FESHM 4120: ERGONOMICS PROGRAM

Revision History

Author	Description of Change	Revision Date
Bridget Scerini	Added direction on obtaining additional ergonomic information through training or division ergonomic representatives.	September 2011
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1.0 INTRODUCTION

The purpose of this chapter is to assist the line manager in preventing the occurrence of musculoskeletal disorders (MSDs) such as tendonitis, low back pain, and carpal tunnel syndrome. This is accomplished by controlling employee exposure to the workplace risk factors that can cause or aggravate these disorders.

An effective ergonomics program consists of four elements: workplace analysis, hazard prevention and control, medical case management, and training. These are discussed in detail in the Technical Appendix.

2.0 DEFINITIONS

Ergonomics - study of human work that considers the physical capabilities and limitations of the worker as he or she interacts with tools, equipment, work methods, tasks and the working environment.

Musculoskeletal Disorders (MSD) – A group of conditions that involve the nerves, tendons, muscles, and supporting structures such as intervertebral discs. The various conditions can differ in severity from mild symptoms once in a while to severe chronic and disabling disorders. Examples include carpal tunnel syndrome, tenosynovitis, tension neck syndrome, and low back pain. (ref: NIOSH)

Risk factors - actions and/or conditions, in the workplace that may cause or aggravate a work-related musculoskeletal disorder. Workplace risk factors include repetition, forceful or prolonged exertions; frequent or heavy lifting, pushing, pulling, or carrying of heavy objects; a fixed or awkward work posture; contact stress, vibration; extreme temperatures; and poor lighting.

Work Activities Analysis Form - form completed by supervisor prior to initial hiring as well as before every periodic medical exam for each person they supervise. The form identifies the expected frequency of employee exposures to a variety of workplace stressors and conditions.

3.0 RESPONSIBLILITIES

3.1 Division/Section/Center Heads

The Division/Section/Center Heads shall ensure compliance with this chapter.

3.2 Supervisors

Supervisors are responsible for completion of a Work Activities Analysis Form prior to initial hiring as well as before every periodic medical exam. Supervisors are responsible for ensuring that employees are appropriately trained for the work they are expected to perform. Supervisors shall ensure that employee musculoskeletal complaints and injuries are reported immediately to the Occupational Medicine Office for evaluation. Supervisors shall ensure that workplace evaluations are performed for instances when concerns or injuries occur.

3.3 Employees

Employees are responsible for reporting musculoskeletal concerns, symptoms, and injuries to their supervisor and the Occupational Medical Office as soon as they occur. Employees are expected to implement their ergonomic training while working at the laboratory, at home, or any other facility in which working on behalf of FNAL. Employees should refer to the Fermilab ergonomic training materials and/or contact their Division's ergonomic representative when looking for assistance with hazard prevention and control, including ergonomic related personal protective equipment.

3.4 Ergonomics Safety Subcommittee

The Ergonomics Safety Subcommittee shall provide assistance and expertise along with the division/section Senior Safety Officer or ESH&Q Section to the line management in evaluating workplace design and providing recommendations for improvements of the workplace and/or corrections of risk factors in the workplace. The Ergonomics Safety Subcommittee shall also provide educational information to employees regarding ergonomics. The subcommittee and/or ESH&Q-HS shall provide or coordinate training in such areas as computer workstation ergonomics, industrial ergonomics and back safety.

3.5 The Medical Department

The Occupational Medicine Office is responsible for assessing the employee's ability to conduct the essential functions of the job in consideration of potential occupational exposures and medical history. The Occupational Medicine Office is responsible for communicating with the line management and the division/section SSO regarding the employee's ability to work and any restrictions placed on the employee. The Occupational Medicine Office will assist in workplace evaluations as requested.

4.0 PROGRAM DESCRIPTION

Fermilab's Ergonomic Program consists of four activities: workplace analysis, hazard prevention and control, medical management, and training.

4.1 Workplace Analysis

4.1.1. Work Activities Analysis Form

At pre-employment or before an existing employee fills a new position at the laboratory, the supervisor is required to complete a Workplace Activities Analysis Form (http://www-esh.fnal.gov/pls/default/WAAF.html) as well as create or update the individual's Job Description and Individual Training Needs Assessment (ITNA).

Supervisors should be aware of the common ergonomic risk factors described in the Technical Appendix. He or she should identify whether any of these factors are present in the workplace so as to have potential to cause musculoskeletal disorders. If so, an evaluation of the particular activity should be performed. The supervisor can contact their Ergonomics Safety Subcommittee representative or their SSO for assistance.

