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	<p>Safety and Occupational Health USACE ERGONOMICS PROGRAM PROCEDURES</p>	
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Safety and Occupational Health
USACE ERGONOMICS PROGRAM PROCEDURES

1. Purpose. This Engineer Pamphlet (EP) provides a framework for developing a local ergonomics program in accordance with ER 385-1-96, as part of the command's overall safety and occupational health program. The primary focus is the prevention and management of work-related musculoskeletal injuries and illnesses both to USACE employees and to others based on our designs.
2. Applicability. This pamphlet applies to all USACE Commands and their employees.
3. Distribution. Approved for public release; distribution is unlimited.
4. References. References are included in Appendix A.
5. Discussion. Ergonomic work-related musculoskeletal disorders account for approximately 50% of the civilian workers' compensation claims and costs in FY 99. Even more significantly, the failure to address ergonomic design issues increases production and task accomplishment time, increases costs and reduces responsiveness.

FOR THE COMMANDER:



RUSSELL L. FUHRMAN
Major General, USA
Chief of Staff

CESO-I

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Safety and Occupational Health
USACE ERGONOMICS PROGRAM PROCEDURES

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CHAPTER 1

Introduction

1-1. Purpose. This pamphlet provides guidance for establishing an ergonomics program, required by DoD and DA (see references), as an integral part of each District, Center and FOA Safety and Occupational Health (SOH) Program. The term USACE Command (common term used to describe USACE Division, District, Laboratory and FOA) will hereafter be referred to as Command.

1-2. Applicability. This pamphlet applies to HQUSACE elements, major subordinate commands, districts, laboratories, and field operating activities hereafter referred to as USACE commands. Contractor ergonomics requirements are not included in this EP but are addressed by the provisions of EM 385-1-1, Section 06.K.

1-3. Distribution Statement. Approved for public release, distribution is unlimited.

1-4. References. Reference are listed in Appendix A.

1-5. Explanation of abbreviations and terms. Abbreviations and terms used in this pamphlet are explained in the glossary.

1-6. Background.

a. An effective ergonomics program can:

(1) Prevent workplace injuries.

(2) Reduce medical and associated costs of work-related musculoskeletal disorders (WMSDs) (see glossary).

(3) Preserve readiness in USACE missions and personnel.

b. Ergonomics programs are regulated by:

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

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(2) Department of Defense Instruction (DODI), 6055.1, DOD Occupational Safety and Health Program.

(3) Deputy Under Secretary of Defense for Environmental Security (DUSD(ES) program policy memorandum dated 4 February 1997, Subject: Ergonomics Program Requirements.

(4) Deputy Assistant Secretary of the Army (Environment, Safety and Occupational Health) OASA(IL&E) memorandum dated 18 May 1998, Subject: Policy Memorandum – Army Ergonomics Program.

(5) Army Surgeon General memorandum dated 31 August 1998, Subject: Army Ergonomics Program Policy Memorandum.

(6) Director Army Safety memorandum dated 6 October 1998, Subject: Army Safety and the Army Ergonomics Program.

(7) Change 1 to AR 40-5, Preventive Medicine, Section VII, Ergonomics Program.

(8) DA PAM 40-ERG, Ergonomics Program.

(9) EM 385-1-1, USACE Safety and Health Requirements Manual, Section 06.K.

1-7. Scope. This pamphlet applies to USACE employees and USACE owned and operated facilities and includes; command leadership and programmatic responsibility, program plan, work-site analysis, hazard prevention and control, occupational health medical management, education and training and program evaluation.

1-8. Responsibilities and Procedures. In addition to the general responsibilities for implementing the Command's SOH program, as required by AR 385-10 and AR 40-5, the specific responsibilities and procedures required to implement the ergonomics program are prescribed in ER 385-1-96. Recommended membership for the Ergonomics Subcommittee is at Appendix B.

1-9. Technical assistance. Technical assistance may be requested through command channels to HQUSACE, Chief, SOHO, ATTN: CESO-I and to Commander, U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), ATTN: MCHB-DC-OER, Aberdeen Proving Ground, MD 21010-5422, telephone DSN 584- 3928, commercial 1-410-671-3928, or 1-800-222-9698.

CHAPTER 2

The Ergonomics Program Component

2-1. Goals.

a. The goals of the ergonomics program are to:

(1) Prevent injuries and illness by eliminating or reducing worker exposure to WMSD risk factors.

