery.
- (8) Off-duty activities and hobbies.
- (9) Current medications to include prescription, nonprescription, herbal, and nutritional supplements.
- (10) Treatments and the results, to include self-treatments.

b. Conduct a physical examination that includes, but is not limited to—

- (1) Appearance (swelling, muscle atrophy, erythema, ecchymosis).
- (2) Range of motion and muscle strength.
- (3) Neurologic assessment (motor, sensory, reflexes).
- (4) Vascular assessment (pulses, capillary refill).
- (5) Changes in skin temperature, increased warmth or coldness.
- (6) Evaluation for pain and tenderness.
- (7) Special tests, such as median nerve percussion (Tinel's sign) and the wrist flexion test (Phalen's test) when appropriate.

c. Perform additional testing as indicated, such as nerve conduction velocities, laboratory tests, and radiographic procedures.

d. Document findings of chronic diseases and other conditions that may be risk factors for or present with findings similar to WMSDs.

### **5-4. Treatment**

Health care personnel should initiate appropriate treatment and rehabilitation as defined by current standards of medical practice. In general, try conservative therapy before invasive treatment.

a. Supervisors, human resources personnel, and coworkers will encourage civilian personnel with a suspected WMSD to seek evaluation and treatment in an military treatment facility (MTF) where possible according to AR 690-800, chapter 810, subchapter 6. Priorities for care and authorization for treatment will be according to AR 40-5, paragraph 5-10a, and AR 40-400, paragraphs 2-3, 3-14 and 3-15. Occupational health personnel will coordinate with human resources personnel and the Patient Administration Division when there are questions about a person's entitlement to care.

b. Active-duty soldiers with a suspected WMSD will be seen in an MTF.

c. Army Reserve Component soldiers with a suspected duty-related WMSD will be seen at an MTF according to AR 40-400, paragraph 3-2.

### **5-5. Modified or restricted duty**

Health care personnel should coordinate with trained ergonomics personnel to recommend duty assignments that will not aggravate a patient's condition, as discussed in paragraph 4-6f.

## **5-6. Followup**

Health care personnel should perform regular followup for patients being treated for WMSDs to monitor the efficacy of therapy and worksite intervention.

## **5-7. Medical surveillance**

*a.* WMSDs do not require a general screening medical surveillance program. Instead, use the methods of problem identification as described in chapter 3. Health care personnel, in cooperation with members of the ergonomics subcommittee, should—

(1) Conduct periodic, systematic worksite walk-through surveys to remain knowledgeable about operations and work practices. A minimum of once a year is suggested.

(2) Provide written documentation of the walk-through survey. Documentation should include date, area(s) visited, risk factors identified, actions taken (if any), and any needed prioritized followup.

*b.* Special medical surveillance may be indicated for—

(1) Specific work areas, jobs, operations, or work practices where a high incidence of WMSDs has been demonstrated.

(2) Specific work areas, jobs, operations, or work practices that have been identified as high risk based on systematic active surveillance and detailed analysis, as discussed in chapter 3.

*c.* Baseline and periodic health assessment results should be maintained in personnel medical records. Any changes that could indicate a WMSD should be noted.

## **5-8. Reporting**

Occupational health, safety, and health care personnel should use the following forms to document WMSDs and perform passive surveillance; findings should be reported to the ergonomics subcommittee:

- a.* OSHA Forms 300, 300A, and 301 or equivalents.
- b.* DOL Forms CA-2 and CA-2a (all WMSDs except back injuries).
- c.* DOL Forms CA-1 and CA-17 (Duty Status Report) (back injuries).
- d.* Standard Form (SF) 600 (Medical Record—Chronological Record of Medical Care) in the medical record.
- e.* DA Forms 285 and 285-AB-R for reporting military occupational illnesses according to AR 385-40, paragraph 2-8.

## **5-9. Worksite evaluation referrals**

*a.* Health care personnel who are treating a patient with a suspected WMSD should request a worksite evaluation for the patient through the IEO and the ergonomics subcommittee. Trained ergonomics personnel, together with health care personnel, should conduct the worksite evaluation.

*b.* Flow diagrams depicting the handling of traumatic injury and occupational disease and illness are available in USACHPPM TG 220.

# **Chapter 6**

## **Education and Training**

### **6-1. The "train the trainer" concept**

Training programs should be administered in a pyramid fashion.

