REPETITIVE MOTION DISORDERS

THE

MEDICAL
ERGONOMICS
TRAINING
PROGRAM

A GUIDE FOR THE POULTRY INDUSTRY
DISCLAIMER

This guideline was developed by an independent poultry industry task force and has the endorsement of the National Broiler Council, National Turkey Federation, and the Duckling Industry. The guideline is intended to be used only as an aid to help the poultry processing industry address the incidence of employee medical disorders resulting from repetitive motion tasks that are inherent in poultry processing operations. Neither the task force members nor their respective companies nor the National Broiler Council, National Turkey Federation, nor the Duckling Industry make any warranty, expressed or implied, or assumes any legal liability or responsibility for any use or the results of such use of any information in this guideline.

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Concorde, Incorporated
744 East Passyunk Avenue
Philadelphia, PA 19147
INTRODUCTION

It is estimated that millions of dollars have been drained from the "bottom line" profits of the poultry industry by one continuing problem. These dollars have been spent on workers' compensation and group health insurance costs, absenteeism, turnover, training and retraining, and loss of productivity. The underlying cause of these costs is not always easy to identify or accept as a responsibility of doing business. This document addresses Repetitive Motion Disorders (RMD) as the causal factor in this loss of productivity and profit.

RMD's can briefly be defined as those medical complications resulting from the repetitive motion tasks inherent in production-line manufacturing and processing operations. This area of shared concern recently resulted in the formation of the Poultry Industry Task Force. The Task Force was established to identify the actual scope of the problem and possible solutions currently in use within the industry. The task force began this identification process by looking at the historical origins of the problem.

Task force discussion identified four major historical factors that have brought RMD's to the forefront of the industry's attention: 1) state worker's compensation laws; 2) a heightened awareness by the medical profession of RMD's, particularly carpal tunnel syndrome (CTS); 3) emphasis of industry in the 21st century on "line assembly" operations that require multiple repetitive motion tasks involving the hand, wrist, and forearm; 4) the Occupational Health & Safety Administration's (OSHA) response to the increasing incidence of RMD's and the concurrent effect on employee health and safety. These factors and their impact were identified as the motivation for the poultry industry's pursuit of the appropriate preventative measures.

The poultry industry has actively responded to the challenge of preventing RMD's over the last four decades. In the 1950's ergonomics began to be applied to individual work station design of the poultry processing work place. Job rotation and specific job-related safety training programs were implemented in the 1960's. The "seventies" saw the introduction of ergonomically designed hand tools, an increased emphasis on ergonomically designed work stations, and trials of vitamin therapy as a preventative medical strategy. Presently, in the "eighties," specific medical intervention programs that stress prevention through effective job placement, early identification of adverse reactions, and early intervention through appropriate medical treatment are being incorporated into the overall preventative approach. Regardless of the identified preventative efforts, RMD's remain the most frequently occurring and most costly employee injuries in some companies within the chicken, turkey, and duck processing industries.

On November 6 and 7, 1985, members of the poultry industry met with the representatives from OSHA in Washington, DC, to discuss the incidence of RMD's in the poultry industry. At this meeting, it was determined that the poultry industry has in many ways been a leader in the development of preventative approaches to RMD. The recommendation for a joint effort by members of the industry was made. The task force was then established in an effort to identify a comprehensive preventative approach which could benefit the poultry industry as a whole. Participation in the task force was solicited from companies that were recognized as having preventative programs which specifically address RMD's.
The primary stated goal of this group was to develop and distribute a "practical document" to guide the poultry processing industry towards the reduction of human suffering and the associated costs of RMD's. It was decided that this would be most effectively achieved by sharing the experiences of individual company preventative programs. Both successes and failures were reviewed in identifying possible preventative solutions to RMD. Preventative programming efforts were then classified into three areas: 1) training, 2) ergonomics and 3) medical intervention. Subcommittees of the original task force compiled comprehensive summaries of the findings within each of these three areas.

It must be stressed that the attached document is by no means a standard of performance, but a guideline, which has roots planted firmly in the soil of successful programming efforts utilized by a large portion of the U.S. poultry industry. The "triad strategy" of training, ergonomics, and medical intervention presents a sampling of possible interventions for decreasing the incidence and costs associated with RMD's. The selection of an appropriate strategy which fits an individual company's needs rests solely with the respective company's management. The task force representing the poultry industry supports any and all efforts in the prevention of RMD's as being proactive versus reactive and therefore definitely worthwhile. As part of this offer of support, all members of the task force are available to discuss identified concerns and questions.
TASK FORCE MEMBERS

Sam Fulginiti (Chairman)
Horace Longacre, Inc.
P.O. Box 8
Franconia, PA 18924

Randy Albrecht
Jerome Foods, Inc.
34 N. 7th Street
Barron, WI 54812

Janice Braunstein
Georgia Occupational Medicine
4939 Riverside Road
Atlanta, GA 30337

Jerry Briller (Training Subcmte.)
Longmont Turkey Processors, Inc.
P.O. Box 1479
Longmont, CO 80502-1479

Edward Brown (Medical Subcmte.)
Foster Farms
P.O. Box 457
Livingston, CA 95334

Donna Casorio (Ergonomics Subcmte.)
Gold Kist, Inc.
P.O. Box 2210
Atlanta, GA 30301

Mike Edmunds (Chr., Medical Subcmte.)
Tyson Foods, Inc.
P.O. Box E
Springdale, AR 72764

Ron Gillespie (Training Subcmte.)
ConAgra Frozen Foods
P.O. Box 70
St. Louis, MO 63022-0700

Pat Gleason (Training Subcmte.)
Loss Prevention Administration
Continental Grain Company
10 South Riverside Plaza
Chicago, IL 60606

Wayne Hubbert
Hudson Foods, Inc.
P.O. Box 777
Rogers, AR 72757

Debora Jones, RN
Concorde, Inc.
An Occupational Health Management Co.
744 E. Passyunk Ave.
Philadelphia, PA 19147

Jim McCauley
Perdue Farms
P.O. Box 1537
Salisbury, MD 21801

David Morrill (Ergonomics Subcmte.)
Gold Kist, Inc.
P.O. Box 2210
Atlanta, GA 30330

Dan Ortiz (Chrm. Ergonomics Subcmte.)
Georgia Tech Research Institute
Georgia Institute of Technology
Environmental Health and Safety Division
Economic Development Laboratory
Atlanta, GA 30332