(2) Reduce the potential for fatigue, error, and unsafe acts by adapting the job and workplace to the worker's capabilities and limitations.

(3) Increase the overall productivity of the work force.

(4) Reduce workers' compensation claims and associated costs.

(5) Improve overall readiness.

b. An emphasis on early identification and prevention of WMSDs will preserve and protect USACE military and civilian work force while decreasing related costs.

2-2. Organizational involvement. A collaborative partnership among all levels of the command is essential in achieving the goals of the ergonomics program. Command emphasis, commitment by management, and demonstrated visible involvement are imperative to provide the organizational resources and motivation needed to implement a sound ergonomics policy. All levels of personnel (managers, supervisors, employees and employee union representatives) are responsible for injury prevention and the identification and resolution of WMSDs.

2-3. Effects of work-related musculoskeletal disorders.

a. Health effects. Repeated biomechanical stress and microtrauma (see glossary) 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:

(1) Tendinitis.

(2) Tenosynovitis.

- (3) Bursitis.
- (4) Chronic muscle strain.
- (5) Nerve entrapment syndromes (for example, carpal tunnel syndrome).

b. Economic effects. The expense associated with a poorly designed workplace is considerable and includes both direct and indirect costs.

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

(2) Indirect costs include lost work time, decreased productivity, decreased work quality, retraining costs, and diminished morale.

2-4. Occupational risk factors.

a. Research identifies the following as specific workplace conditions that can contribute to the development of WMSDs:

- (1) Repetitive motions (especially during prolonged activities).
- (2) Sustained or awkward postures.
- (3) Excessive bending or twisting of the wrist.
- (4) Continued elbow or shoulder elevation (for example, overhead work).
- (5) Forceful exertions (especially in an awkward posture).
- (6) Excessive use of small muscle groups (for example, pinch grip).
- (7) Acceleration and velocity of dynamic motions.
- (8) Vibration.
- (9) Mechanical compression.
- (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.

b. The combined effect of several risk factors in one job or workstation may lead to a higher probability of causing a WMSD.

CHAPTER 3

Command Ergonomics Written Plan

3-1. Focus. The command ergonomics plan shall focus 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 2-4.

3-2. Practical effects. Implementing a command 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.

3-3. Development and approval.

a. The EPC, the Chief, SOHO, and the ergonomics subcommittee shall develop, document, and maintain the installation ergonomics plan. They may:

(1) Solicit input to the plan from a broad cross-section of the command.

(2) If needed, request technical assistance on plan development from HQUSACE and USACHPPM (paragraph 1-7).

b. In coordination with the Chief, SOHO, the command SOH advisory council recommends the command ergonomics plan to the commander for approval and communicates the plan to all managers, supervisors, and workplace personnel.

3-4. Outline.

a. The command ergonomics plan should reflect the traditional and unique needs and requirements of the command. At a minimum, the ergonomics plan should contain the items listed below. The EPC and the ergonomics subcommittee may use the structure and content provided in this pamphlet in developing a command ergonomics plan. The command plan shall address each of the items listed below.

(1) Program goals, objectives and Commander emphasis.

(2) Program interface with existing programs.

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

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- (a) Worksite analysis (Chapter 4).
- (b) Hazard prevention and control (Chapter 5).
- (c) Occupational health medical management (Chapter 6).
- (d) Education and training (Chapter 7).
- (e) Ergonomics program evaluation (Chapter 8).

b. The first two items will always be fully addressed in the command plan. The extent of involvement of the five critical program elements in paragraph 3-4.a.(3) will vary according to the hazards and concerns at each command; however, some degree of activity in each of the five critical program elements is required for an effective program.

CHAPTER 4

Worksite Analysis

4-1. 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 intervention priorities, and organize the ergonomics effort. The office responsible for maintaining the records, logs, or reports will perform the systematic passive surveillance and communicate the results to the EPC and the ergonomics subcommittee. Sources of data include:

- (1) Routine injury and illness reports.
- (2) OSHA Log 200, Log of Federal Occupational Injuries and Illnesses or equivalent.
- (3) FECA claims to include monthly new-case-create and quarterly chargeback reports.
- (4) ENG Form 3394, Accident Investigation Report and local accident report processes, forms and systems.
- (5) Safety, industrial hygiene and occupational health surveys and records.
- (6) Work force reports (including civilian and active-duty personnel and continuation-of-pay reports of lost duty time as a result of injury or illness).
- (7) Employee suggestions.