*a.* Ergonomics experts provide training to develop trained ergonomics personnel.

*b.* Trained ergonomics personnel then—

(1) Train others at the installation level, including supervisors and workers.

(2) May also train special assistants, who can help with recognizing risk factors for WMSDs. The special assistants may be representatives from each department or division who assist other department members in recognizing and reporting WMSDs.

### **6-2. Education requirements**

*a.* The IEO should have a minimum of 40 hours of formal ergonomics training. Formal training consists of a combination of classroom instruction, exercises, supervised worksite assessment, and individual learning assignments. At a minimum, this formal training includes—

- (1) Identification of WMSDs and risk factors.
- (2) Anthropometrics.
- (3) Biomechanics.
- (4) Workplace design.

- (5) Office ergonomics.
- (6) Manual material handling.
- (7) Lifting assessment.
- (8) Tool assessment and design.
- (9) Hazard prevention and control.
- (10) Ergonomic evaluations and surveys.
- (11) Program management and evaluation.
- (12) Field assessment exercise.

*b.* Trained ergonomics personnel should have—

- (1) A minimum of 40 hours of formal ergonomics training.
- (2) Training and experience sufficient to identify WMSDs and risk factors.

*c.* Core ergonomics subcommittee members, support and advisory ergonomics subcommittee members, and installation-level personnel providing assistance in recognizing WMSDs should have basic ergonomics training, to include elements listed in paragraph 6–3c(2), from trained ergonomics personnel.

*d.* For information on available in-depth courses, assistance should be requested through command channels to USACHPPM, ATTN: MCHB–TS–OER, 5158 Blackhawk Road, Aberdeen Proving Ground, MD 21010–5403 (<http://chppm-www.apgea.army.mil/ergopgm/ergohome.htm>). USASC also offers information and training; contact USASC, ATTN: CSSC–OP, Building 4905, 5th Avenue, Fort Rucker, AL 36362 (<http://safety.army.mil/home.html>).

### **6–3. Training requirements**

Personnel responsible for administering the installation ergonomics program should receive appropriate special training. Training is necessary for the Active Army, the Army National Guard of the United States, the U.S. Army Reserve, and civilian personnel at all levels to enable them to understand and recognize WMSD risk factors and actively participate in the ergonomics effort (USACHPPM TG 220).

*a. Personnel requiring training.*

- (1) DA personnel who are exposed to WMSD risk factors.
- (2) Supervisors (for example, line supervisors or squad leaders).
- (3) Managers (for example, program managers or unit commanders).
- (4) Health care personnel.
- (5) Childcare personnel.
- (6) Engineers and maintenance personnel.
- (7) Installation safety and occupational health personnel.

*b. Personnel who may conduct training.*

- (1) Trained ergonomics personnel.
- (2) Suitable health care personnel to conduct specific portions of training, such as those related to health risks.

*c. Curriculum considerations.* Trained ergonomics personnel should—

- (1) Present training at a level appropriate to ensure audience comprehension.
- (2) Include in the training curriculum an overview of—

- (a)* WMSD risk factors.
- (b)* The possible causes and symptoms.
- (c)* How to recognize and report symptoms.
- (d)* The means of prevention.
- (e)* The sources of treatment.

- (3) Include methods for evaluating the effectiveness of the ergonomics effort, as discussed in chapter 7.

*d. Types of training.*

(1) *General training.* Personnel who are exposed to WMSD risk factors should receive formal instruction on hazards associated with their jobs and equipment. Personnel should receive training at an initial orientation with annual refresher or information thereafter. This training should include elements listed in paragraph 6–3c(2).

(2) *Specific training.* New and reassigned military and civilian personnel who are exposed to WMSD risk factors should receive an initial orientation and hands-on training from trained ergonomics personnel and the immediate supervisor prior to being placed in a full-production position. The initial orientation should include—

- (a)* A demonstration of the proper use and care of, and the proper operating procedures for, all tools and equipment.
- (b)* Use of safety equipment.
- (c)* Use of safe and proper work procedures, such as proper lifting techniques.

(d) Procedures for making recommendations to improve work processes to decrease or eliminate ergonomic risk factors.

## **Chapter 7 Ergonomics Program Evaluation**

### **7-1. Evaluation requirements**

Both internal and external sources should evaluate each installation's ergonomics program to assess program effectiveness.