Edwin Phelps
Louis Rich Company
P.O. Box 14077
Madison, WI 53714-0077

Stephen Pretanik
National Broiler Council
1155 15th Street NW/Suite 614
Washington, DC 20005

Ted Reynolds (Chrmn., Training Subcmte.)
Holly Farms Poultry Industries, Inc.
P.O. Box 88
Wilkesboro, NC 28697

Joan Rouse
Carolina Turkeys
P.O. Box 589
Mt. Olive, IN 46542

Jeff Rowe
Maple Leaf Farms
P.O. Box 308
Milford, IN 46542
Lew Waits
National Turkey Federation
11319 Sunset Hills Road
Reston, VA 22090

Dennis Woods (Medical Subcmte.)
Oscar Mayer Food Corp.
P.O. Box 1788
Madison, WI 53707
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TRAINING FOR PREVENTION OF REPETITIVE MOTION INJURIES

This section is intended to provide information on which to base an effective training program that will contribute significantly to the reduction of repetitive motion injuries.

The new employees and employees assigned to new jobs are acknowledged to be at a higher risk of injury than more established employees. Also, at high risk are established employees who have not received information on job hazards and their avoidance.

Carefully prepared and implemented programs are cost effective. In addition to providing employees with information needed to avoid injury, production considerations including quality and efficiency are generally enhanced.

By informing employees of the causes of repetitive motion disorders and appropriate avoidance methods including proper job techniques, use and maintenance of tools and equipment, hand and arm strengthening exercises, self-care and support available from supervisors and medical staff, many problems can be avoided.

Failure to train employees will result in a higher incidence of repetitive motion injury and can result in increased equipment damage, production inefficiency, and reduced quality.

The poultry industry faces several training problems that are not unique but certainly are exaggerated in comparison to many other industries.

Many times the training conducted by the poultry industry is informal in nature. Information is passed on to the trainees by other employees, lead men, supervisors, or trainers on the line. New workers receive on the job training while being coached by their trainer. This is certainly an acceptable method of training if there is some means of ensuring that all necessary information is passed along to the trainee. This type of training can be particularly effective with most jobs in the poultry industry because it does not artificially separate job steps and safety information.

Formal training systems in which employees are often taught in classrooms or on training lines sometimes using lectures, audiovisual programs, or a combination of the two can also be effective. These systems lend themselves mostly to training very large numbers of people in non-job specific areas, except in the case of training lines. Training lines are effective in allowing employees to gain job skills at a pace more conducive to learning.

Regardless of the method selected, training must follow some systematic method if it is to be cost effective and meet the objectives of reducing injuries while enhancing productivity and quality. Developing and implementing an effective training program can be broken down to the following steps:

1) Identify training needs.
2) Determine content.
3) Determine approach.
4) Select training objectives.
5) Select and train trainers.
6) Develop training activities.
7) Conduct training.
8) Document training given
9) Evaluate effectiveness
10) Improve programs

I. Identify Needs

The identification of training needs is the foundation of any training program. If a program does not lend itself to a solution by training, it would be senseless to try and solve it by training. One gauge of whether or not a problem lends itself to training is whether or not the person to be trained already knows enough about the subject to perform or behave as desired. If they do, no training is necessary. If they do not, then training will obviously be at least a partial solution to the problem.¹

For the purposes of determining the training needs of transferred personnel and new hires, it should be assumed that they have not had exposure to training designed to reduce repetitive motion disorders.

Supervisors, trainers, and lead persons will have training requirements that depend on existing knowledge of the individual.

II. Determining Program Content

Program content is determined by needs. In order to prevent injury, all potential areas of training should be considered. If the underlying assumption is that employees do not have sufficient knowledge to avoid repetitive motion disorders, then all of the following should be considered as necessary information:

A. Causes of repetitive motion disorders
   1. Occupational risk factors
   2. Non-occupational risk factors
   3. Simple explanation of physical factors of carpal tunnel syndrome, tenosynovitis, back injuries, tendonitis, and the like
   4. Simple anatomy of back and upper extremities

B. Early detection
   1. Symptoms of repetitive motion disorders
   2. How to react to early symptoms
      a. Self-help techniques
      b. Report to supervisor
      c. Report to medical staff
   3. Work methods
      a. Proper job techniques
      b. Proper maintenance and use of tools
      c. Use of gloves where appropriate

4. Familiarization with ergonomic controls in work place
   a. How controls work
   b. What to do
   c. How to adjust or use

5. Job-hardening/break-in
   a. Exercise programs
   b. Work/rest cycles

C. Additional Necessary Information

1. Supervisors, trainers, and lead persons must be familiar with:
   a. Their responsibilities within the program
   b. Detection of incipient problems through observation of employees
      work habits and techniques
   c. Basic ergonomics
   d. Training methods

2. Sources of information
   a. Job safety analysis
   b. Hourly employees
   c. Supervisors and lead persons
   d. Medical staff
   e. Engineering staff
   f. Outside consultants
      (1) Physical therapists
      (2) Ergonomics
      (3) Training consultants

3. Information necessary to management
   a. Need for visible commitment to program
   b. Content and objective of program
   c. Basic ergonomics
   d. Basic biomechanics

III. Determination of Training Approach

A. Factors Involved
   1. Availability of facilities
   2. Depth of training
   3. Type of job
   4. Available staff
   5. Time available for training
   6. Management preference

IV. Selection of Objectives

Selection of objectives is most important. Objectives should be well understood
prior to beginning training. Any objectives must be measurable. Testing or
observation should be the key determinates. Observation is particularly effective
in determining the effectiveness of training in areas such as work methods.
One pitfall is that failure to do something the right way is not always due to inadequate training. One way to determine if training is faulty is to ask the question, "If this person's life depended on it, could he/she do the task properly?"  

A. Notes on objectives  
1. Must be precise (using words like understands, know, etc. is not sufficient)  
2. Identify what a person will be doing to demonstrate competency  
3. Include conditions under which the person must demonstrate competence  
4. Define criteria of acceptable performance  

V. Developing Training Activities  

Training activities depend largely on the subject matter to be taught. Where manual skills are involved, hands-on activities where the employee learns while doing are generally most practical. Audiovisual aids are helpful in activities such as teaching the anatomy of the wrist. They can often be used as a short break from on-the-line work.  

