

**BY ORDER OF THE COMMANDER  
HQ 62D AIRLIFT WING (AMC)**

**62 AW INSTRUCTION 48-6**

**11 JULY 1997**

**Aerospace Medicine**

**BASE ERGONOMICS PROGRAM**



**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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This instruction prescribes the minimum requirements to anticipate, recognize, evaluate, and control work-related musculo-skeletal disorders associated with routine exposure to ergonomic risk factors in McChord AFB workplaces. This instruction applies to operations performed by all units and personnel assigned or attached to McChord AFB. These requirements and procedures do not apply to government-owned, contractor-operated (GOCO) operations. This instruction does not cover incidental or instantaneous events leading to contusions, lacerations, fractures or amputations. A Glossary of References, and Terms and Definitions are at [Attachment 1](#).

## Chapter 1

### RESPONSIBILITIES

**1.1. Medical Treatment Facility (MTF) Commander.** The MTF commander provides appropriate manpower and resources for MTF personnel involved in ergonomic efforts.

**1.2. 62d Medical Operations Squadron, Chief, Bioenvironmental Engineering (62 MDOS/SGOAB).** (The Chief, Bioenvironmental Engineering:

- 1.2.1. Is the office of primary responsibility (OPR) for the installation ergonomics program.
- 1.2.2. Annotates Potential Ergonomic Problem Area (PEPA) or Ergonomic Problem Area (EPRA) designation in the appropriate work area case file, building folder, or miscellaneous file.
- 1.2.3. Routinely, but at least annually, briefs the installation Air Force Occupational Safety and Health (AFOSH) Council and Aeromedical Council (AMC) on the installation ergonomics program. The briefing will include, as a minimum, a status report of active PEPA, and a status report of active EPRA, including description of controls implemented.
- 1.2.4. Incorporates PEPA identification into annual industrial hygiene surveys.
- 1.2.5. Prioritizes and performs EPRA work area analyses, and documents all EPRA work area analyses in appropriate work area case files, building folders, or miscellaneous files.
- 1.2.6. Evaluates the effectiveness of the implemented controls in eliminating or minimizing the identified ergonomic risk factors.
- 1.2.7. Investigates occurrences of reported Work-Related Musculoskeletal Disorder (WMD).
- 1.2.8. Reviews facility and operations plans for new or modified operations, jobs or procedures to ensure ergonomics design principles have been taken into consideration.
- 1.2.9. At the request of a medical provider, performs a work area visit prior to an employee's assignment to light duty areas, to ensure assigned tasks will not exacerbate the existing WMD.

**1.3. Chief, Aerospace Medicine (alternatively, Chief Flight Surgeon).** The Chief, Aerospace Medicine:

- 1.3.1. Develops or adopts standard operating procedures for evaluation, medical management, and follow-up of WMD treated on the installation.
- 1.3.2. Assists the Chief, Bioenvironmental Engineering in EPRA work area analyses, as requested.
- 1.3.3. Monitors patient caseload for work areas meeting EPRA criteria. Provides caseload information to the Chief, Public Health to ensure cases are entered in data collection system.

**1.4. 62d Airlift Wing, Chief, Ground Safety (62 AW/SEG).** The Chief, Ground Safety:

- 1.4.1. Retrieves musculoskeletal injury data associated with routine exposure to ergonomic risk factors for use by the Chief, Public Health in compiling installation surveillance and trend statistics. Basic information about the injuries, such as the type of work being performed, when and where the incident occurred, the body parts involved, and the classification of the injury will be included.

1.4.2. Assists the Chief, Bioenvironmental Engineering in EPRA work area analyses, as requested.

1.4.3. Investigates musculoskeletal injuries not associated with routine exposure to ergonomic risk factors.

**1.5. Chief, Public Health.** The Chief, Public Health:

1.5.1. Coordinates with installation Chief, Civilian Personnel and Chief, Ground Safety to establish on-going installation surveillance process for WMD.

1.5.2. Collects illness data. Compiles injury and illness data to determine WMD incidence and severity rates. Where applicable, uses same denominator data as the Chief, Ground Safety. Provides information to the Ergonomics Working Group (EWG) for discussion and action.

1.5.3. Briefs AFOSH Council and Aeromedical Council annually on results of data collection and analysis. Provides the Chief, Bioenvironmental Engineering with information, as requested.