b. Systematic active surveillance. This procedure involves focused and active efforts to gather information about WMSD hazards at worksites and to identify workers at risk of developing a cumulative trauma disorder (CTD) (see glossary). Trained ergonomics personnel (see glossary) will perform active surveillance in conjunction with safety and/or IH 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 (see USACHPPM Technical Guide (TG) 220 <http://chppm-www.apgea.army.mil/ergopgm>). 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 safety and/or IH surveys can identify WMSD hazards (see 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) Activity or position (job) hazard analysis. Corps-wide method, described in EM 385-1-1, to identify the steps of a particular activity or employee's job, determine the hazards associated with the performance of those steps, and finally, recommend controls or changes to eliminate or reduce the risks during the activity or job task execution. This method shall be used in conjunction with the other procedures identified in this chapter.

(d) 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. Use a specific reporting procedure to facilitate reports.

(e) Case referrals. Use case referrals to identify a work area with potential WMSD risk factors. For example, a lock and dam mechanic 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 (see USACHPPM TG 220) in conjunction with an activity or position (job) hazard analysis. Trained ergonomics personnel will perform systematic active surveillance at all worksites at least once per year. Also, trained ergonomics personnel will 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 the solution immediately. Chapter 5 provides information on hazard prevention and control. More complex problems will require prioritization and detailed analysis.

(4) If a worksite or job is identified as high risk, special medical surveillance may be indicated. Chapter 6 provides information on occupational health medical management.

4-2. Prioritization. The ergonomics subcommittee or the appropriate subcommittee member (for example, safety, IH, collateral duty project safety officer, etc.) will prioritize worksites for detailed analysis based on the passive and active surveillance information. The prioritization may be based on incidence rates (see glossary), the number of workers affected, direct costs, lost work time, or severity of cases. Calculate incidence and prevalence rate by unit, work section, or job series to identify high-risk areas. Use FECA claims information or local accident/incident reporting procedures to identify high-cost injuries and high-risk work areas.

4-3. 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 that include factors such as: age, gender, work task, and time of injury.
- (3) Identify the work tasks or portions of the process that contain risk factors using the activity and position (job) hazard analysis process included in EM 385-1-1.
- (4) Identify both problems and solutions.

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

- (1) Incidence rates, OSHA Log 200, Log of Federal Occupational Injuries and Illnesses or equivalent, accident and injury reports, and lost work time or absenteeism reports by job, unit, department, or facility.
- (2) Checklists, questionnaires, and interviews (see USACHPPM TG 220).
- (3) Direct observation, videotape analysis, and job analyses (see USACHPPM TG 220).
- (4) Tests, such as:
 - (a) Revised National Institute for Occupational Safety and Health (NIOSH) Equation for the Design and Evaluation of Manual Lifting Tasks.

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- (b) Static and dynamic strength testing.
- (c) Timed activity analysis.
- (d) Biomechanical analysis.
- (e) Cardiovascular measurements.

CHAPTER 5

Hazard Prevention and Control

5-1. Intervention hierarchy. The primary method of preventing and controlling exposure to WMSD hazards is through effective design (or redesign) of a job or worksite. Paragraphs 5-2 through 5-7 define intervention methods in order of priority.

5-2. Process elimination. Elimination of the demanding process essentially eradicates the WMSD hazard. For example, eliminate the use of the hand-held bar code scanner for logistics/inventory management personnel by providing an automatic bar code scanner.

5-3. 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, provide a video display terminal workstation that can be adjusted to a wide range of anthropometric dimensions (see glossary).

5-4. 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, replace hand tools that require awkward wrist positions (extreme wrist flexion, extension, or deviation) with tools that allow a neutral wrist posture.

5-5. 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 occupational health personnel should

identify those jobs that require a break-in period. Occupational health personnel should evaluate those personnel returning from an occupational illness or accident-related absence in accordance with 5 CFR Part 339 and define the break-in period (For example, an employee returning to work from an WMSD).

c. Regular monitoring of operations helps to ensure proper work practices and to confirm that the work practices do not contribute to cumulative trauma injury 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.

5-6. 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. Decreasing production rate requirements and limiting overtime work to reduce the number of repetitions.

b. 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).