A. Factors determining training activities  
1. Subject matter  
2. Facilities available  
3. Local preference  
4. Available staff  

Learning activities should be designed so that when activities are over the trainer will be able to tell if the employee has acquired the skills or knowledge presented.  

VI. Selection and Training of Trainers  

An often overlooked factor in training is that not everyone has the necessary skills to effectively train employees. This is particularly true in the case where supervisors and lead people are the primary trainers. These people are often selected for their ability to do a job not for their training skills.  

A. Skills necessary to trainer  
1. Demonstration of commitment to program  
2. Ability to present material clearly  
3. Ability to make others comfortable in a new situation  
4. Patience  
5. Skills and knowledge in subject matter  

B. Consequences of not providing adequate training  
1. Legal  
2. Moral  
3. Loss of profits  

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C. Cause of injuries/repetitive motion disorders
   1. Predispositional factors
   2. Health status
   3. Job techniques
   4. Ergonomic factors

D. Problem identification
   1. Early symptoms
   2. Poor work habits that can lead to problems

E. Problem solving
   1. What to do when problems arise
   2. Available help such as medical staff

F. Good training techniques

G. Methods and importance of documentation
   1. What to document
   2. When to document
   3. Legal consequences of failure to document

VII. Conducting Training

Once the steps previously described have been completed, it is time to begin training. The training should always be connected in some manner with the overall operation of the plant. This can effectively be done during initial orientation of an employee but should be repeated during specific training.

A. Introductory training - a first step
   1. Provide an overview of the training to follow
   2. Connect each skill to the training objectives selected and describe objectives
   3. Connect skills to their importance in overall production process and the employees interests and experience

B. Basic skills training - essential hands-on experience
   1. Introduction (as described in A)
   2. Show skills step by step from employee's perspective
   3. Talk employees through performing skills correcting mistakes in positive manner as they are made
   4. Have employee perform task on his own with trainer's coaching, correcting errors and providing encouragement
   5. Provide opportunity for practice until skills are perfected and observable objectives are reached
   6. Conclude by reinforcing skills taught to job duties and inform employee of future training or placement on regular job

VIII. Documentation

All training given to any employee at any time should be documented. Documentation provides proof that information was passed along and will help in ensuring that all employees receive the required training. This can be especially helpful during OSHA inspections or legal proceedings.
A. Necessities in documentation
   1. The name(s) of the trainer(s)
   2. Date and place where training was conducted
   3. Content of training
   4. Test results or statement of completion of objectives
   5. Statement that employee understands training and why it was given.
   6. Statement that the employee was given an opportunity to ask questions and clear up areas of misunderstanding
   7. Disciplinary or other action that may be taken towards employee for failure to perform as instructed
   8. Name and signature of trainer
   9. Signature of trainee
   10. Date of training and signature

Training checklists can also provide an excellent source of documentation. If a check list indicating all the important items in a training segment is developed, it can be used to guide the trainer through each step and be kept on file as documentation. This is especially helpful where on-line training is involved.

Documentation should be completed as soon as the training is finished. The documents should be kept on file in a manner that allows the file easily retrieved. Placement in an employee’s personnel record or individual training files (if kept) with cross reference on a master training log is an effective method.

IX. Evaluation of Program Effectiveness

A. Criteria for evaluating results
   1. Were all behavioral objectives met by trainees?
   2. Are company goals being met?
      a. Injury reduction
      b. Improved efficiency
      c. Improved quality
   3. Has job performance improved?

Determining the above will lead to improvements of the program. By observing employees on the job and measuring the other factors both before and after the training, comparisons can be made providing insight as to areas in which improvement can be made.

X. Program Improvement

If the evaluation of the program indicates that all objectives were met satisfactorily, no further work is needed except to ensure that the program continues and is monitored to ensure that it does not fail by the wayside.

A. Steps toward unaccomplished goals
   1. Make sure objectives selected were appropriate to problem
   2. Make sure training addressed objectives
   3. Did instructors actually teach desired materials?
   4. Was training appropriate to job?
   5. Were the training activities matched to desired skills?
During this phase, it may be necessary to go back to any or all of the previous steps described. If further improvement does not help, then it is possible that motivational factors are the cause and must be corrected before training will be effective.

Training can reduce incidence of repetitive motion disorders if it is well thought out and effectively implemented.
ERGONOMIC CONSIDERATIONS

As one of the legs of the intervention strategies "triad", the application of ergonomic principles in designing and modifying the work environment is surely one of the most visible and viable means of achieving effective production in our processing facilities. As a major note, the active implementation of these principles also pays rich dividends in the reduction of costs due to various repetitive motion disorders/diseases brought on by repetitive motion tasks. The following guidelines are presented to help formulate the total ergonomic approach to the poultry processing work place.

1. Work Station Design

   a. Work Elevation:

      Arm work should be done with elbows down, as close to the body as possible, and the elbow flexor angle between 85 and 100 degrees. This posture will allow the forearm flexor muscles to work at a biomechanical advantage. It is recommended that all work be located somewhere between two inches below to two inches above the elbow height where possible. Elbow height can be estimated using the following formula:

      \[
      \text{ELBOW HEIGHT} = 0.63 \times \text{EMPLOYEE HEIGHT}
      \]

      Many people design the work height for the "average" person. Others recommend that the work height be adjusted for the "tall" worker where the "small" worker is raised with the use of a platform. It is important to emphasize that this represents an ideal approach to work elevation height and that deviation by as little as two inches from this will decrease employee productivity and will also increase the probability of repetitive motion disorders. Therefore, when designing the proper work station height, these physical parameters should be considered strongly.

   b. Foot Support

      Installing foot rails along the processing line helps take a strain off employee's lower spine and therefore makes for a more comfortable work environment. Recommendations call for a rail height ranging from 11 inches for a small woman (60.3 inches in standing height) to 14 inches high for a large man (75.1 inches). For the "average" adult (67.5 inches), the value is 12.5 inches. Several industry contacts indicate great success with a three rail system consisting of 6 inch, 12 inch, and 18 inch section rails respectively. Foot rails of variable heights could be run along different sections of the line and people placed accordingly. The heights of the work platform must also be taken into consideration when installing these rails. A properly designed foot rail will allow the backbone to assume its least stressful configuration (S-shaped) and will permit employee to alternate feet thus creating a work/rest (i.e. contraction/relaxation) cycle for different muscle groups. Also, anti-stress pads should be considered along processing lines. These should be made of a manufactured type that meets USDA standards and/or approvals.
      When purchasing these pads, consideration should be given to tapered edges and contrasting colors to reduce fall potential.
c. **Reach Envelop:**