1.5.4. Administers ergonomic risk factor and discomfort surveys to employees in PEPA. Analyzes data for association between ergonomic risk factors, employee discomfort, and reported WMD (if available). Reports results to EWG for further action.

1.5.5. Provides ergonomics awareness education and training to supervisors, workers, health care providers, and other installation personnel as specified in this instruction.

1.5.6. Evaluates the effectiveness of the controls in terms of reduced employee discomfort and WMD incidence.

1.5.7. Incorporates PEPA identification into work area visits.

**1.6. Chief, Civilian Personnel.** The Chief, Civilian Personnel provides the Chief, Public Health with civilian WMD data including compensation costs, lost duty days, and limited duty days.

**1.7. Ergonomics Working Group (EWG).** The EWG is incorporated into the occupational health working group and organized as a subcommittee of the 62d Medical Group (62 MDG) Aerospace Medicine Committee. Core membership includes the Chief, Public Health, the Chief, Bioenvironmental Engineering, and the Chief Flight Surgeon. The EWG may specifically invite others, such as the Chief Ground Safety, to participate in the meeting, as needed. The EWG will:

1.7.1. Designate and remove PEPA.

1.7.2. Designate and remove EPRA.

1.7.3. Review surveillance and risk factor data to identify the work areas and occupational groups at greatest risk for WMD. The EWG will identify those to be listed as PEPA and assign priority for additional assessment and examination.

**1.8. Commanders, Directors, and Functional Managers.** Commanders, directors, and functional managers:

1.8.1. Support an effective, quality ergonomics program that conforms to the requirements of this instruction and applicable federal standards/laws.

1.8.2. With guidance from the EWG, develop a strategic plan for upgrading or replacing poorly selected tools, workstations, devices, and equipment. As a guideline, ensure the design of new tools, workstations, devices, and equipment are for the physical capabilities and anthropometry of the 5 percentile female to 95 percentile male installation population.

1.8.3. Ensures supervisors and workers attend ergonomics awareness education and training program as specified by the EWG.

1.8.4. For new purchases, provide employees, who routinely use the computer for more than 2 hours per day, with computer workstation furniture, chairs, and accessories that meet the requirements of American National Standards Institute (ANSI)/Human Factors Society (HFS)-100, American National Standard for Human Factors Engineering of Visual Display Terminal Workstations.

### **1.9. Work Area Supervisors.** Work area supervisors:

1.9.1. Notify the Chief, Bioenvironmental Engineering or Chief, Ground Safety of any previously unidentified processes or activities that appear to cause employees pain, discomfort, injury, or illness.

1.9.2. Take action to eliminate or minimize ergonomic risk factors identified by the Chief, Bioenvironmental Engineering. Consult with workers who accomplish the activities and implement changes to the work that will abate the ergonomic risk factors.

1.9.3. Enforce worker use of measures to control exposure to ergonomic risk factors, including engineering controls, administrative controls, work practice controls, and personal protective equipment (PPE).

1.9.4. Attend ergonomics awareness education provided or coordinated by the Chief, Public Health, and provide job specific ergonomics training to employees as specified in this instruction.

1.9.5. Inform the Chief, Bioenvironmental Engineering of plans for new or modified operations, jobs, or procedures.

1.9.6. Encourage personnel to promptly report any musculoskeletal symptoms suspected to be associated with the job or the work environment to the supervisor.

1.9.7. Ensure employees with musculoskeletal complaints are promptly evaluated by a medical provider. Encourage use of military medical treatment facilities, when feasible.

1.9.8. Encourage workers to work together to assess and implement remedies for ergonomic risk factors from their processes.

### **1.10. Individuals.** Individuals:

1.10.1. Provide feedback and suggestions for improvement regarding potential or actual ergonomic risk factors encountered on the job.

1.10.2. Promptly report to supervisor any musculoskeletal complaints suspected to be associated with ergonomic risk factors in the work area.

1.10.3. Attend ergonomics awareness education and training as directed.

1.10.4. Participate in activities designed to anticipate, recognize, evaluate, and control work area ergonomic risk factors.