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. Do not use job rotation in response to symptoms of cumulative trauma. This can contribute to symptom development in all personnel involved in the rotation schedule rather than preventing problems. Trained ergonomics and occupational health 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, assisting in the healing process. Make every effort to provide modified- or restricted-duty assignments when physical limitations (as identified by occupational health personnel) 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) An occupational health medical provider should specifically identify assignments or job tasks for the individual worker based on his or her symptoms, capabilities, and limitations.

(2) Occupational health medical 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) HRO representatives and supervisors, in conjunction with occupational health 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.

5-7. 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. Medical appliances, such as wrist rests, back belts, back braces, etc., are not considered PPE. The Office of The Surgeon General (OTSG) does not support the use of back belts as a back injury preventive measure. Anti-vibration 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 Army and manufacturers' 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.

CHAPTER 6

Occupational Health Medical Management

6-1. Written protocol. Occupational health personnel will develop a written protocol for the early recognition, evaluation, treatment, and follow-up of WMSDs. This chapter provides the structure and much of the content of this protocol. The protocol includes communication with supervisors and employees to identify worksite problems and implement recommendations. Occupational health professionals should tailor the protocol to the command and provide it to the ergonomics subcommittee for review.

6-2. Early evaluation of employees with symptoms. Early recognition and medical management of WMSDs are critical to reduce the impact of injury on both employees and the command.

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, visual fatigue, and increased errors.

b. Employees with symptoms of WMSDs should report through the Command's SOHO to the command occupational health medical provider for an evaluation. Employees with such symptoms have the option to select their own medical provider.

(1) Active-duty soldiers should report to their primary care provider.

(2) Civilian employees will report to the command's SOHO with the appropriate completed and authorized forms: Department of Labor (DOL) Form CA-2 (Notice of Occupational Disease and Claim for Compensation) for all WMSDs except 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).

c. Supervisors should ensure that employees with WMSD symptoms report for a medical evaluation in a timely manner.

d. Supervisors may not place disincentives as an impediment to employees reporting WMSDs.

6-3. Medical evaluation. The initial medical evaluation of an employee 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. (see USACHPPM TG 220). Occupational health medical personnel, within their approved scope of practice, will:

a. Complete a medical and occupational history that includes:

- (1) 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) Lost time or limited duty due to symptoms.
- (6) Prior evaluation, diagnosis, and treatment of symptoms.
- (7) Other existing medical conditions and history of trauma and surgery.
- (8) Activities and hobbies outside of work.
- (9) Current medications.

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) Evaluation for pain and tenderness.

(6) 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.

6-4. Treatment. Treatment and rehabilitation associated with a work-related WMSD will only be provided to the civilian employee by private health care providers through the FECA in accordance with 20 CFR Part 10.

a. Command management and supervisors will encourage civilian employees with a suspected WMSD to seek evaluation through the command occupational health medical provider where possible, according to AR 690-800, chapter 810, subchapter 6.

b. USACE active duty military personnel with a suspected WMSD will be seen in an Army MTF or other approved source in conformance with Army regulations.

6-5. Modified or restricted duty. Occupational health medical personnel will coordinate with command, Chief, SOHO, the medical surveillance manager (normally performed in the command SOHO), the servicing HRO and trained ergonomics personnel to recommend duty assignments that will not aggravate an employee's condition, as discussed in paragraph 5-6.f.

6-6. Follow-up. Health care and workers' compensation personnel and HRO personnel will perform regular follow-up for employees being treated for WMSDs to monitor the efficacy of therapy, worksite intervention and employability duty status issues.

6-7. Medical surveillance.

a. Work-related musculoskeletal disorders do not require a general screening medical surveillance program. Instead, use the methods of problem identification as described in chapter 4. Occupational health personnel, in cooperation with members of the ergonomics subcommittee, will:

(1) Conduct periodic, systematic worksite walk-through surveys to remain knowledgeable about operations and work practices. The ergonomics subcommittee shall determine the frequency of occupational health personnel walk-through surveys. A minimum of once every other year is recommended for the first 4 years upon initiation of the program with a reduced or increased schedule based on needs determined by the ergonomics subcommittee. This survey can be accomplished as part of other required surveys contained in this EP.

(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 follow-up.

b. Special medical surveillance may be indicated for:

(1) Specific jobs where a high incidence of WMSDs has been demonstrated.