The reach envelop refers to the area in front of the worker where the bulk of the work is accomplished. For a standing work place position, forward reaches should not exceed 18 inches in front of the employee. For seated employees, 16 inches is the recommended distance. Frequent reaching outside this work envelop could significantly increase the load on the back as well as upper extremities. Proper training and correct job techniques are an essential part of this reach envelop concept.

d. **Sit-Stand:**

Some work stations can be designed with "sit and stand" posts where employees can alternately sit, stand free, or lean back on a solid support. Using all three of these specific postures will stress different muscle groups so that, with each changeover from one posture to another, some muscles will be in relaxation while others will be in use. It is important to note that in designing these "sit-stand" work stations one should not create a problem of causing employees to over-reach thereby taking them beyond the established limits set forth in the reach envelop concept in Section c. above.

e. **Lighting:**

Poor lighting will not only result in poor performance, it can cause distinct visual discomfort among employees. General lighting guidelines for the poultry industry have been developed by the Illuminating Engineering Society of North America (IESNA). It is recommended that familiarization with these guidelines be made. Glare minimization can be achieved by the use of fluorescent and "moonbeam" type lighting as well as color contrast modifications (i.e., green conveyor belts as opposed to white). Glare reduction and adequate lighting will enhance visual performance.

f. **Temperature:**

Gloves are traditionally used to protect the hands from cold/damp environments. Because of USDA restrictions and regulations, and the wide variation in temperature, relative humidity, and airflow between plant locations, it is not possible to recommend a specific temperature.

g. **Manual Materials Handling:**

The NIOSH Work Practices Guide for Manual Lifting is the most comprehensive guide to the subject to date.

Note: See attachments A1, A2, and A3 for diagrams regarding suggested work design.

2. **Job Methods/Work Practices**

a. **Task Analysis:**

Related to training, it is important that engineers and supervisors are familiar with the high risk motions and postures that increase susceptibility to
repetitive motion disorders. With this knowledge, suspect tasks should be carefully examined using any one of a number of analytical methods (e.g., job activity, work task, work cycle, or Method Time Management [MTM] analysis). Familiarity with repetitive motion disorders is also necessary for the purpose of identifying injury/illness trends or tendencies.

b. Methods Modification:

Each hand-intensive, repetitive task should be carefully examined to determine if exposure to the stressful components can be reduced through job methods modification. It is well documented that quite often inexperienced workers use relatively forceful and inefficient motions/postures to accomplish the task. On the other hand, many "well seasoned" employees adopt smooth fluid motions using fewer strokes to accomplish the same task. Motion and strength conservation will certainly help prevent or reduce the likelihood of repetitive motion disorders. Therefore, the experienced repetitive motion disorder-free worker should be used as a model for developing work practices. Also, the use of the forearm muscles and less wrist action should be promoted here and in the training program. Example: Some cuts can be made with the knife held vertically in a power grip (very little wrist motion). In this situation, protective gloves (on both hands) must be worn to prevent cuts and lacerations.

c. Job Rotation:

When properly scheduled and designed, job rotation may be an effective control strategy for the industry. Workers can be rotated between jobs having different force demands to minimize the time spent on the jobs with the greatest strength requirements. Care must be taken when evaluating which jobs qualify for this program. Rotation between two or more hand-intensive jobs may not be the answer if the force and stroke requirements are the same or greater.

d. New Employees:

When practical, new or inexperienced workers should be thoroughly oriented to the job tasks via the use of stationary or separate training lines and should be brought up to production speed gradually.

3. Automation

Careful examination and evaluation of highly repetitive jobs will help management determine which jobs, if any, can be replaced by automated equipment. This can, in many cases, reduce repetitive motion disorder problems for highly repetitive jobs and should be strongly considered.

4. Hand Tools

a. Knife Design:

The knife and orientation of the work can cause the process line worker to assume a bent or deviated wrist position to accomplish the task. Therefore, the knife and specific job should be closely studied to determine if handle
redesign can reduce this bending motion. Due to the vast variety of different cuts and individual motions, a single type of knife handle (or blade) may not be appropriate for all jobs.

b. Knife Sharpening:

To help minimize the efforts of making a cut, all knives should be placed on a strict and timely sharpening schedule. Employees must be made aware of the need for this control over sharp knives.

c. Other Handle Design Considerations:

Generally speaking, a properly designed (not just the shape) tool can help keep the job effort to a minimum. A list of important considerations that, as a minimum, can be used as purchasing guidelines, are provided as follows:

i. Cylindrical handle diameters from 1.25 to 2.0 inches. Preferred diameter is 1.5 inches.

ii. Double handled tool spans (e.g., scissors and pliers) from 2 to 2.5 inches.

iii. To accommodate the hand breadth of over 90 percent of the working population, the handle length should be at least four inches. Handles that end in the middle of the palm of the hand can damage soft tissue and nerves and promote hand distress.

iv. Ideally, handles should permit workers to use either hand.

v. Warm water stations should be placed at regular intervals along the line so built-up grease can be removed from the knife handle when necessary.

vi. Insulated, and textured handles enhance tactile sensory feedback and are strongly encouraged.

5. Personal Protective Equipment

a. Footwear:

Employee footwear needs to be slip resistant for the damp environments of our industry. They should be orthopedically sound to promote comfort and work tolerance and should also be durable for long life.

b. Gloves:

Gloves provide protection against the following:

i. Cuts (principally on the non-dominant hand)

ii. Temperature extremes

iii. Water

With regard to glove use for jobs that require forceful exertions, it is important that they fit properly. Loose fitting gloves can produce pressure on the soft tissue of the hand as well as reduce strength capability by as much as
40 percent. Therefore, a variety of glove sizes should be made available to employees.

6. Training and Support

Training is an integral part of any ergonomic prevention or intervention strategy. In a successful program the two cannot be separated without severely undermining the overall level of effectiveness. Moreover, as with all programs related to worker's safety and health, if there is no management support structure (that is also highly visible) the program is doomed to fail. Training will be discussed in detail in another section. Management representatives and engineering staff personnel should receive specific training in ergonomics, describing the advantage of their active participation. A system of employee feedback should also be encouraged as a method of gaining valuable insight into what work place changes might need to be made and the impact of any changes that have been made.