1.10.5. Comply with recommended controls for minimizing ergonomic risk factors.

## Chapter 2

### PROGRAM REQUIREMENTS

**2.1. Goals.** The primary goal of the ergonomics program is to prevent WMD among Air Force employees routinely exposed to ergonomic risk factors. The secondary goal is to reduce the severity of WMD through early medical management. Though other risk factors, including psychosocial and individual characteristics, may lead to development of WMD, these factors are not addressed in this standard.

**2.2. Program Elements.** The basic elements of an installation ergonomics program include: PEPA designation, EPRA designation and removal, work area analysis, medical management, and training and education. Both qualitative (PEPA) and quantitative (EPRA) screening techniques are used in a sequential fashion to identify employees at risk. See [Attachment 2](#) for a flowchart describing the installation ergonomics program.

2.2.1. PEPA Designation. The qualitative PEPA screening technique is the first step to identify employees in work areas with potential risk for developing WMD. The EWG bases PEPA designation on existing information (passive surveillance data, industrial hygiene surveys, etc.), professional judgment, and overall corporate knowledge.

2.2.1.1. PEPA Risk Factor Criteria For Industrial Work Areas. The EWG will designate an industrial work area a PEPA when one or more employees are routinely exposed to one or more of the following risk factors:

Repetitive motions for >2 hours at a time or >4 hours total

Fixed or awkward postures for >2 hours total

Forceful hand exertions for >2 hours total

Vibration from tools (or equipment) for >2 hours total

Manual material handling >2 hours total

Unassisted lifting of loads >25 pounds

2.2.1.2. Risk Factor Review Frequency. Initially, the Chief, Bioenvironmental Engineering will review existing occupational health data in industrial work areas to identify PEPAs. The Chief, Bioenvironmental Engineering will incorporate PEPA criteria into annual occupational health visits and surveys.

2.2.1.3. Passive Surveillance. The EWG will designate both industrial and administrative work areas as PEPAs at any time when one or more employees report a WMD. The Chief, Public Health will review a variety of data sources to identify past and ongoing patterns of WMD associated with routine exposure to ergonomic risk factors. Examples of data sources include: Workers' Compensation claim data, primarily U.S. Department of Labor Forms CA-1, Federal Employee's Notice of Traumatic Injury and Claim for Continuation of Pay/Compensation, and CA-2, Notice of Occupational Disease and Claim for Compensation); AF Form 190, Occupational Illness/Injury Report; Occupational Safety and Health (OSHA) 200 Logs, Aerospace Safety Automation Program (ASAP), and local mishap forms. A listing of specific and non-specific WMD by the International Classification of Diseases, Clinical Modification, 9th Revision (ICD-9CM) codes can be found in [Attachment 3](#). Initially, the Chief, Public Health should obtain as much historical data as

possible to determine the depth of WMD on an installation. Thereafter, data obtained by passive surveillance will be analyzed annually.

2.2.1.4. EWG Role. The EWG develops and updates, as needed, a list of industrial and administrative work areas meeting PEPA criteria. The EWG will discuss newly identified work areas potentially meeting PEPA criteria at the next scheduled EWG meeting. The EWG shall decide if the work area is designated PEPA. The Chief, Bioenvironmental Engineering will annotate the PEPA designation in the appropriate case file, building folder, or miscellaneous file.

2.2.2. EPRA Designation. The more quantitative EPRA screening is an active surveillance technique used to specifically identify which PEPA designated work areas (and their associated processes) are truly at risk for WMD development. It is these work areas which will require further attention.

2.2.2.1. Employee Risk Factor and Discomfort Surveys. The Chief, Public Health will administer risk factor and discomfort surveys to each PEPA designated work area employee or selected occupational groups (if applicable). In the case of administrative work areas, the Chief, Public Health will administer risk factor and discomfort surveys to employees in close proximity to the identified WMD, performing similar activities, and using similar equipment. The Chief, Public Health will provide sufficient employee education so they will correctly complete the surveys.

2.2.2.2. Reporting Employee Risk Factor and Discomfort Survey Results. The Chief, Public Health will analyze the data for associations between ergonomic risk factors, employee discomfort, and reported WMD (if applicable) in the PEPA. After completing the analysis, the Chief, Public Health will present the findings at the next scheduled EWG meeting. The Chief, Public Health will file all risk factor and discomfort survey results in the appropriate case file, building folder, or miscellaneous file.