(2) Specific jobs that have been identified as high risk based on systematic active surveillance and detailed analysis as discussed in chapter 4.

c. Maintain baseline and periodic health assessment results in employee medical folder records in accordance with 5 CFR Parts 293 and 339. Pay attention to any changes that could indicate a WMSD.

6-8. **Reporting.** Department of Labor (DOL) workers' compensation forms (CA Forms) are used to record civilian employee claims for illness and injury benefits associated with WMSDs. In accordance with local USACE command policy, those forms may be issued by either supervisor, occupational health nurse or FECA administrator. Completion of accident and illness reporting shall be in accordance with AR 385-40, Accident Reporting and Records and USACE Supplement 1 to AR 385-40. A ready reference for guidance in completion of DOL CA Forms below is the Department of Defense (DoD Directive 1400.25M, Subchapter 810, Injury Compensation (<http://www.cpms.osd.mil/cpm/docs/810.pdf>)). Safety, industrial hygiene, and occupational health personnel will use the completed forms to document WMSDs and perform passive surveillance. These findings will be reported to the ergonomics subcommittee. Forms are available from the command SOHO.

a. OSHA Log 200, Log of Federal Occupational Injuries and Illnesses or equivalent.

(Link, OSHA Log 200) <http://www.osha-slc.gov/OshDoc/Additional.html>

b. DOL Forms CA-1, Federal Notice of Traumatic Injury and Claim for Continuation of Pay/Compensation. A CA-1 is applicable only to certain specific categories of WMSD related back injuries incurred as a result of a specific event, incident or series of events or incidents within a single day or work shift.

c. DOL Form CA-2, Notice of Occupational Disease and Claim for Compensation. A CA-2 is applicable for most WMSDs including some categories of back injuries incurred as a result of exposures in the work environment over a period longer than 1 work day or shift.

d. DOL Form CA-16, Authorization for Examination And/Or Treatment. A CA-16 authorizes an injured employee (CA-1) to obtain examination and/or treatment for up to 60 days and provides OWCP with initial medical report. It may also be used for illness or disease (CA-2) if prior approval is obtained from OWCP.

e. DOL Form CA-17, Duty Status Report (In traumatic injury cases, provides supervisor and OWCP with interim medical report containing information about employee's ability to return to any form of work).

The link for DOL Forms is <http://www.dol.gov/dol/esa/public/regs/compliance/owcp/forms.htm> .

f. Standard Form 600, Chronological Record of Medical Care (in the medical record).

(Obtain SF 600 in Form Flow)

g. DA Form 3075 (Occupational Health Daily Log).

h. ENG Form 3394 is for reporting civilian employee, military employee and contractor accidents and incidents of illness. (Link, ENG Form 3394)<http://www.usace.army.mil/inet/usace-docs/forms/formslib-flow/>

6-9. Worksite evaluation referrals.

a. Occupational health personnel who are assessing or providing management oversight of the private treatment of an employee with a suspected WMSD will request a worksite evaluation for the employee through the command HRO. Trained ergonomics personnel, together with occupational health, safety and industrial hygiene personnel, should conduct the worksite evaluation.

b. Flow diagrams depicting the handling of traumatic injury and occupational disease and illness are available (see USACHPPM TG 220).

CHAPTER 7

Training

7-1. The "train the trainer" concept. Administer training programs in a pyramid fashion.

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

b. Trained ergonomics personnel:

(1) Then train others at the Command level, including supervisors and workers.

(2) May also train special assistants, who can help with recognizing WMSDs. The special assistants may be representatives from each division, branch, section, etc. who assist other employees in their organizational unit in recognizing and reporting WMSDs.

7-2. Requirements for trained ergonomics personnel.

a. Trained ergonomics personnel (see glossary) to include the EPC, alternate EPC and other personnel with designated major command-wide ergonomic program responsibilities will have:

(1) A minimum of 40 hours of formal ergonomics training. Minimum acceptable training for local command-level trained ergonomics personnel is the basic 40-hour ergonomics course offered by USACHPPM or equivalent civilian training. Formal training is classroom instruction, exercises, supervised worksite assessment, and individual learning assignments.

(2) Training and experience sufficient to identify WMSDs and risk factors.

b. Employees that are designated as collateral duty safety officers and employees that perform a collateral duty safety officer function without official designation, will have:

(1) A minimum of 8 hours of formal ergonomics training (can be provided by the EPC, alternate EPC, formal course by the USACHPPM, or other training determined acceptable by the EPC).