In conclusion, through the implementation of these ergonomic guidelines, processing management can realize a real decrease in cumulative trauma disorders amongst their work force and at the same time realize higher levels of effectiveness, productivity, and employee morale.
MEDICAL INTERVENTION

The Poultry Industry has recognized that Repetitive Motion Disorders (RMD) often-times result in the loss of services of valuable employees, lessen production efficiency, and impact on profitability as a whole. As a result of such awareness, the industry has actively sought to develop programs for reducing RMD and for minimizing its severity.

The mission of the medical intervention committee has been to assimilate and evaluate medical and related activities that have been successful in reducing incidence rates of RMD.

The following report combines recommendations and procedures from major U.S. Poultry Producers used for reducing and minimizing effects from RMD. Primary categories of consideration include:

1. Pre-placement screening
2. Physical conditioning
3. Recognition and treatment of early symptoms
4. Recommended physician-directed treatment

Goals of Medical Intervention

1. Minimize employee pain and suffering
2. Maintain employee morale
3. Maintain efficiency and productivity
4. Minimize dollar losses

Cost to industry is a factor that cannot be overlooked. Injury costs are among the few controllable variables of production. Management is aware of the following direct and indirect costs resulting from injuries:

Direct costs

1. Medical
   a. Doctor fees
   b. Medication
   c. Medical supplies
   d. Second opinions
2. Indemnity
3. Surgery
4. Legal fees
5. Therapy - physical, vocational

Indirect costs

1. Time lost for doctor visits
2. Increased group health costs
3. Decreased employee morale
4. Decreased production because of impairment
5. Supervisor lost-time
   a. New employee training
   b. Injury-related paper work
6. Reduced production of replacement workers
I. Pre-placement screening

The pre-placement exam is an effective tool for matching an employee's physical capabilities with specific physical job requirements. During the upper-extremity phase of the assessment, a careful history is taken followed by a detailed visual exam of the upper extremity according to the following format:

II. Pre-placement assessment

A. History

1. Trauma, numbness, tingling in the hands and fingers, previous problems with working, fractures, lacerations, tendon repairs, deformities, pregnancy, previous surgery for ganglions, trigger finger, DeQuervain's disease, tennis elbow, and thoracic outlet syndrome

2. Any medications taken for thyroid disease, fluid retention or arthritis, birth control pills, hormonal therapies

3. Previous symptoms on activities such as: quilting, sewing, gardening, yard work, talking on the phone, combing hair, sleeping, driving, etc.

B. Exam

The following symptoms are signs of:

1. Synovitis: Swelling, tenderness in the extensor and flexor areas, joint tenderness with swelling and enlargement

2. Trigger Fingers: Locking fingers, tenderness, and pain in the flexor tendon areas

3. DeQuervain's Disease: Tenderness over the styloid of the radius, crepitation of the extensor mechanism of the thumb

4. Carpal Tunnel Syndrome: Tinel's sign, Phalen's test, tenderness, weakness, and numbness

5. Carpo-Ulna Tendonitis: Subluxation of the ulna

6. Epicondylitis: Tenderness to pressure over the medial and lateral condyles of the elbow

7. Tennis Elbow: Tenderness over the head of the radius

8. Bursitis: Tenderness over the coracoid and bicepital groove

9. Thoracic Outlet Syndrome: General weakness and/or aching of the arm, decreased range of motion of the upper extremity, loss of pulse on turning head from side to side and deep breathing (Adson's sign)

Additionally, examination may include a range of motion test and a grip strength evaluation with a dynamometer.
Some companies have made efforts to quantify the results of physical assessments. IsokinetiC equipment may be used in gathering pre-placement physical data. In analyzing the upper and lower extremities, the isokinetiC system is providing reliable data concerning abnormality regarding:

1. Joint strength
2. Range of motion
3. Endurance

III. Physical conditioning

Physical conditioning greatly influences one's ability to perform repetitive work. Conditioning programs may be introduced at hiring to assist an employee through the "break-in" period. Such programs can be used at shift-starts and periodically through the production day to maintain strength, flexibility, and range of motion. Finally, conditioning programs have been proven effective in speeding the healing and rehabilitation process for injured workers.

In this section examples of conditioning exercises are provided. They are designed to "warm-up" and to develop flexibility. They may be used 2 or 3 times a day.

The second set of three exercises is a series designed for muscle strengthening.

Exercises should be used for both hands and combinations should be varied to achieve the best success for the appropriate purpose.

(Anyone under medical care should consult with his doctor before participating. Care should be taken to avoid excessive motion in all directions during exercise.)
The following are exercises to be done 2 times a day to reduce fatigue on the job:

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backward Bending</td>
<td>Standing with both hands on back of hips - lean back gently (5 repetitions)</td>
</tr>
<tr>
<td>Shoulder Shrugs</td>
<td>Shrug both shoulders together up and then release. Then just the right side</td>
</tr>
<tr>
<td></td>
<td>and just the left side - releasing each time (5 repetitions both, 5 repetitions each side)</td>
</tr>
<tr>
<td>Reaching Up and Rope Climbing</td>
<td>Stretch both arms overhead as high as possible and pretend to climb rope</td>
</tr>
<tr>
<td></td>
<td>using arms only (5 repetitions)</td>
</tr>
<tr>
<td>Rowing Exercises</td>
<td>With arms up at shoulder level, pull both elbows back - squeezing shoulder</td>
</tr>
<tr>
<td></td>
<td>blades together</td>
</tr>
<tr>
<td>Finger Stretch</td>
<td>Open hand and fingers as wide as you can and then clench fist (5 repetitions)</td>
</tr>
</tbody>
</table>
IV. Recognition and Treatment of Early Symptoms

Early detection and aggressive treatment of RMD is a key in averting a problem and perhaps disabling injury. Most companies having a company nurse have procedures in place for quick reporting of RMD symptoms. Nurses under the direction of a physician can then proceed with the conservative on-site treatment and then attempt to manage the problem to avoid the need for more radical intervention.