4.1.2. Record Review

The Records Review consists of a safety and health review that identifies jobs and workstations that may contain musculoskeletal hazards, the risk factors that pose the hazards, and the causes of the risk factors.

The Ergonomics Safety Subcommittee will conduct a records review to identify patterns of injuries (or potential injuries) that will help find the jobs or workstations that may have musculoskeletal hazards. This review will occur annually. Results of this review will be distributed to division/section SSOs for further action.

4.1.3. Workstation Evaluation

A representative of the Ergonomics Safety Subcommittee or other knowledgeable individual can conduct a formal workstation evaluation. These evaluations can be performed at the request of the employee, the employee's supervisor, the division/section SSO or the Occupational Medicine Office. They may also be prompted by a review of records or an audit. The supervisor and/or the division/section SSO should be notified before the evaluation begins. The forms used for conducting ergonomic evaluations are found at the end of the Technical Appendix to this chapter. There is an optional pre-assessment form (4120-1) available for evaluators. This form is to be filled out by the evaluatee, then returned to the evaluator before the assessment. The form 4120-2 is used for evaluating computer workstations (*Computer Workstation Ergonomic Review*) and form 4120-3 for evaluating industrial work activities (*Industrial Workstation Ergonomic Review*).

4.2 Hazard Prevention and Control

After the worksite analysis is completed, all reasonable steps need to be taken so that the jobs, workstations, tools and environment fit the worker (See Technical Appendix). The changes made should eliminate or reduce the risk of injury through the use of engineering controls, work practice controls, personal protective equipment and/or administrative controls.

Note: The Fermi Occupational Medicine Office strongly recommends that no individual employee should physically pick up a load greater than 50 pounds.

4.3 Medical Management

The goals of medical management are the effective use of health-care resources to prevent or reduce work-related musculoskeletal injuries, and manage them to limit further injury once they occur.

There are three phases of medical management. They are:

1. Injury prevention.
2. Injury management/early intervention.
3. Chronic injury management.

These are discussed in greater detail in the Technical Appendix.

4.4 Training and Education

The Ergonomics Program shall be introduced during New Employee Orientation. Additional training is provided to all employees and support personnel through a coordinated effort of the Ergonomics Safety Subcommittee and ESH-HS. Those employees and support personnel that need ergonomic training are identified through the ITNA.

Discussion of any new ergonomic hazards or risks should also occur between the supervisor and employee(s) whenever new processes, equipment or procedures are introduced into the workplace, and in some instances, should be addressed in the Hazard Analysis.

5.0 REFERENCES

HumanScale Train the Trainer Program by *Humanscale Consulting*

http://www.osha.gov/SLTC/ergonomics/index.html

Cornell University Ergonomics Web: http://ergo.human.cornell.edu/

6.0 TECHNICAL APPENDIX

6.1 Workplace Analysis

6.1.1. Work Activities Analysis Form

Supervisors shall complete a Work Activities Analysis Form (http://www-esh.fnal.gov/pls/default/WAAF.html) prior to initial hiring as well as before every periodic medical exam for each person they supervise. This form is used to collect the supervisor's impression of the expected frequency of employee exposures to a variety of workplace stressors and conditions, including those that can contribute to work related musculoskeletal disorders. The supervisor will receive input from the Medical Department regarding the employee's ability to perform the work. The list of common risk factors (listed under the Workstation Evaluation portion of this Technical Appendix) should be taken into consideration when filling out the form.

6.1.2. Record Review

Conducted by the Ergonomics Subcommittee, it begins with reviewing the laboratory's records to identify patterns of injuries (or potential injuries) and to help find the jobs and workstations that may have musculoskeletal risk factors.

Records that should be considered for review:

- CAIRS Reports (Accident/Incident Reports)
- Worker's Compensation claims
- Job titles and descriptions

Record the types of symptoms found along with the following information:

- Description of injury or illness, including affected body parts
- Job title or position title of the worker
- Any previous job titles or job descriptions of the worker
- Department where worker works
- Time on the job
- Date of injury or illness
- Description of equipment used on that job

Look at the data gathered and group together similar injury types, body parts, severity of injuries, etc.

Calculate the incidence rate: the number of new incidents of injuries/illnesses in a given period of time.

Calculate the severity rate: the cost of injuries/illnesses, either in terms of dollars or physical severity, in a given time period.