### **7-2. Internal evaluations**

The IEO ensures evaluation of the ergonomics effort regarding program participation and effectiveness. Methods of measuring both of these elements are listed below (see USACHPPM TG 220, which contains detailed information and examples of metrics for program evaluation).

#### *a. Program participation.*

- (1) Number of requests for ergonomic assistance by management occurring during a specified period.
- (2) Number of personnel suggestions related to ergonomics during a specified period.
- (3) Number of educational programs in ergonomics offered or number of personnel attending educational programs.

#### *b. Program effectiveness.*

- (1) Number of general or systematic identifications of WMSD risk factors.
- (2) Number of detailed analyses conducted (para 3-3).
- (3) Number of high priority listings relating to ergonomics based on RAC.
- (4) Changes in the incidence and severity rates of WMSD illness or injury reports filed for military and civilian personnel.
- (5) Changes in the incidence and severity rates of WMSD FECA claims or dollar amount of new FECA claims within a particular period.
- (6) Changes in the incidence and severity rates of WMSD illness or injury by department or unit.
- (7) Changes in the incidence and severity rates of days away from work, days of restricted work, or transfer to another job due to WMSD illness or injury.
- (8) Changes in the number of new job reassignments due to WMSD illness or injury.
- (9) Changes in productivity or production costs that can be attributed to ergonomic interventions. Note: In some cases, there may be an increase in illness or injury reporting at the start of an ergonomics program due to increased personnel and supervisor awareness. Although reporting may increase, the severity rate (days away from work, days of restricted work, or transfer to another job) should decrease, with more workers returning to work sooner. Eventually, the reporting rate will decrease as a well-managed, effective ergonomics program is integrated into the workplace.

### **7-3. External evaluations**

- a.* Ergonomics program personnel at USACHPPM, on request from the installation, can—
  - (1) Assist with development of an ergonomics program.
  - (2) Evaluate elements of the ergonomics program.
  - (3) Conduct installation ergonomics surveys.
- b.* Each installation should continue to use existing reporting guidelines in AR 385-40, paragraph 2-6.
- c.* Commands with trained ergonomics personnel may provide assistance visits to subordinate installations.
- d.* Installations may work with OSHA under the OSHA Strategic Partnership Program (<http://www.osha.gov/fso/vpp/partnership/index.html>) for collaborative assessment and corrective plans of ergonomic risk factors.

### **7-4. Regular evaluation and review**

- a.* The chair of the ergonomics subcommittee, or a selected representative as appropriate—
  - (1) Includes results of ergonomic assessments in the Standard Army Safety and Occupational Health Inspection (AR 385-10, para 4-1) and other required regional and local reports.
  - (2) Prepares a semiannual summary of ergonomics subcommittee activities for the local SOHAC. As a minimum, these summaries include results of passive surveillance, active surveillance, implemented controls, and effects of controls.
  - (3) Communicates the results of the program evaluation and review to top management and all workplace personnel.
  - (4) Sends a copy of this report to USACHPPM (ATTN: MCHB-TS-OER, Aberdeen Proving Ground, MD 21010-5403) and to the Office of The Surgeon General.



*b.* The program evaluation assesses the implementation, progress, and effectiveness of the installation ergonomics plan. It should include—

- (1) A progress summary or program update.
- (2) A summary of results of program participation and effectiveness measures as defined in paragraph 7–2 and external evaluations as defined in paragraph 7–3.
- (3) Plans, goals, and accomplishments for the program as a whole and for each of the critical program elements cited in paragraph 2–4a(3).
- (4) Identification of trends, deficiencies, and corrective actions needed.
- (5) New or revised program goals, priorities, and time lines.

*c.* The following information is used to develop the evaluation and review:

- (1) Analysis of trends in injury or illness rates according to—
  - (a) Health care facility sign-in logs.
  - (b) OSHA Forms 300 (or an equivalent log), 300A, and 301.
  - (c) Individual personnel medical records.
  - (d) The Defense Occupational and Environmental Health Readiness System (for example, the Defense Occupational and Environmental Health Readiness System IH Application).
- (2) Review of results of installation evaluations.
- (3) Before and after surveys or evaluations of worksite improvements.
- (4) Observation of work practices to determine the effect of training and education.
- (5) Personnel surveys or interviews conducted by department, job title, or work area to monitor trends.