Early symptoms for Tendonitis and Carpal Tunnel Syndrome with conservative suggested treatment are as follows:

A. Early symptoms

1. Pain in hand and/or wrist
2. Tingling in hand and/or wrist
3. Swelling in hand and/or wrist

B. Treatment for early symptoms

1. Cut down amount of work done at present job; and/or
2. Recondition employee
3. Reinstruct employee on proper techniques
4. Administer ibuprofen every 4-6 hours for swelling and pain
5. Apply analgesic balm and ace wrap or coban
6. Suggest hot and cold alternating soaks
7. Hot wax bath if available PRN

C. Secondary symptoms

1. Early symptoms along with numbness in day and/or night
2. Hear or feel crepitus (squeaking)

D. Treatment for secondary symptoms

1. Put hand completely at rest
2. Apply forearm splint for no longer than 2 weeks
3. Refer to a physician if no progress is made after 2 weeks of treatment or if symptoms become worse

V. Examples of Physician Directed Treatment (General Comments)

------------------------------------------------------------------------------------------------------

DISCLAIMER

The following treatments are examples only. The treatments your company uses must be directed by a qualified physician. These treatments are merely descriptions of those being used by some doctors and are not intended as doctor’s orders.

------------------------------------------------------------------------------------------------------
Effective treatment for industrial RMD generally requires a physician who has had considerable experience with both Repetitive Trauma problems and with industry, and the various jobs performed in industry. For these reasons, employers should seek out the most qualified physician in the community to deliver medical care.

Included in this section are two treatment regimens submitted by physicians skilled and experienced in handling RMD cases.

The first is comprehensive and is limited to Carpal Tunnel Syndrome. The second is more general but covers suggestions for treating all of the common Repetitive Motion Disorders.

Prior to surgical intervention, an appropriate second opinion from a qualified physician should be considered.

You will note in the second treatment outline that reference is made to vitamin therapy, using Vitamins C and E. These vitamins are thought to enhance production of synovial fluid. Additionally, some physicians support and advocate the use of B-6.

VI. Examples of Treatment - Carpal Treatment Syndrome

A. Splint and two to three week trial of anti-inflammatories (watch for GI tract problems). Splint may be worn day and night - most effective at night.

B. Light work or no work for two weeks. Avoid overtime.

C. Counsel about avoiding off-the-job activities which might aggravate the problem (get off-job history)

D. If no response in two to three weeks, refer to physician for evaluation and consider steroid carpal tunnel injection. Then continue splint, medications, and light work.

E. Follow-up with physician in two or more weeks; if progressing, then continue regimen or slowly advance work; if digressing, get EMG; continue re-exam, reassess history.

F. If response is not satisfactory after five to six weeks, and if history, EMG, and hand X-rays are all consistent, consider surgery (five to six weeks after the onset of treatment) - and the patient must understand the implications of operation, risks, expected results.

G. If all considerations have been entertained and the patient has a favorable result predicted and all parties understand, then Carpal Tunnel Release (operation) is performed.
   a. Short procedure
   b. Local or block anesthesia
   c. External neurolysis for severe constriction
   d. Direct visualization of entire medical ligament from distal forearm (2 cm, prox to wrist) to distal end of transverse carpal ligament
   e. Six to eight weeks recovery prior to resumption of heavy hand usage
   f. Follow-up in office in three to six months
VII. Repetitive Motion Disorders - Suggested Treatment

A. Synovitis

1. Early recognition treatment
   a. Analgesics, heat, rest, vitamin therapy (3 grams of C and 1200 units of E for people less than 120 pounds - 4 grams of C and 1600 units of E for people larger than 120 pounds)

2. Late recognition or moderate symptom treatment
   a. Discontinue repetitive motion work
   b. Increase vitamin therapy to 4 grams of C and 1600 units of E
   c. Continue heat and analgesic
   d. Continue treatment until symptoms subside. If greater than four weeks, discuss with medical director

B. DeQuervain's Disease

1. Treatment is same as above

2. If squeaking occurs at the extensor mechanism of the thumb, repetitive motion should be stopped and vitamin therapy of 4 and 4 should be instituted. The duration of the treatment should be until the symptoms have completely subsided and then a maintenance dose of 3 grams of C and 1200 units of E are continued as long as repetitive motion work is done.

C. Stenosing Synovitis (Trigger Finger)

1. 4 grams of C and 1600 units of E

2. If symptoms are no better in three months, surgery should be considered

D. Carpo-Ulna Tendonitis

1. Stop repetitive motion
2. Analgesics
3. If in the late stage, cortisone injections

E. Carpal Tunnel Syndrome

1. Early recognition (mild pain over the carpal tunnel area)
   a. 4 grams of C and 1600 units of E
   b. Vitamin B-6, 100 mgs per day

2. Later recognition (includes intermittent tingling and numbness of hand)
   a. 4 grams of C and 1600 units of E
   b. Vitamin B-6, 100 mgs per day
   c. Stop repetitive motion

3. Too late recognition (includes continuous numbness)
   a. EMG studies
   b. Consider carpal ligament resection
F. Epicondylitis

1. Early recognition
   a. Heat and analgesics

2. Late recognition
   a. Injection and surgery

G. Tennis Elbow

1. Analgesics
2. Rest and hand splint
3. Injection with cortisone

H. Bursitis

1. Anti-inflammatory medication
2. Injection with cortisone

I. Thoracic Outlet Syndrome

1. Conservative treatment consisting primarily of posture improvement, correction of sleeping habits and shrugging exercises
2. Avoid overhead work and exercise
3. Last resort: surgery with resection of the first rib

Conclusion

Repetitive Motion Disorders are more clearly understood today than they were, even five years ago. It is clear that the poultry industry should continue the programs of effective prevention and treatment they have begun. The industry should move into the research arena for new information, should continue to move toward promoting wellness in the work place, and should link the many medical intervention facets into a single science for reducing RMD in the work place.
PROPER WORK STATION

55 FT CANDLE AT 3 FEET

ELEV. 2"

36"

STEP

WORK STATION DESIGN
Dwg No. 676
MATERIAL HANDLING

USE SCISSORS LIFT

HELPs ELIMINATE BACK PROBLEMS, MUSCLE PULLS, AND STRAINS
LESSENS FATIGUE, INCREASES PRODUCTIVITY

WORK STATION DESIGN
Dwg No 678
NORMAL WORKING AREAS

WORK STATION DESIGN
DNG NO 679
EXERCISES

BACKWARD BENDING

SHOULDER SHRUGS
FINGER STRETCHING
THE HAND GRIP

Squeeze the gripper as many times as possible with a goal of 20 to 30 continuous repetitions. This exercise will develop the finger and hand muscles.