Rank the departments, jobs, or equipment in descending order, starting with the highest injury rate and severity rate based on the incidence and severity rate information.

Investigate jobs further to identify the risk factors present. This should include input from workers as well as observers from the ergonomics team.

6.1.3. Workstation Evaluation

Should be considered whenever:

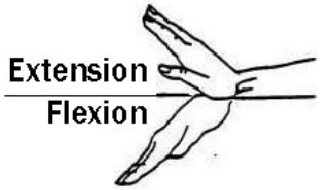
- The workplace moves to a different location.
- Workplace configurations change.
- New equipment is purchased and installed.
- Work methods or procedures change.
- The employee complains of musculoskeletal disorders or injuries.

Signs of musculoskeletal disorders include:

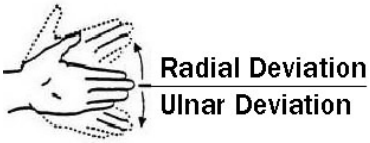
- Painful joints
- Pain in wrists, shoulders, forearms, knees, etc.
- Pain, tingling or numbness in hands or feet
- Fingers or toes turning white
- Shooting or stabbing pains in arms or legs
- Back or neck pain
- Swelling or inflammation
- Stiffness
- Burning sensations
- Heaviness
- Weakness or clumsiness in hands

Common Risk Factors – (Can also be used to serve as a general guide in filling out the Work Activities Analysis Form):

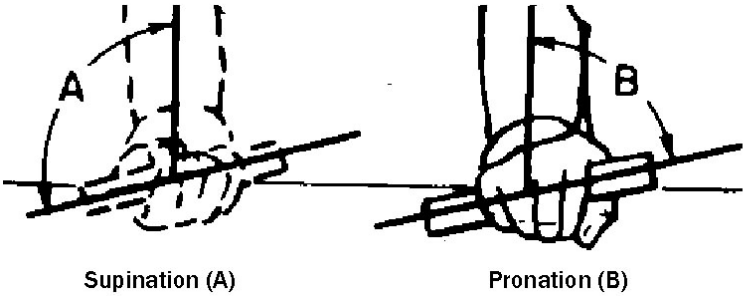
- Wrist
    1. Wrist Extension/Flexion: Hand is bent up above/down below the plane of the forearm.



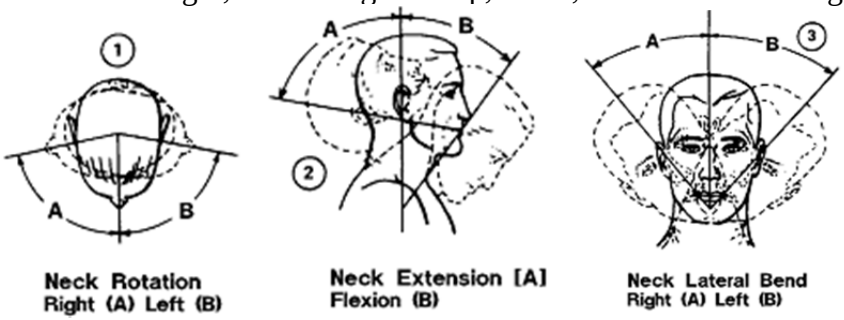
2. Ulnar/Radial deviation: Hand bends to the left or right of the forearm.



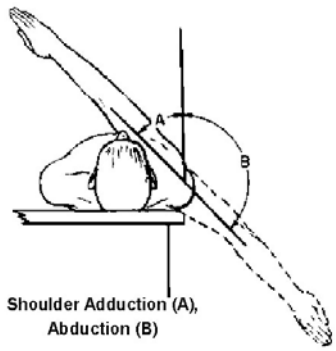
- Forearm
  1. **Forearm Pronation/Supination**: Wrist and forearm twist in and out (i.e. turning a screwdriver).



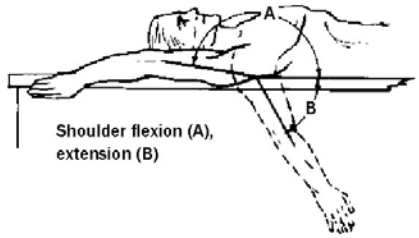
- Neck
  1. **Neck Rotation/Extension/Flexion/Lateral Bend**: Rotating the head to the left or right, or bending head up, down, and to the left or right.