## **Appendix A References**

### **Section I Required Publications**

#### **AR 40-5**

Preventive Medicine. (Cited in paras 1-1 and 5-4a.)

#### **AR 40-400**

Patient Administration. (Cited in paras 5-4a and 5-4c.)

#### **AR 385-10**

The Army Safety Program. (Cited in paras 1-1 and 7-4a(1).)

#### **AR 385-40**

Accident Reporting and Records. (Cited in paras 5-8e and 7-3b.)

#### **AR 690-800**

Insurance and Annuities. (Cited in para 5-4a.)

#### **HQDA Ltr 40-02-1**

Army Ergonomics Program. (Cited in paras 1-1, 1-4d(3), and 1-6.) (Available at [www.army.mil/usapa](http://www.army.mil/usapa).)

#### **29 CFR 1904**

Recording and reporting occupational injuries and illnesses. (Cited in paras 3-1a(2), 3-1a(3), and 3-1a(4).) (Available at [www.access.gpo.gov/nara/cfr/index.html](http://www.access.gpo.gov/nara/cfr/index.html).)

#### **29 CFR 1960.8(a)**

Agency responsibilities. (Cited in para 1-4d(1).) (Available at [www.access.gpo.gov/nara/cfr/index.html](http://www.access.gpo.gov/nara/cfr/index.html).)

#### **EO 12196**

Occupational Safety and Health Programs for Federal Employees. (Cited in para 1-4d(1).) (Available at [www.archives.gov/federal\\_register/executive\\_orders/1980.html](http://www.archives.gov/federal_register/executive_orders/1980.html).)

#### **PL 91-596**

Occupational Safety and Health Act of 1970, as amended (29 USC 651 et seq.). (Cited in para 1-4d(1).) (Available at [www.osha.gov/pls/publications/pubindex.list](http://www.osha.gov/pls/publications/pubindex.list).)

### **Section II Related Publications**

A related publication is a source of additional information. The user does not have to read it to understand this pamphlet.

#### **AR 40-10**

Health Hazard Assessment Program in Support of the Army Materiel Acquisition Decision Process.

#### **AR 385-16**

System Safety Engineering and Management.

#### **AR 602-2**

Manpower and Personnel Integration (MANPRINT) in the System Acquisition Process.

#### **DA PAM 40-503**

Industrial Hygiene Program.

#### **U.S. Army Forces Command, Directorate of Civilian Personnel and Installation Safety, 1992**

A Supervisor's Guide to the Civilian Resource Conservation Program. (Available from the Directorate of Civilian Personnel and Installation Safety, U.S. Army Forces Command, 1777 Hardee Avenue, Fort McPherson, GA 30330-6000.)

**USACHPPM TG 220 (Draft)**

Ergonomics in Action. U.S. Army Center for Health Promotion and Preventive Medicine and the U.S. Army Safety Center. (Available at [http://chppm-www.apgea.army.mil/ergopgm/drafttech\\_220/drafttech\\_220.htm](http://chppm-www.apgea.army.mil/ergopgm/drafttech_220/drafttech_220.htm).)

**DOD 1400.25-M**

Department of Defense Civilian Personnel Manual. (Available from [www.dtic.mil/whs/directives](http://www.dtic.mil/whs/directives).)

**DODI 6055.1**

DOD Safety and Occupational Health (SOH) Program. (Available from [www.dtic.mil/whs/directives](http://www.dtic.mil/whs/directives).)

**MIL-STD-1472F**

Design Criteria Standard Human Engineering. (Available at [www-library.itsi.disa.mil](http://www-library.itsi.disa.mil).)

**NIOSH 94-110**

Applications Manual for the Revised NIOSH Lifting Equation. U.S. Department of Health and Human Services (DHHS), NIOSH. 1994. (Available at [www.cdc.gov/niosh/94-110.html](http://www.cdc.gov/niosh/94-110.html).)

**NIOSH 97-117**

Elements of Ergonomics Programs, A Primer Based on Workplace Evaluations of Musculoskeletal Disorders. (Available at [www.cdc.gov/niosh/ergopage.html](http://www.cdc.gov/niosh/ergopage.html).)