THE THUMB SQUEEZE

With the ball located in the palm of your hand, press the ball with your thumb, toward the fingers. Do not press the ball with your fingers. This exercise will develop the thumb muscles.
THE FINGER SQUEEZE

With the ball located in the palm of your hand, squeeze the ball with all of your fingers. Use a rolling action like you were making a fist. Relax your hand and repeat 25 times. This exercise will strengthen your fingers.
Ergonomic Consultants State OSHA Consultant Services

**FEDERAL OFFICE**
OSHA Office of Consultation Program
200 Constitution Ave., NW
Room N3700
Washington, DC 20210
202-532-7102

**ALABAMA**
Alabama Consultant Program
P.O. Box 6005
University, AL 35486

**ALASKA**
Department of Labor
Occupational Safety and Health
3301 Eagle Street
POUCH 7-022
Anchorage, AK 99510
907-276-5013

**ARIZONA**
Consultation and Training
Arizona Division of Occupational Safety and Health
P.O.Box 19070,
1624 W. Adams
Phoenix, AZ 85005
602-255-5795

**CALIFORNIA**
CAL/OSHA Consultation Service
525 Golden Gate Ave., 2nd Floor
San Francisco, CA 94102
415-557-2870

**COLORADO**
Occupational Safety & Health Section
Institute of Rural Environment Health
110 Veterinary Science Bldg.
Colorado State University
Fort Collins, CO 80523
303-491-6151

**CONNECTICUT**
Div. of Occupational Safety & Health
Connecticut Dept. of Labor
200 Folly Brook Blvd.
Wethersfield, CT 06109
203-569-4550

**DELAWARE**
Delaware Dept. of Labor
Div. of Industrial Affairs
8220 N. French Street, 6th Floor
Wilmington, DE 19801
302-571-3908

**DISTRICT OF COLUMBIA**
Occupational Safety & Health Div.
District of Columbia Department Employment Services
2900 Newton Street, NE
Washington, DC 20018
202-832-1230

**FLORIDA**
Dept.of Labor & Employment Security
Bureau of Industrial Safety & Health
LaFayette Bldg., Room 204
2551 Executive Center Circle West
Tallahassee, FL 32301
904-488-3044

**GEORGIA**
Economic Dev. Div, Tech. & Dev. Lab
Engineering Experiment Station
Georgia Institute of Technology
Atlanta, GA 30332
404-894-3606

**GUAM**
Department of Labor, Govt. of Guam
23548 Guam Main Facility
Agana, Guam 96910
671-772-6291

**HAWAII**
Education & Information Branch
Div. of Occupational Safety & Health
677 Ala Moana, Suite 910
Honolulu, HI 96813
808-548-2511

**IDAHO**
OSHA ONSITE Consultation Program
Boise State, Cmmnty/Envmnmt Health
1910 University Drive
Boise, ID 83725
208-385-3929
ILLINOIS
OSHA Onsite Consultation Program
Dept. of Commerce & Community Affairs
310 S. Michigan Ave., 10th Floor
Chicago, IL 60601
800-972-4141 ext. 4216

INDIANA
Bureau of Safety Education & Training
Indiana Division of Labor
1013 State Office Bldg.
Indianapolis, IN 46204

IOWA
Bureau of Labor
307 W. 7th Street
Des Moines, IA 50319
515-281-3606

KANSAS
Kansas Dept. of Human Resources
401 Topeka Ave.
Topeka, KS 66603
913-296-4086

KENTUCKY
Education & Training, Occupational Safety & Health
Kentucky Dept. of Labor
127 South, 127 Bldg.
Frankfort, KY 40601
502-564-6895

LOUISIANA
No services available as of yet

MAINE
Div. of Ind. Safety
Maine Department of Labor
Labor Station 45/State Office Bldg.
Augusta, ME 04333
207-289-3331

MARYLAND
Consultation Services
Div. of Labor & Industry
501 St. Paul Place
Baltimore, MD 21201
301-659-4210

MASSACHUSETTS
Div. of Industrial Safety
Mass. Dept. of Labor & Industries
100 Cambridge St.
Boston, MA 02202
617-727-3557

MICHIGAN (Health & Safety)
Special Programs Section
Div. of Occupational Health
Mich. Dept. of Public Health
3500 N. Logan
Lansing, MI 48909
517-373-1410

Safety Education & Training Div.
Bureau of Safety & Regulation
Michigan Dept. of Labor
7150 Harris Dr., Box 30015
Lansing, MI 48909
517-322-1809

MINNESOTA
Consultation Unit, Dept. Labor & Ind.
444 LaFayette Rd., 5th Floor
St. Paul, MN 55101
612-296-2973

MISSISSIPPI
Div. of Occupational Safety & Health
Mississippi State Board of Health
P.O. Box 1700
Jackson, MS 39205

MISSOURI
Missouri Dept. of Labor & Ind. Reltn.
722 Jefferson Street
Jefferson City, MO 65101
1-800-392-0208

MONTANA
Montana Bureau of Safety & Health
Div. of Worker’s Compensation
815 Front Street
Helena, MT 59604
406-449-3402

NAVAJO NATION
The Navajo Nation
Window Rock
Navajo Nation (Arizona) 86515
602-871-6335
NEBRASKA
Nebraska Department of Labor
State-House Station/State Capitol
P.O. Box 94600
Lincoln, NE 68502
402-475-8451 ext. 258

NEVADA
Div. of Occupational Safety & Health
1370 S. Curry St./Capitol Complex
Carson City, NV 89710
702-885-5240

NEW HAMPSHIRE
New Hampshire Labor Dept.
Safety Consultation Program
19 Pillsbury Street
Concord, NH 03301
603-271-3170

NEW MEXICO
OSHA Consultation
Health & Environment Dept.
Environmental Improvement Div.
Occupational Health & Safety Section
4215 Montgomery Blvd., NE
Albuquerque, NM 87109
505-842-3387

NEW YORK
New York State Dept.of Labor
2 Worlds Trade Center, Room 6995
New York, NY 10047
212-488-7746 or 7747