2.2.2.3. EWG Review. The EWG will review the data presented by the Chief, Public Health, previous work area analyses, plus any additional information pertaining to work area ergonomic risk factors. If there is an association between ergonomic risk factors, employee discomfort, and reported WMD (if applicable), the EWG will designate the PEPA an EPRA. If there is no association indicated, the EWG will remove the area from the PEPA list. No further action is required as long as the processes or activities do not change and no additional WMD are reported in the work area.

2.2.3. Work Area Analysis. The Chief, Bioenvironmental Engineering shall conduct a work area analysis for each EPRA. The Chief, Bioenvironmental Engineering may include the work area analysis as part of the annual industrial hygiene survey. The work area analysis should include videotape documentation of the specific processes and activities.

2.2.3.1. General Requirements. A detailed work area analysis quantifies ergonomic exposure and recommends controls to minimize or eliminate the exposure. A detailed work area analysis should contain the following information:

Surveyor name

Date

Work area name and identifier (if available)

Summary of work area symptom survey results

Review of previous work area analyses (if available)

- Employee demographics (age, sex, dominant hand, etc.)
- Work schedules/variations
- Identification of Homogeneous Exposure Groups (HEG) within the work area
- Activity/Task breakdown for each HEG
- Workstation and equipment descriptions
- Materials and part processed
- Description of hand tools used (if applicable)
- Environmental conditions
- Personal protective equipment (PPE) utilized (if applicable)
- Quantification of fixed and awkward body postures
- Evaluation of manual material handling tasks (if applicable)
- Quantification of repetitive movements by body part
- Estimate of forceful exertions being applied
- Location of contact stress (if applicable)
- Productivity and quality requirements
- Control measures that would minimize or eliminate the ergonomic risk factors identified during the analysis

Both analysis techniques and control measures should reference consensus standards, texts, and other references such as Military Standard 1472, Human Engineering Design Criteria for Military Systems, Equipment and Facilities.

2.2.3.1.1. National Institute for Occupational Safety and Health (NIOSH) Lifting Model. The Chief, Bioenvironmental Engineering will analyze manual materials handling tasks to ensure that weights of objects lifted by workers do not exceed their physiological, biomechanical and psychophysical capabilities. The Chief, Bioenvironmental Engineering will use the latest version of the Revised National Safety and Health (NIOSH) Lifting Equation to analyze lifting tasks.

2.2.3.1.2. Snook-Ciriello Tables. The Chief, Bioenvironmental Engineering should use the Snook-Ciriello tables for manual materials handling tasks involving pushing, pulling, and carrying.

2.2.3.1.3. American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) for Hand-Arm Vibration. Vibration from hand tools should not exceed the ACGIH TLV for hand-arm vibration. Direct measurements or data from similar tools should be used for comparison to the ACGIH TLV. Weighted, unweighted, and 1/3 octave band accelerations should be recorded for each hand tool measured.

#### 2.2.3.2. Hazard Prevention and Control:

2.2.3.2.1. Engineering Controls. Engineering controls are the preferred and first-line method of control. The Chief, Bioenvironmental Engineering will work with work area supervisors to eliminate ergonomic risk factors from the work environment by manipulating or changing the design of the job, workstation, tools, or equipment used by the worker. If permanent engineer-

ing controls cannot be immediately implemented, temporary measures to modify or minimize the identified risk factors should be employed. Some engineering control changes may require approval by the Air Force Materiel Command depot manager who develops the technical orders (T.O.) that govern work operations.

2.2.3.2.2. Work Practices Controls. When ergonomic risk factors cannot be engineered out, the Chief, Bioenvironmental Engineering may recommend alternate approaches to work area supervisors. Work practices controls, such as routine tool-sharpening and maintenance, generally involve changing or improving procedures routinely followed by the worker.

2.2.3.2.3. Administrative Controls. Bioenvironmental Engineering personnel may also recommend administrative controls, which consist of actions initiated by supervisors to reduce the duration, frequency, and forcefulness of ergonomic stressors. Although administrative controls, such as a written job rotation plan, can be a useful adjunct to engineering and work practices controls, they should never be considered a primary defense against ergonomic risk factors.