**OSHA 3123**

Ergonomics Program Management Guidelines for Meatpacking Plants, U.S. Department of Labor, OSHA, 1991. (Available at [www.ergoweb.com/resources/reference/guidelines](http://www.ergoweb.com/resources/reference/guidelines).)

**Policy Memorandum, 18 May 1998**

Office of the Assistant Secretary Installations Logistics and Environment, subject: Policy Memorandum—Army Ergonomics Program. (Available at <http://chppm-www.apgea.army.mil/ergopgm/policy/policy.htm>.)

**Policy Memorandum, 4 February 1997**

Office of the Under Secretary of Defense (Environmental Security), Acquisition and Technology, subject: Policy Memorandum—Ergonomics Program Requirements. (Available at <http://chppm-www.apgea.army.mil/ergopgm/policy/policy.htm>.)

**American National Standards Institute/Human Factors Society (HFS) 100-1988**

American National Standard for Human Factors Engineering of Visual Display Terminal Workstations. (Available from Human Factors and Ergonomics Society, P.O. Box 1369, Santa Monica, CA 90406-1369.)

**American National Standards Institute Z365 Draft Ergonomics Standard, Product No. 19596-1800**

Management of Work-Related Musculoskeletal Disorders. (Available at [www.nsc.org/product/lrs/z365.cfm](http://www.nsc.org/product/lrs/z365.cfm).)

**International Organization for Standardization (ISO) 9241**

Ergonomic requirement for office work with visual display terminals (VDTs). (Available at [webstore.ansi.org/ansidocstore/find.asp](http://webstore.ansi.org/ansidocstore/find.asp).)

**Section III****Prescribed Forms**

This section contains no entries.

**Section IV****Referenced Forms**

Except where otherwise indicated below, the following forms are available on the Army Electronic Library (AEL), CD-ROM (EM 0001), and the USAPA web site ([www.usapa.army.mil](http://www.usapa.army.mil)).

**DA Form 285**

U.S. Army Accident Report

**DA Form 285-AB-R**

U.S. Army Abbreviated Ground Accident Report (AGAR)

**DOL Form CA-1**

Federal Employee's Notice of Traumatic Injury and Claim for Continuation of Pay/Compensation. (Available at [www.dol.gov/libraryforms/index.asp](http://www.dol.gov/libraryforms/index.asp).)

**DOL Form CA-2**

Notice of Occupational Disease and Claim for Compensation. (Available at [www.dol.gov/libraryforms/index.asp](http://www.dol.gov/libraryforms/index.asp).)

**DOL Form CA-2a**

Notice of Recurrence. (Available at [www.dol.gov/libraryforms/index.asp](http://www.dol.gov/libraryforms/index.asp).)

**DOL Form CA-16**

Authorization for Examination And/Or Treatment. (Available from any Injury Compensation Program administrator.)

**DOL Form CA-17**

Duty Status Report. (Available at [www.dol.gov/libraryforms/index.asp](http://www.dol.gov/libraryforms/index.asp).)

**OSHA Form 300**

Log of Work-Related Injuries and Illnesses. (Available at [www.osha.gov/pls/publications/pubindex.list](http://www.osha.gov/pls/publications/pubindex.list).)

**OSHA Form 300A**

Summary of Work-Related Injuries and Illnesses. (Available at [www.osha.gov/pls/publications/pubindex.list](http://www.osha.gov/pls/publications/pubindex.list).)

**OSHA Form 301**

Injury and Illness Incident Report. (Available at [www.osha.gov/pls/publications/pubindex.list](http://www.osha.gov/pls/publications/pubindex.list).)

**SF 600**

Medical Record—Chronological Record of Medical Care. (Available at <http://contacts.gsa.gov/webforms.nsf>.)

## **Appendix B Recommended Membership of the Ergonomics Subcommittee**

### **B-1. Chairperson**

The IEO—

- a. Serves as chairperson of the ergonomics subcommittee.
- b. *Should be the individual with the most experience, knowledge, and training in ergonomics*—the chief, preventive medicine; occupational health physician; flight surgeon; industrial hygienist; occupational health nurse; occupational therapist; physical therapist; other health care professional; or safety manager—who has received at least 40 hours of formal training in ergonomics (para 6-2a).