NORTH DAKOTA
Div. of Environmental Engineering
Dept. of Health
Bismarck, ND 58505
701-224-2366

OHIO
Dept. of Ind. Reltns./Div. Onsite Cnslt.
P.O. Box 825 - 2322 5th Avenue
Columbus, OH 43216
800-282-1425

OKLAHOMA
OSHA Div., Oklahoma Dept. of Labor
State Capitol- Suite 118
Oklahoma City, OK 73105
405-521-2461

OREGON
Consult. Sect., Dept. of Worker's Comp.
Accident Prevention Division
Labor & Industry Building
Salem, OR 97310
503-378-3273

Pennsylvania
OSHA Consultation Program
205 Uhler Hall
Indiana University in Pennsylvania
Indiana, PA 15705
412-357-2561

PUERTO RICO
Occupational Safety & Health
Puerto Rico Dept./Labor & Human Srvs.
505 Munoz Rivera Ave., 21st Floor
Hato Rey, PR 00919
809-754-2134

RHODE ISLAND
Division of Occupational Health
Rhode Island Dept. of Health
205 Health Dept Bldg./The Cannon Bldg
Providence, RI 02903
401-277-2438

SOUTH CAROLINA
Consultation & Monitoring
South Carolina Dept. of Labor
P.O. Box 11329
Columbia, SC 29211
803-758-8921

SOUTH DAKOTA
S.T.A.T.E. Engineering Extension
South Dakota State University
Box 2218
Brookings, SD 57007

TENNESSEE
OSHA Consultative Services
Tennessee Dept. of Labor
501 Union Bldg. - 3rd Floor
Nashville, TN 37219
615-741-2793
TEXAS
Div. of Occupational & Safety, State Safety Engineer
Texas Dept. of Health & Resources
110 West 49th Street
Austin, TX 78756

UTAH
Utah job Safety & Health Consultation Service
307 West 200 South, Suite 4004
Salt Lake City, UT 84101
801-533-7927

VIRGIN ISLANDS
Div. of Occupational Safety & Health
Virgin Island Dept. of Labor
Lagoon Street, Room 207
Frederiksted, Virgin Islands 00840
809-772-1315

VIRGINIA
Dept. of Labor & Industry
P.O. Box 12064
205 N. 4th St.
Richmond, VA 23241
804-786-5875

WASHINGTON
Dept. of Labor & Industry
P.O. Box 207
Olympia, WA 98504
206-753-6500

WEST VIRGINIA
West Virginia Dept. of Labor
State Capitol, Room 451B
1900 Washington Street
Charleston, W. VA 25305
304-348-7890

WISCONSIN (HEALTH & SAFETY)
Section of Occupational Health
Dept. of Health & Social Services
P.O. Box 309
Madison, WI 53701
608-266-0417

Div. of Safety & Buildings Dept. of Industry, Labor & Human Relations
1570 E. Moreland Blvd.
Waukesha, WI 53186
414-544-8686

WYOMING
Occupational Health & Safety State of Wyoming
Cheyenne, WY 82002
307-777-7785
Ergonomic Tools & Devices - Suppliers List
(Source for Some Ergonomic Tools & Devices/Accessories)

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Skogangsvagen 58 S-163 57
Spanga, Sweden
(Hand tools & aids for disabled)

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c/o GETC
570 Lexington Ave., 20th Floor
New York, 10022
212-750-3823

KLEIN TOOLS, INC.
7200 McCormick Blvd.
Chicago, IL 60645
312-677-9500
(Hand Tools)

ADVANCED MANUFACTURERS
TECHNOLOGIES DIV.
AMP, Inc.
3901 Fulling Mill RD.
Middletown, PA 17057

STEERE ENTERPRISES
285 Commerce Street
Tallmadge, OH 44278
216-633-4926
(Custom dlp & blow molding, plastics)

CHICAGO CUTLERY

SUNNEX EQUIPMENT AB
Box 242 686 00
Sunne, Sweden
(Hand grips for power tools)

DYNAMICS OPERATIONAL, INC.
600 Fondulac Drive
East Peoria, IL 61611
309-699-6046
(Handles)

SORBOTHANE INC.
2144 State Rt. 39, P.O. Box 178
Kent, OH 44240
800-321-0171
(Vibration dampening)
Occupational Ergonomics - Video Programs

"The Finest Tools"
Available from:

Division of Manpower Training & Development
NIOSH - Taft Laboratories
4676 Columbia Parkway
Cincinnati, OH 45226

"Sore Hands/Sore Arms"
Available from:

Center for Ergonomics
The University of Michigan
1205 Beal Avenue, IOE Bldg.
Ann Arbor, MI 48109

"Back to Basics"
Available from:

VISUCOM Productions, Inc.
P.O. Box 5472
Redwood City, CA 94063

"Lifting Analysis"
Available from:

Division of Manpower of Training & Development
NIOSH - Taft Laboratories
4676 Columbia Parkway
Cincinnati, OH 45226

"People and Machines - Understanding Ergonomics"
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IBM Corporation

"The Weakest Link"
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823 East Gate Drive
Mount Laurel, NJ 08054
609-234-5554
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Warrington, PA 18976
800-331-4258

KNAPP SAFETY SHOES
One Knapp Centre
Brockton, MA 02401
800-343-1070

RED WING SHOE COMPANY
419 Bush Street
Red Wing, MN 55066
612-388-8211

BATA IND DIV Bata Shoe Co, Inc.
Belchamp, MD 21017
301-272-2000

DIRECT SAFETY COMPANY
7815 s. 46th street
Phoenix, AZ 85040
602-968-7009

Gloves

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312-394-2070

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Endicott, NY 13760
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Eastlake, OH 44094
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Eastlake, OH 44094
216-951-7440

WHEELER PROTECTIVE APPAREL, INC.
4330 W. Belmont Avenue
Chicago, IL 60641
Occupational Ergonomics: Suggested Reading


BIBLIOGRAPHY

BOOKS


PERIODICALS

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2) *Occupational Hazards*, Published monthly by Penton/IPC Publications, Inc., 1111 Chester Ave., Cleveland, OH, 44114.

3) *Occupational Health and Safety*, Published monthly by Medical Publications, Inc., 3700 West Waco Drive, Waco, TX 78710.

4) *Professional Safety*, Published monthly by the American Society of Safety Engineers, 850 Busse Highway, Park Ridge, IL 60068.