2.2.3.2.4. Personal Protective Equipment (PPE). PPE, such as gloves or padding, is worn for the purpose of controlling ergonomic risk factors such as temperature, vibration, or contact stress. Devices worn on or attached to the wrist, back, or other joints to retard movement or provide support are **not** considered PPE. The Chief, Bioenvironmental Engineering or Chief, Ground Safety will not recommend these devices. Gloves may offer some protection against temperature variations, contact stresses, and vibration, but must be carefully selected in terms of material and fit to be effective.

2.2.3.3. Written Reports. The Chief, Bioenvironmental Engineering will send a written report of any work area analysis to the work area supervisor. The Chief, Bioenvironmental Engineering may include the work area analysis as part of the annual work area survey. The Chief, Bioenvironmental Engineering will place a copy of the written report in the appropriate case file, building folder, or miscellaneous file. When conducting an ergonomically related occupational illness investigation (AF Form 190), the Chief, Bioenvironmental Engineering should send a separate report containing suggested control measures to the commander, facility manager, and work area supervisor. The Chief, Bioenvironmental Engineering uses the AF Form 190 to analyze whether the risk factors associated with the task could be causative factors in the illness reported. The AF Form 190 is forwarded to the Chief, Public Health for inclusion in the patient's medical records.

2.2.4. EPRA Removal. After the workplace implements all recommended controls, the Chief, Bioenvironmental Engineering will resurvey the EPRA to determine if the controls are reducing employee ergonomic exposure. After resurvey, the Chief, Bioenvironmental Engineering will present their findings at the next scheduled EWG meeting. If the changes have practically eliminated the ergonomic risk factors and do not introduce additional risk factors, the EWG will remove the work area from the EPRA list. Approximately 6 to 12 months after the workplace implements all recommended controls, the Chief, Public Health may readminister employee discomfort surveys in the work area.

#### 2.2.5. Medical Management:

2.2.5.1. General. The objective of medical management is to use basic preventive medicine techniques to reduce WMD through early diagnosis and treatment. Early recognition and prompt treatment of employee symptoms is critical in the effort to prevent the need for invasive or complicated medical intervention, as well as to reduce Workers Compensation costs.

2.2.5.2. Restricted Duty or Light Duty. Health care providers may recommend that an employee return to the same work area with temporary activity restrictions, or be assigned to "light duty " areas during recovery or rehabilitation. When health care providers recommend temporary light duty, supervisors must ensure that the assigned job does not aggravate the same body parts as those currently involved in the worker's complaint.

2.2.5.3. Medical Surveillance. Based on the results of the risk factor and discomfort surveys, the Occupational Health Working Group (OHWG) may recommend to the Aeromedical Council specific work areas to receive recurring physical exams. The purpose of the exam is to screen workers for early signs and symptoms of WMD. The Aeromedical Council will determine the scope and frequency of the examinations.

#### 2.2.6. Training and Education:

2.2.6.1. Targeted Training. The Chief, Public Health will conduct initial general ergonomics training, per requirements of paragraph 2.2.6.2., for all employees and supervisors in EPRA designated work areas. Supervisors will provide initial and annual specific training on job activities and processes. They may request assistance from the Chief, Public Health to develop training materials. Supervisors will convey the following specific information in their training:

Specific activities or processes posing increased risk of WMD for employees.

Proper use of existing tools and equipment to prevent WMD.

Control measures and how they affect specific risk factors identified in the work area.

Supervisors will continue this training annually, until the EWG removes the EPRA designation. Supervisors will record training on each employee's AF Form 55, Employee Safety and Health Record. The Chief, Public Health will record employee training on AF Form 2767, Occupational Health Training and Protective Equipment Fit Testing.

2.2.6.2. General Awareness Education. The objective of general awareness education is to make all workers aware of the benefits of seeking appropriate medical care before musculoskeletal symptoms progress to chronic disability. The Chief, Public Health will periodically offer ergonomics awareness education to supervisors and employees in both industrial and administrative work areas. Ergonomics awareness education may take many forms including briefings, newspaper articles, brochures, and computer software. The education will cover description of WMD and the associated ergonomic risk factors, recognition of symptoms associated with ergonomic disorders, the importance of early medical intervention, and local procedures for reporting suspected ergonomics risk factors and WMD.