### **B-2. Membership**

The ergonomics subcommittee should include, but need not be limited to, the following representatives:

- a. *Core membership.*
  - (1) Health care activity representative (for example, physician, nurse, occupational and physical therapists, physician assistant, and other trained medical personnel).
  - (2) Industrial hygienist.
  - (3) Safety professional.
  - (4) Tenant activity representative.
  - (5) Key military chain of command representatives.
  - (6) Union representative(s).
  - (7) Human resources representative.
  - (8) FECA administrator.
- b. *Support and advisory membership.*
  - (1) Director of Contracting Support (or equivalent) representative.
  - (2) Director of Public Works (or equivalent) representative.
  - (3) Director of Logistics (or equivalent) representative.
  - (4) Director of Information Management (or equivalent) representative.

**B-3. Training**

All subcommittee members should receive appropriate ergonomics training as discussed in chapter 6.

## **Glossary**

### **Section I**

#### **Abbreviations**

##### **AR**

Army regulation

##### **CFR**

Code of Federal Regulations

##### **DA**

Department of the Army

##### **DOD**

Department of Defense

##### **DODI**

Department of Defense Instruction

##### **EO**

Executive Order

##### **MTF**

military treatment facility

##### **PL**

Public Law

##### **SF**

Standard Form

##### **USASC**

U.S. Army Safety Center

##### **USC**

United States Code

### **Section II**

#### **Terms**

##### **Anthropometry**

The study of the physical dimensions of people, including size, breadth, girth, distance between anatomical points, and joint range of motion. This information is used in the design and analysis of workspaces, tools, and equipment.

##### **Cumulative trauma disorders (CTDs)**

Disorders of the musculoskeletal or nervous system that are the result of, or contributed to by, the biomechanical risk factors listed in paragraph 1–4c. CTDs are a class of musculoskeletal disorders involving damage to the tendons, tendon sheaths, synovial lubrication of the tendon sheaths, and the related bones, muscles, and nerves. Synonymous terms include WMSD, repetitive motion injury, occupational overuse syndrome, and repetitive strain injury.

##### **Equivalent civilian training**

A minimum of 40 hours training covering WMSDs; workstation and job design; hand-tool design; current regulatory requirements and issues; analysis and design of manual materials handling tasks; analysis and design of the office environment; and conducting, analyzing, documenting, and presenting an ergonomic worksite evaluation, including hands-on experience.

##### **Ergonomics**

A body of knowledge about human abilities, human limitations, and other human characteristics that are relevant to the

design of tools, machines, systems, tasks, jobs, and environments for safe, comfortable, and effective human use. The aim of the discipline is to fit the job to the person in order to—

- a. Prevent the development of occupational injury or illness.
- b. Reduce the potential for fatigue, error, or unsafe acts.
- c. Increase effective, efficient work.

### **Ergonomics expert**

An individual who—

- a. Possesses a recognized degree or professional credentials in ergonomics or human factors engineering (typically a master's or doctorate degree).
- b. Demonstrates the ability to identify and correct WMSDs in the workplace.
- c. Teaches the 40-hour ergonomics course for trained ergonomics personnel.
- d. Provides consultation only in cases in which trained ergonomics personnel are unable to solve identified problems. In most cases, an ergonomics expert will not be available at each installation.

### **Ergonomics team**

Those responsible for identifying and correcting occupational hazards in the workplace, including trained ergonomics personnel, health care providers, industrial hygienists, safety personnel, engineers, and other support personnel, managers, and supervisors.

### **Health care personnel**

Physicians, chiropractic physicians, nurses, occupational therapists, physical therapists, physician assistants, and other health care professionals and their related, supervised technicians (for example, certified occupational therapy assistants and licensed practical nurses). Health care personnel participating in the ergonomics program should have training in basic ergonomics and epidemiology and be up-to-date in the systematic recognition, evaluation, treatment, and rehabilitation of WMSDs.

### **Microtrauma**

A series of minor stresses to the body, each of which alone does not cause discernible damage; however, their accumulation over time can lead to WMSDs. These disorders (injuries or syndromes) are also known as CTDs, overuse disorders, repetitive motion injuries, repetitive strain injuries, and occupational motion-related injuries.

### **Multiple causation**

The combined effect of several risk factors in one job, operation, or workstation that may increase the possibility of WMSDs.