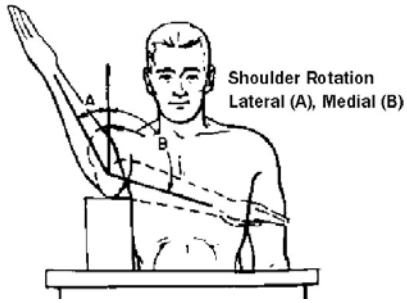
- Shoulder
  1. Shoulder & Elbow Abduction/Adduction: Elbows are out away from the body, or in toward the body.



2. Shoulder Flexion/Extension: Arm rose above head or down behind the back.



3. Lateral/Medial Shoulder Rotation: Side-to-side rotational movement of the shoulder



- Contact Stress – the contact of the body with any hard surface or edge that results in the pinching or crushing of tissue.
- Trunk Rotation – any twisting or bending at the waist.
- Repetition – performing the same motions many times and continuously for a period of time. The severity of risk depends on the frequency of repetition, speed of the movement or action of the number of muscle groups involved, and the required force.
- Duration – the amount of time it takes to perform a task.
- Prolonged Static Postures – staying in one position for a prolonged duration.
- Forcefulness – the amount of physical effort required by the person to do a task and/or maintain control of tools and equipment.
- Extreme temperatures – working in conditions that are very cold or very hot.
- Lighting – the amount of light in a given work space.

- Hand-arm vibration – vibration that goes through the hand and arm, and then travels through the rest of the body.
- Poorly fitted gloves – reduces dexterity and feeling, resulting in a need to use stronger muscle force.

***NOTE on LAPTOP USE**: It is very difficult to remove these risk factors when using a laptop. It is recommended that a laptop be used in a docking station, that is with a separate keyboard and mouse, and to implement the spirit of this chapter. There are a number of different types of docking stations. Contact the appropriate D/S Ergonomic Safety Subcommittee member or SSO to help decide which is right for the situation. If a docking station is not a practical solution, laptop users should take very frequent breaks (a few minutes at least every 20 minutes), and stretch their bodies as needed.*

Tools to help identify risk factors (at least two should be used to ensure a more thorough analysis):

- Employee interview - used to get employee's opinion of risk factors present on the job.
- Work Activities Analysis Form (WAAF) – filled out by supervisor and used by the Medical Dept. to assess risk factors in individual jobs.
- Pre-Assessment Form, Industrial Workstation Ergonomic Review or Computer Workstation Ergonomic Review– forms used by the division/section Ergonomic Subcommittee member conducting the ergonomic evaluation. (See Forms 4120-1, 4120-2 and 4120-3 at the end of this chapter.)
- Videotaping - videotaping a job from different angles for a period of time (typically 10-20 minutes or at least three complete work cycles) and then viewed later.
- Narrative Review - watching the work for a period of time and writing a detailed description of the observations found.

Identify risk-factor causes. Determine whether the risk factor is caused by:

- The *method* used or required to do the task
- The *effort or strength* required to do the task
- The *location* of the parts, equipment or tools
- The *position* of parts, equipment or tools
- The *speed or frequency* of the work
- The *duration or repetition* of the tasks
- The *design* of the parts, equipment or tools
- The *environmental factors*, such as light, noise, temperature and air quality
- The *habits* of the individual

6.2 Hazard Prevention and Control

This part of the Ergonomics Program consists of changing workstations, tools and the environment to fit the worker. This is the active process of eliminating or reducing the risk of injury by changing things that contribute to the risk factors.

Risk factors are eliminated or reduced by the use of three types of controls:

- Engineering controls
- Work practice controls
- Personal protective equipment

6.2.1. Engineering Controls

- Preferred method of control
- Makes permanent changes that eliminate hazards at the source
- Can be more expensive than other controls, but effect is often more significant
- Examples include; workstation design, work methods design, tool and equipment design

[An "Ergo Lab" is located on the 5th floor crossover and a presentation is given on a weekly basis. A variety of reasonably priced chairs, keyboard and mouse trays, document holders, and footrests are available from which individuals can select. Contact a member of the Ergonomics Subcommittee for additional information.]

6.2.2. Work Practice Controls

- Procedures for safe and proper work that are used to reduce the duration, frequency or severity of exposure to a hazard.
- Standard operating procedures (SOPs) should allow for enough workers to complete the tasks. Evaluations of the procedures should occur regularly.
- Worker's input should be incorporated into the problem solving process.
- Controls should be understood and followed by managers, supervisors and workers.
- Examples of work practice controls include; work methods training, gradual introduction to work, monitoring, recovery pauses, job rotation, job design, maintenance and housekeeping.