2.2.6.3. Ergonomics Awareness Education for Administrative Area Employees. All non-EPRA administrative area employees will have ready access to some form of educational material described in paragraph 2.2.6.2. For work areas with computers, the material will be tailored toward the specific needs of computer users and describe proper computer workstation set-up. Additionally, EPRA designated administrative area employees will receive annual targeted training per the requirements of paragraph 2.2.6.1.

KATHY J. REYNOLDS, Col, USAF,  
Commander, 62d Medical Group

**Attachment 1****GLOSSARY OF REFERENCES, AND SUPPORTING INFORMATION*****References***

- AFI 48-101, Aerospace Medical Operations (formerly AFR 161-33)
- AFI 91-204, Investigating and Reporting US Air Force Mishaps (formerly AFR 127-4)
- AFI 91-301, The Air Force Occupational and Environmental Safety, Fire Prevention, and Health Program
- AFI 91-301/AMC1, Air Mobility Command supplement to AFI 91-301, The Air Force Occupational and Environmental Safety, Fire Prevention, and Health Program
- AFOSH Standard 127-31, Personal Protective Equipment
- AFOSH Standard 161-17, Standardized Occupational Health Program
- AFPD 48-1, Aerospace Medical Program (formerly AFR 161-33)
- AL-TR-1991-0082, Ergonomics Manual, Armstrong Laboratory Technical Report, October 1991
- AMCP 161-X, Air Mobility Command Ergonomics Program, First Ed, July 1993
- American Conference of Governmental Industrial Hygienists, *Threshold Limit Values for Chemical Substances and Physical Agents*
- ANSI/Human Factors Society (HFS) Standard 100. *Human Factors Engineering of Visual Display Terminal Workstations*
- HQ AMC/SE Policy Letter, *Implementation of AMC Ergonomic Program Command-Wide*, 11 Mar 94
- HQ AFMOA/SGPA letter, *Ergonomic Disorders in Commissary Employees*, 15 Oct 93 [Cover letter for DeCA/DOC Letter, 11 May 93]
- Military Standard (MIL-STD) 1472, *Human Engineering Design Criteria for Military Systems, Equipment, and Facilities*
- Snook, S.H., and V.M. Ciriello, *The Design of Manual Handling Tasks: Revised Tables of Maximum Acceptable Weights and Forces*, Ergonomics, 1991, 34:9, 1197-213.
- U.S. Department of Labor, Occupational Safety and Health Administration (OSHA). *Ergonomics Program Management Guidelines for Meatpacking Plants*, 1990.
- U.S. Department of Labor, OSHA. *Draft Ergonomic Protection Standard Proposal, March 21, 1995*.
- U.S. Department of Health and Human Services, National Institute of Occupational Safety and Health (NIOSH). *Workplace Use of Back Belts*. Publications Dissemination, DSDTT, Cincinnati, OH., 1994.
- U.S. National Center for Health Statistics. *The International Classification of Diseases, Clinical Modification, ICD-9CM. 9th Revision, 2nd Ed, second printing*. Commission on Professional and Hospital Activities, Ann Arbor MI. Vol 2, 1980.
- Waters, T., Putz-Anderson, V, and Garg, A. *Applications Manual for the Revised NIOSH Lifting Equation*. U.S. Department of Health and Human Services, Centers for Disease Control. 1994.

## *Terms and Definitions*

### **Definitions—:**

**Administrative Controls—.** Any procedure that significantly limits exposure to ergonomic risk factors by control or manipulation of the work schedule or manner in which work is performed. Includes job rotation, use of rest breaks or alternative tasks, and job enlargement to increase task variability.

**Active Health Surveillance.—**The systematic collection, analysis, and interpretation of data obtained through self or group administered risk and discomfort surveys to determine the scope of potential or actual work-related musculoskeletal disorders in one or more work areas.

**Anthropometry—**The study of the physical dimensions of people, including size, breadth, girth, distance between anatomical points, and joint range of motion.

**Awkward Posture.—**A deviation from the neutral position of any particular joint. Examples include extreme flexing, extending, bending or rotating parts of the body, and repeatedly reaching behind the trunk or above the shoulders.

**Contact stress.—**A type of trauma inflicted by direct contact of various body parts with workpieces, tools, or work surfaces. Mechanical stress generated on tendons and nerves can lead to work-related musculoskeletal disorders.

**Discomfort Prevalence Ratio.—**The percentage of employees reporting discomfort in a particular body part. For WMD, discomfort should be persistent and associated with the ergonomic risk factors.