(2) Training and experience sufficient to identify WMSDs and risk factors.

c. Civil Works Project Managers will complete formal ergonomics training. The local command EPC shall determine the appropriate length of such training. For some civil works

operating project locations, less than 8 hours would be appropriate. However, at more complex high hazard locations, 8 hours or more may be appropriate.

d. Core ergonomics subcommittee members, support and advisory ergonomics subcommittee members, and personnel providing assistance in recognizing WMSDs will have basic ergonomics training, to include elements listed in paragraph 7-3c(2), from trained ergonomics personnel.

e. For information on available in-depth courses, request assistance through command channels to the Commander, USACHPPM, ATTN: MCHB-DC-OER, Aberdeen Proving Ground, MD 21010-5422. The U.S. Army Safety Center (USASC) also offers information and training. To request assistance from USASC, contact Commander, USASC, ATTN: CSSC-PT, Building 4905, 2901 5th Avenue, Fort Rucker, AL 36362-5363.

7-3. Requirements for other command personnel. Personnel responsible for administering the command ergonomics program will receive appropriate special training. Training is necessary for all levels of civilian employees to enable them to understand and recognize potential WMSDs and actively participate in the ergonomics effort (see USACHPPM TG 220).

a. Personnel requiring training:

- (1) All employees who are potentially exposed to WMSDs.
- (2) Supervisors.
- (3) Managers.
- (4) Facility operations and maintenance personnel.
- (5) Safety, industrial hygiene, occupational health and FECA administrator personnel.

b. Personnel who may conduct training.

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

c. Curriculum considerations. Trained ergonomics personnel will:

(1) Present training at a level appropriate to ensure audience comprehension.

(2) Include in the training curriculum an overview of:

(a) The potential risk of WMSDs.

(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 8.

d. Types of training:

(1) General training. Personnel who are potentially exposed to WMSDs will receive instruction on hazards associated with their jobs and equipment. Personnel will receive training at an initial orientation and annually thereafter. This training will include elements listed in paragraph 7-3c(2). This training shall be documented by trained ergonomics personnel. The documentation shall include the signature of individual trained, signature of the trainer (and the trained ergonomic person if not the trainer), date training completed, summary of training elements provided. This record shall be in hard copy or automated file in accordance with the command's training record maintenance procedures. The record should be readily retrievable to the employee upon request. A training schedule shall be developed by the ergonomics subcommittee to employees exposed to WMSDs receive the required training as soon upon command implementation of the ergonomics program.

(2) Specific training. New and reassigned employees who will be exposed to ergonomic hazards during the performance of work tasks that can lead to WMSDs will receive an initial orientation and hands-on training from trained ergonomics personnel and the immediate supervisor prior to performing such tasks. The initial orientation will include:

(a) A demonstration of the proper use and care of, and the proper operating procedures for, all tools and equipment.

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- (b) Use of safety equipment.
- (c) Use of safe and proper work procedures, such as proper lifting techniques.

CHAPTER 8

Ergonomics Program Evaluation

8-1. Evaluation requirements. Both external and internal sources will evaluate each command's ergonomics program to assess program effectiveness.

8-2. External evaluations.

a. Authorized Occupational Safety and Health Administration (OSHA) inspections as described in 29 CFR Part 1960, DODI 6055.1 and AR 385-10.

b. Safety and occupational health personnel of a higher level USACE Command and/or ergonomics program personnel from the USACHPPM, on request from the higher level USACE Command, may:

- (1) Conduct command ergonomics surveys.
- (2) Evaluate elements of the command ergonomics program.
- (3) Assist with ergonomics program development and implementation.
- (4) Conduct technical assistance visits.

c. Each command will continue to use existing reporting guidelines in AR 385-40 and USACE supplement to AR 385-40.

8-3. Internal evaluations. The EPC, in coordination with the Chief, SOHO, shall ensure evaluation of the ergonomics effort regarding program participation and effectiveness. Methods of measuring both of these elements include:

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 potential WMSDs.

(2) Number of detailed analyses conducted (paragraph 4-3).

(3) Number of high priority listings relating to ergonomics.

(4) Change in the incidence rate (see glossary) of ergonomically related FECA claims or dollar amount of new FECA claims within a particular period.

(5) Change in the incidence rate of ergonomically related illness or injury reports filed for civilian employees.