<u>Examples of Work Practice Controls</u>

<u>Work methods training</u> – Two ergonomic training classes are in place, *Computer Workstation Review* and *Industrial Ergonomics*. Employees are provided a general awareness of how to perform their job with the least amount of physical stress, while maintaining good body position and using good body mechanics. They will also be instructed

on how to handle materials, tools and equipment safely. A repeated course, *Computer Workstation Review Refresher* with Computer Workstation Review as prerequisite, is offered online as well to those employees whose supervisors select it on their ITNA.

Gradual introduction to work - For tasks that involve prolonged repetitive motion, new and returning employees are introduced slowly to a full workload to improve work capacity. *(See Medical Management)*

Monitoring - Jobs are regularly monitored to see if specified safe work practices are being used, and to insure that risk is reduced.

Recovery pauses - Employees can perform other activities that involve different muscle groups during pauses from the original activity.

Job rotation - Workers are rotated into different jobs/work activities that use different muscle-tendon groups, thus preventing fatigue.

Administrative Controls – A job or activity is divided among a number of workers rather than having one worker perform the entire job or activity. For example, four workers may perform an activity two hours each rather than one worker performing the activity for the entire eight hours.

Job design - Jobs can be (re) designed to incorporate good ergonomic practices. This includes providing relief from frequent repetitive motions, static or awkward postures, excessive forceful exertions, and mental/muscular fatigue.

Maintenance and housekeeping – This insure that tools and equipment are in good condition and perform to expectations.

6.2.3. Personal Protective Equipment

- Used to reduce the hazards until other controls can be put into place, or to supplement existing controls
- Eliminating the hazard is preferable

Note on back belts: No back belts are to be used by Fermilab personnel without prior review by the Occupational Medicine Office and the Division/Section ES&H group. Comprehensive studies to date have found no evidence that back belts are effective in reducing back injuries.

6.3 Medical Management

6.3.1. Injury Prevention

Detailed written job descriptions are needed for each job category. This is primarily the supervisor's responsibility. The descriptions should clearly define the qualifications, essential functions and physical requirements of the job. This is a good step in identifying risk factors, and eliminating them.

The subcommittee as well as supervisors will encourage suggestions from employees concerning job improvement. This will help to provide a direct source of ideas about injury prevention.

6.3.2. Management/Early Intervention

The focus here is to diagnose and treat the injury or illness during its early phase with the goal minimizing time lost and ensuring a safe return to work. Workers need to be encouraged to report injuries/illnesses to their supervisor as soon as they occur, who in turn should direct the employee to the Occupational Medicine Office. Workers shall not be discriminated against for doing so.

When an ergonomically related injury is reported to the employee's supervisor and the Occupational Medicine Office, medical personnel will report the incident to the divisional SSO and request that a workstation evaluation take place. If the SSO is not a part of the Ergonomics Subcommittee, the SSO should request that the subcommittee divisional representative or other knowledgeable individual evaluate the workstation.

6.3.3. Chronic Injury

The goals in cases of chronic injuries are to ensure a safe return to work without further complications and to prevent disability. Chronic injury intervention should begin under one or more of the following conditions:

- The employee has not returned to work and the claim remains unresolved.
- The employee has not returned to work and does not show demonstrated improvement from the *Management/Early Intervention* phase.
- The employee has returned to work with limited duties, but without resolution of the claim.

The injured worker's recovery status should be re-evaluated by Medical before returning to work. All barriers should be reviewed that are preventing the worker from returning to work.

6.4 Training and Education

Five classes are being offered to laboratory employees in TRAIN, and are tracked in the Individual Training Needs Assessment (ITNA). The ITNA contains questions that, when answered in the affirmative, indicate the need for one, two or all of these training classes. They are *Computer Workstation Review*, *Computer Workstation Review Refresher*, *Industrial Ergonomics*, *Backworks*, and *Backworks Refresher*, and cover the following:

- Signs and symptoms of musculoskeletal disorders
- Where to report symptoms
- Risk factors and potential causes
- How to report risk factors to the supervisor or Ergonomics Subcommittee

Training and educating employees on work-related musculoskeletal disorders is important to the success of the ergonomics program. It gives both workers and managers an understanding of the potential risk of injuries, their causes, symptoms, prevention and treatment.