**Engineering Controls.—**Physical changes to work stations, equipment, materials, facilities, or any other relevant aspect of the work environment that reduce or prevent exposure to ergonomic risk factors.

**Ergonomics.—** The field of study that seeks to fit the job to the person, rather than the person to the job. This is achieved by the evaluation and design of workplaces, environments, jobs, tasks, equipment, and processes in relationship to human capabilities and interactions in the workplace.

**Ergonomic Problem Area.—**A designated work area where an association can be shown between ergonomic risk factors, employee discomfort, and reported WMD (if applicable).

**Ergonomic Risk Factors.—**Attributes, experiences, and exposures that increase the probability of occurrence of WMD. Risk factors include repetitive, forceful, or prolonged exertions; frequent or heavy lifting; pushing, pulling, or carrying of heavy objects; fixed or awkward work postures; contact stress; localized or whole-body vibration; and temperature extremes and poor lighting (leading to awkward postures). These risk factors can be intensified by work organization characteristics, such as inadequate work-rest cycles, excessive work pace and/or duration, unaccustomed work, lack of task variability, machine work, and piece rate. Specific dose-response relationships between ergonomic risk factors and WMD are not yet known.

**Fixed Postures.—**Prolonged muscle contraction without movement. Examples include stringing wire overhead and prolonged gripping of a hand tool.

**Incidence Rate.—**The number of new WMD occurring during a year per 100 full-time equivalent workers. Incidence rates are calculated as follows:

(Number of new WMD) X (200,000 hours or 100 full-time equivalent workers) / (Work hours per year or number of full-time equivalent workers)

**Manual Material Handling.—**The act of pushing, pulling, carrying, holding, and lifting objects from

one location to another.

**Passive Health Surveillance.**—The systematic collection, analysis, and interpretation of existing records and data to identify incidents and patterns of work-related musculoskeletal disorders and potential problem work areas.

**Potential Ergonomic Problem Area.**—A designated work area where one or more employees report a WMD or a work area where the *potential* risk for WMD development due to routine exposure to one or more ergonomic risk factors exists.

**Risk Factor Survey.**—Form used for rapid general characterization of an employee's exposure to ergonomic risk factors.

**Routine Exposure.**—Approximately daily.

**Severity Rate.**—The number of lost workdays due to WMD occurring in a year per 100 full-time equivalent workers. Severity rates are calculated as follows:

$(\text{Number of lost workdays}) \times (200,000 \text{ hours or } 100 \text{ full-time equivalent workers}) / (\text{Work hours per year or number of full-time equivalent workers})$

**Vibration.**—The oscillatory motion of a physical body. Localized (segmental) vibration, such as hand-arm vibration, is produced by contact with powered tools or equipment. Whole body vibration exposure occurs while standing or seated in vibrating environments or objects, such as trucks, heavy machinery, or while using heavy equipment such as jackhammers.

**Work Area Analysis.**—The systematic investigation of work area processes and activities to recognize ergonomic risk factors, evaluate their probable causes, and develop controls to minimize or eliminate the identified ergonomic risk factors.

**Work Practices Controls.**—Changing or improving procedures commonly followed in the workplace to minimize or eliminate ergonomic risk factors. Examples of work practices controls include: using proper lifting techniques in manual materials handling operations; adjusting work flow or line speed; and routine tool-sharpening and maintenance.