(6) Change in the incidence rate of ergonomically related illness or injury by division, branch or section.

(7) Change in the incidence rate of lost- or restricted-duty time due to ergonomically related illness or injury.

(8) Change in the number of new job reassignments due to ergonomically related illness or injury.

(9) Change 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. This reporting rate will decrease as a well-managed, effective ergonomics program is integrated into the workplace.)

8-4. Regular evaluation and review.

a. The EPC and the ergonomics subcommittee shall:

(1) Conduct at least a semi-annual program evaluation and review.

(2) Present the results of this evaluation and review to the command SOH advisory council.

(3) Communicate the results of the program evaluation and review to top management and all workplace personnel.

b. The program evaluation assesses the implementation, progress, and effectiveness of the command ergonomics plan. It should include:

(1) A summary progress report or program update.

(2) A summary of results of external evaluations as defined in paragraph 8-2 and program participation and effectiveness measures as defined in paragraph 8-3.

(3) Plans, goals, and accomplishments for the program as a whole and by the critical program elements cited in paragraph 3-4a(3).

(4) Identification of trends, deficiencies, and corrective actions needed.

(5) New or revised program goals, priorities, and time lines.

c. Use the following information to develop the evaluation and review.

(1) Analysis of trends in injury or illness rates according to:

(a) Occupational health medical provider facility or health unit sign-in logs.

(b) OSHA Log 200, Log of Federal Occupational Injuries and Illnesses, or equivalent.

(c) Individual personnel medical records.

(2) Review of results of command 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

PL 91-596

Occupational Safety and Health Act of 1970, as amended (29 USC 651, et seq.

5 CFR Part 339

Medical Determinations Related to Employability

29 CFR Part 1960

Federal Agency Safety and Occupational Health Program

EO 12196

Occupational Safety and Health Programs for Federal Employees

DODI 6055.1

DOD Occupational Safety and Health Program

Deputy Under Secretary of Defense for Environmental Security (DUDS(ES) memorandum dated 4 February 1997, Subject: Ergonomic Program Requirements

AR 40-3

Medical, Dental, and Veterinary Care

AR 40-5

Preventive Medicine

AR 40-10

Health Hazard Assessment Program

AR 385-10

The Army Safety Program.

AR 385-40

Accident Reporting and Records

AR 690-800

Insurance and Annuities

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Engineer Regulation (ER) 385-1-96, USACE Ergonomics Program Policy

Engineer Manual (EM) 385-1-1, USACE Safety and Health Requirements Manual

Deputy Assistant Secretary of the Army (Environment, Safety and Occupational Health) OASA (IL&E) memorandum dated 18 May 1998, Subject: Policy Memorandum – Army Ergonomics Program

Army Surgeon General memorandum dated 31 August 1998, Subject: Army Ergonomics Program Policy Memorandum

Director Army Safety memorandum dated 6 October 1998, Subject: Army Safety and the Army Ergonomics Program

TB MED 503
The Army Industrial Hygiene Program

USACHPPM TG 220. Ergonomics in Action. U.S. Army Center for Health Promotion and Preventive Medicine and the U.S. Army Safety Center.

EM 385-1-1
USACE Safety and Health Requirements Manual

ANSI Z-365 (Working Draft). American National Standards Institute. (1996). Control of Work-Related Cumulative Trauma Disorders, Part 1: Upper Extremities. National Safety Council (NSC), Itasca, IL. (Available at cost from NSC, P.O. Box 558, Itasca, IL 60143-0429.)

Chapanis, A., 1991. To Communicate the Human Factors Message, You Have to Know What the Message Is and How to Communicate It. Human Factors Society Bulletin, Vol 34 (11): 1-4.

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Revised NIOSH Equation for the Design and Evaluation of Manual Lifting Tasks. (Available from NIOSH, 4676 Columbian Parkway, Cincinnati, OH 45226.)

APPENDIX B

Recommended Membership of the Ergonomics Subcommittee

B-1. Chairperson. The command EPC shall:

a. Serve as chairperson of the ergonomics subcommittee.

b. Be a qualified safety, industrial hygiene or occupational health professional (e.g., OH nurse) who has completed the basic USACHPPM 40-hour ergonomic training course or civilian equivalent.

B-2. Co-Chairperson. The Deputy Commander shall:

a. Serve as co-chairperson of the ergonomics subcommittee providing command leadership, focus and decision-making regarding command-wide recommendations.