### **Occupational hazards**

Workplace conditions that may harm the worker: improperly designed workstations; tools and equipment; improper work methods; and excessive tool or equipment vibration. Other examples include aspects of work flow, line speed, posture, force required, work and rest regimens, and repetition rates.

### **Occupational illness and injury**

To be recorded as an occupational illness or injury, the condition must be diagnosed by a physician or other person who, by training or experience, is capable of making such a determination (such as an occupational therapist, physical therapist, physician assistant, registered nurse, or nurse practitioner). Note that DOL requires physician diagnosis for FECA claim submission. In order to be classified as an occupational injury or illness for FECA purposes, the condition must be accepted by DOL as causally related to work. To be classified as an occupational illness or injury, the condition must meet the following criteria:

- a. Either physical findings or subjective symptoms must exist, that is, at least one physical finding (for example, positive Tinel's, Phalen's, or Finkelstein's test; swelling, redness, or deformity; or loss of motion or strength) or at least one subjective symptom (for example, pain, numbness, tingling, aching, stiffness, or burning).
- b. At least one of the following response actions must occur: medical treatment (including self-administered treatment if made available to personnel by their employer), lost or restricted work activity, or transfer or rotation to another job.
- c. WMSDs must be associated with repeated trauma, and exposure at work must have caused or contributed to the onset of symptoms or aggravated existing symptoms.

### **Pinch grip**

A grip that involves one or more fingers and the thumb.

**Sentinel event**

When one individual in a group of workers who are performing similar job functions demonstrates adverse effects from exposure to WMSD risk factors, that individual may be considered to be the most susceptible worker in the group. The occurrence of an injury or illness in that individual has been identified as a sentinel event, with the scientific concern that other individuals in the group will soon demonstrate adverse effects from the same, unmitigated risk factor exposure.

**Trained ergonomics personnel**

Health care, industrial hygiene, environmental science, safety, or engineering personnel with approved training in ergonomics. Minimum acceptable training for installation-level trained ergonomics personnel is the basic 40-hour ergonomics course offered by USACHPPM or equivalent civilian training.

**Working community**

All members of the work environment, at all levels of authority. It consists of major command commanders, installation commanders, medical commanders, the designated IEO, identified ergonomics personnel, health care personnel, safety personnel, human resources personnel, contracting support personnel, public works personnel, logistics personnel, union representatives, tenant activities representatives, unit commanders, supervisors, and active-duty military and civilian personnel. For the program to be successful, all members of the working community must be considered equal and must share the commitment to ergonomics.

**Work-related musculoskeletal disorders (WMSDs)**

The range of health problems arising from repeated stress to the body encountered in the workplace. These health problems may also affect the nervous, neuromuscular and neurovascular systems. WMSDs may include the various occupationally induced cumulative trauma injuries and repetitive motion disorders involving damage to tendons, tendon sheaths, synovial lubrication of the tendon sheaths, bones, muscles, and nerves of the hands, wrists, elbows, shoulders, neck, back, and legs. Some WMSDs that are reported include chronic back pain, carpal tunnel syndrome, DeQuervains disease, epicondylitis (tennis elbow), Raynaud's syndrome (white finger), synovitis, tenosynovitis, stenosing tenosynovitis crepitans (trigger finger), and tendinitis.

**Worksite**

A work area or work environment.

**Workstation**

An individual person's work area, such as a desk, chair, and computer terminal or an individual inspection station.

**Section III****Special Abbreviations and Terms**

This publication uses the following abbreviations, brevity codes, and acronyms not contained in AR 310-50. These include use for ergonomic programs, workplace injuries, and other health-related activities.

**CTD**

cumulative trauma disorder

**DOL**

U.S. Department of Labor

**FECA**

Federal Employee Compensation Act

**HQDA Ltr**

Headquarters, Department of the Army Letter

**IEO**

installation ergonomics officer

**IH**

industrial hygiene

**NIOSH**

National Institute for Occupational Safety and Health



**OSH**

occupational safety and health

**OSHA**

Occupational Safety and Health Administration

**PPE**

personal protective equipment

**RAC**

risk assessment code

**SOHAC**

Safety and Occupational Health Advisory Council

**TG**

Technical Guide

**USACHPPM**

U.S. Army Center for Health Promotion and Preventive Medicine

**WMSD**

work-related musculoskeletal disorder(s)

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