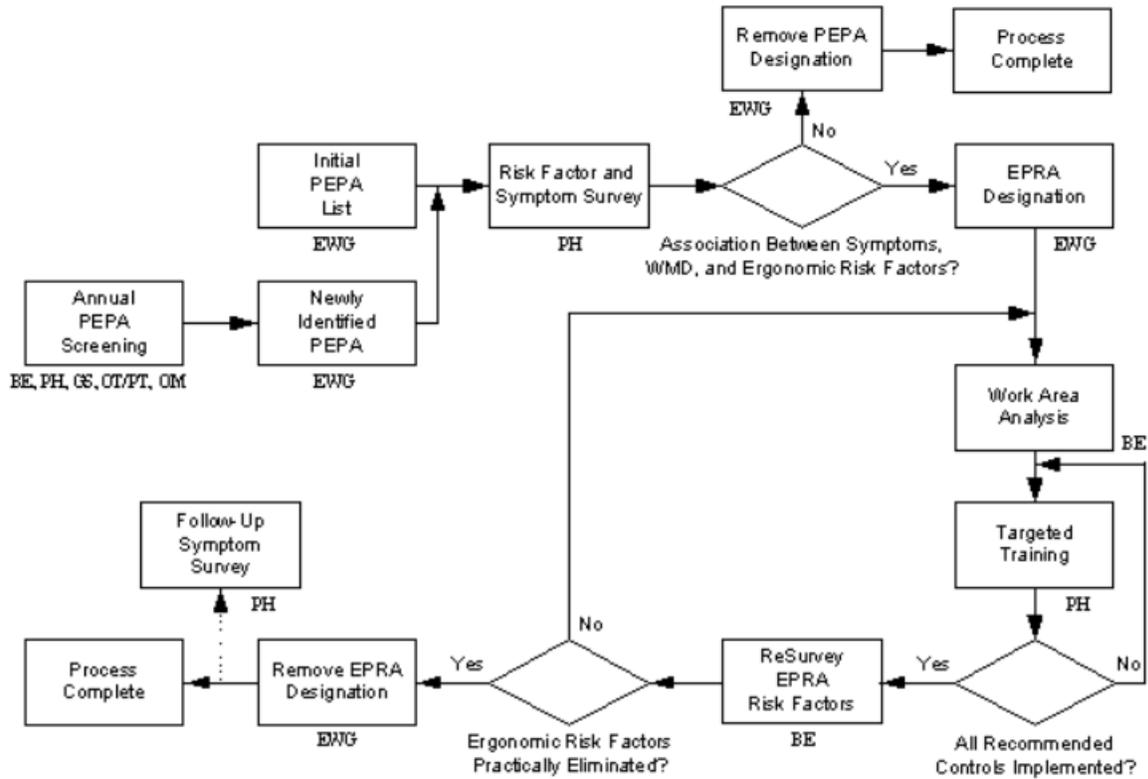
**Work-Related Musculoskeletal Disorder.**—Illness or injury of the muscles, tendons, ligaments, peripheral nerves, joints, bones, and/or supporting blood vessels in either the upper or lower extremities, or back, which are associated with routine exposure to ergonomic risk factors and which are not the result of an acute or instantaneous event (e.g., slips or falls). Commonly used terms, such as "cumulative trauma disorders", "repetitive strain injuries/illnesses", "repetitive motion injuries/illnesses", and "repetitive stress injuries/illnesses" are included in this definition. Under the current Air Force reporting system, back injuries are generally reported as occupational "injuries", while other work-related musculoskeletal disorders are generally classified and reported as occupational "illnesses".

**Workstation.**—An individual employee's work area, such as a desk, chair, and computer or an individual maintenance/inspection station.

Attachment 2

ERGONOMICS PROGRAM FLOWCHART

ERGONOMICS PROGRAM FLOWCHART



## Attachment 3

**WORK-RELATED MUSCULOSKELETAL DISORDERS BY ICD-9CM CODE****WORK-RELATED MUSCULOSKELETAL DISORDERS BY ICD-9CM CODE**SpecificICD-9CM CodeICD-9CM Code**CIRCULATORY**

443 Raynaud's Syndrome

444 Hypothenar Hammer Syndrome

**NERVE**

353 Thoracic Outlet Syndrome

354 Carpal Tunnel Syndrome  
 Cubital Tunnel Syndrome  
 Digital Neuritis  
 Guyon Canal Syndrome  
 Radial Tunnel Syndrome  
 Pronator Teres Syndrome

355 Tarsal Tunnel Syndrome

**MUSCLE**840-848 Muscle strains/sprains  
(specific locations)**TENDON**

726 Shoulder Periarthritis

727 Rotator Cuff Syndrome  
 Bursitis  
 DeQuervains Disease  
 Epicondylitis  
 Ganglion cyst  
 Synovitis  
 Tendinitis  
 Tenosynovitis  
 Trigger Finger

**JOINT**

715 Osteoarthritis

728 Game-Keeper's Thumb

723 Neck disorders/pain

724 Low back pain  
 Lumbago  
 Sciatica

728 Muscle, ligament, fascia disorders; spasms

729 Myalgia/Myositis

Non-Specific