B-3. Membership. It is recommended the ergonomics subcommittee include, but need not be limited to, representatives of the following offices:

a. Core membership.

(1) Engineering and Technical Services (engineer trained in human factors engineering).

(2) Construction-Operations (Operations designee with significant project experience).

(3) Safety and Occupational Health (at least one, but not more than two representatives to include an industrial hygienist, safety professional or occupational health professional). If the designated EPC is from the Safety and Occupational Health Office this would count as the required participant.

(4) HRO (command FECA administrator).

(5) Contracting.

(6) Logistics.

(7) Alternate EPC

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(8) Union(s) representative.

b. Others as deemed necessary.

B-3. Training. All subcommittee members should receive appropriate ergonomics training as discussed in chapter 7.

GLOSSARY

Section I Abbreviations

ANSI
American National Standards Institute

AR
Army Regulation

CFR
Code of Federal Regulations

HRO
Civilian Human Resource Office

CTD
cumulative trauma disorder

DA
Department of the Army

DA PAM
Department of the Army pamphlet

DOEHRS
Defense Occupational & Environmental Health Readiness System

DOD
Department of Defense

DODI
Department of Defense Instruction

DOL
Department of Labor

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EM

Engineer Manual

EO

Executive Order

EPC

Ergonomics Program Coordinator

FECA

Federal Employee Compensation Act

HHIM

Health Hazard Information Module

HQDA

Headquarters, Department of the Army

IH

industrial hygiene

MACOM

Major Army Command

MTF

USACE Command medical treatment facility (in-house or contractor)

NIOSH

National Institute for Occupational Safety and Health

NSC

National Safety Council

OH

occupational health

OSH

Occupational Safety and Health

OSHA
Occupational Safety and Health Administration

OTSG
Office of the Surgeon General

PARC
Principal Assistant Responsible for Contracting

PL
Public Law

PPE
personal protective equipment

SF
Standard Form

SOH
safety and occupational health

SOHO
Safety and Occupational Health Office

TB MED
Technical Bulletin, Medical

TG
Technical Guide

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

USASC
U.S. Army Safety Center

WMSD
Work-related musculoskeletal disorder(s)

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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

Disorders of the musculoskeletal or nervous system that are the result of, or contributed to by, the biomechanical risk factors listed in paragraph 2-4. 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 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 focus 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 within the command.

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, supervisors and selected employees.

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, which may increase the possibility of WMSDs.

Occupational hazards

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

Occupational health personnel (in-house or contractor)

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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). Occupational health 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.

Occupational illness and injury

a. To be recorded as an occupational illness or injury, the condition must be diagnosed by a physician, registered nurse, or other person who, by training or experience, is capable of making such a determination (such as an occupational therapist, physical therapist, or physician assistant).

b. To be classified as an occupational illness or injury, the condition must meet the following criteria:

(1) 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).

(2) 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.

(3) Cumulative trauma disorders 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.

Rate (incidence, severity, prevalence)

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):

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

a. 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.

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

c. 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.

Trained ergonomics personnel

Designated EPC, alternate EPC and others such as workers' compensation, health care, industrial hygiene, environmental science, safety, engineering, operations or logistics personnel with approved training in ergonomics who have been designated with major command-wide ergonomics program responsibilities. Minimum acceptable training for local command-level trained ergonomics personnel is the basic 40-hour ergonomics course offered by USACHPPM or equivalent civilian training. Another category of trained ergonomics personnel are those officially designated as collateral duty safety officers or perform that or a similar function without official designation. These personnel shall have a minimum of 8 hours of formal ergonomics training (can be provided by the EPC, formal course by the CHPPM, or equivalent formal training determined acceptable by the command EPC).

Work-related musculoskeletal disorders (WMSD)

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WMSDs are injuries and disorders of the muscles, nerves, tendons, ligaments, joints, cartilage and spinal discs. Exposure to physical work activities and conditions that involve risk factors may cause or contribute to WMSDs. WMSDs do not include injuries caused by slips, trips, falls, or other similar accidents. Examples of WMSDs include:

a. The range of health problems arising from repeated stress to the body encountered in the workplace. These health problems may also affect the nervous and neurovascular systems and may include the various occupationally induced CTDs, cumulative stress injuries, and repetitive motion disorders.

b. 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 a specific work, maintenance or inspection location.