1. **Identification of Workplace Hazard**

Identification of ergonomic hazards and implementing workplace changes and practices to prevent injuries is an important part of many employers’ safety program. Ergonomic injuries are caused by unusual stress on the body due to interaction with machines, tools, and certain kinds of motion and exertion. The result is manifested in back injuries, joint strains and sprains, and ergonomic injuries due to repetitive motion, such as carpal tunnel syndrome, cumulative trauma disorders and eye strain. The employer should monitor reports of injuries and illnesses and survey work areas to ensure that appropriate working conditions and practices are maintained to prevent ergonomic injuries. The objective of the guidance in this *Hazard Prevention Data Sheet* is to assist in workplace layout, work methods, equipment, and working environment that are more compatible with the physical limitations of employees and to provide background to assist in training.

2. **Management and Trainer Information**

To better recognize ergonomic hazards the meaning of the following terms should be understood. Cumulative Trauma Disorders or CTDs are injuries due to repeated physical trauma on the same part of the body, such as keyboard work. An example of CTD potentially caused by such work is carpal tunnel syndrome that affects hands and wrists. Visual strain is eye discomfort usually caused by intense work before a video display terminal or VDT over a long period of time. Other types of ergonomic injuries are more simply described as strains and sprains and are usually associated with over-exertion especially when the body is in an awkward position.

**Repetitive Motion Injury Prevention**

The California Ergonomics Standard [8 CCR § 5110], which applies only to repetitive motion injuries (RMIs), does not cover the vast majority of sprains, strains, and back injuries unless they are caused by repetitive motion. An RMI is defined as an injury resulting from a repetitive job, process, operation, or similar work activity at the workplace that has been the predominant cause of a diagnosed, objectively identified, musculoskeletal injury. The standard applies when such injuries are experienced by more than one employee within a 12-month period while performing the same task. It should be an employer's goal to prevent all such injuries, if feasible.

To prevent ergonomic injuries, the employer should conduct a worksite evaluation, consider feasible control measures, and train employees. The worksite evaluation will require that a representative number of the jobs, processes, or operations be evaluated for exposures which may cause ergonomic injuries. Any hazards identified should be corrected or minimized to the extent feasible. Engineering controls (work station redesign, adjustable fixtures, or tool redesign) and administrative controls (changes in procedures, body position, job rotation, work pacing or breaks) are alternatives which should be considered.

Employees at risk of repetitive motion injuries and their supervisors should be made aware of the following information concerning ergonomic hazards:

1. Ergonomic injuries to smaller joints (fingers, hands, and wrists), sometimes referred to as cumulative trauma disorders, are most often associated with repetitive action usually associated with awkward positioning which eventually traumatize the affected areas. Examples include carpal tunnel syndrome and other wrist and hand injuries from keyboard work or use of small hand tools or vibrating instruments. These injuries can usually be prevented by better positioning hands through use of a keyboard pad, adjusting work station height, or redesign of tools or work fixtures.
Vision strain is another form of ergonomic injury caused by relatively long sessions of work intensely concentrating on a video display terminal (VDT). Such injuries also may result from screen positioning, glare and improper adjustment. These problems can be readily remedied once detected. Vision strain often can be relieved by varying types of work, allowing for rest periods and using visual exercise software programs.

Employees should report any case of ergonomic injury or any discomfort due to work or job station or tool design to the employee's supervisor or person responsible for the Injury and Illness Prevention Program. Appropriate response to such reports should focus on correcting conditions causing or contributing to the discomfort.

Training of employees at risk should include the following type of information tailored to the type of work the employees perform:

- The types of work activity exposures which may cause ergonomic injuries, in particular, RMI;
- The symptoms and consequences of injuries caused by repetitive motion;
- The importance of reporting symptoms and injuries to the employer; and
- Methods available and used by the employee to minimize RMI and other ergonomic hazards.

Addressing ergonomic hazards through the employer's injury and illness prevention program by correcting any problems that are causing employee discomfort or actual injury is the most effective course to prevent RMI.

Compliance with the Cal/OSHA Ergonomics Standard

Any employer covered by the Cal/OSHA Ergonomics Standard, which means a workplace with 10 or more employees that experiences two physician-diagnosed cases of RMI due to performance of identical work activities within a 12-month period, must establish a minimum program to comply with the standard.

1. Conduct and document a worksite evaluation of the work activities that caused the diagnosed RMI.

2. Evaluate control measures, including work station and equipment redesign and administrative practices, and implement controls to the extent feasible. Document the actions taken and the employer's rationale.

3. Train employees on RMI hazards, symptoms, prevention and reporting requirements and the employer's actions to control RMI hazards as described above. Document the training provided to each employee.

Back and Joint Injury Prevention

A significant percentage of physical injuries in any working environment are back and joint injuries. Even offices and other relatively non-hazardous workplaces are subject to this type of common injury. Some examples of causative factors include lifting boxes and file cabinets, bending to search for documents in file cabinets, moving furniture and reaching for objects stored at a high level.

The injuries caused by awkward positions or improper lifting techniques usually accompanied by over-exertion are acute back, neck and shoulder injuries. These relatively common and well understood
ergonomic injuries are quite different in terms of causation and prevention than the more subtle type of repetitive motion ergonomic injuries previously discussed.

Employees who have experienced back or neck injuries or who are exposed to a potential risk of such injuries and their supervisors should be aware of the following information:
Ergonomics Safety, Including Prevention of Repetitive Motion Injuries and Back and Joint Injuries

1. Over-exertion and straining are virtually always a contributing cause of back, neck or shoulder injuries. Therefore, poor physical conditioning and lack of musculoskeletal flexibility are important factors to recognize and address.

2. Lifting is the most common task associated with back injury. However, back injuries can be caused by other manual handling tasks such as bending, pushing, pulling and carrying. In addition, back injuries can result from falls or reactions to tripping due to poor housekeeping practices (for example, debris on floor or slippery surfaces).

3. Back problems also can be caused by ergonomic incompatibility (for example, improper desk or equipment height requiring bending over to work).

4. Good posture generally, and especially during tasks that require exertion, will contribute to injury prevention. This includes work practices such as keeping back straight when sitting, lifting, pushing carts and when performing other work tasks. Use of legs in lifting and facing the object being manipulated rather than twisting protects the back.

5. Obtaining assistance when moving objects (boxes, file cabinets, etc.), if the objects are heavy, bulky, or awkward is essential to preventing injuries.

6. Employees should stretch their necks, shoulders and backs periodically throughout the work day.

7. Employees should be aware that if they are well rested and in good condition, a work-related back or joint injury is less likely to occur.

8. Due to the prevalence of back and joint injuries, employees should be aware that the person responsible for injury and illness prevention will be monitoring their work practices to determine if there are any unsafe or incorrect practices occurring. Back and joint injuries should be immediately reported.

3. Employee Safe Work Practices

Employees should be required to comply with the following safe work practices to the extent applicable.

**General Ergonomic Safety**

Employees exposed to potential ergonomic or repetitive motion hazards are required to comply with the following safe work practices:

1. Any employee who experiences any ergonomic injury including a strain, sprain or back injury or any prolonged discomfort, numbness or problems in hands, wrists or arms, or frequent or severe visual strain must notify a supervisor or the person responsible for the injury and illness prevention program.

2. For seated work stations, chair height should permit hand and eye work in comfortable positions. This should be done by adjusting chair height so both feet can be placed firmly on a support surface. If this is not feasible, then a foot rest should be used.

3. Adjust chair seat backs to provide firm support for the lumbar (lower back) region. Request a lumbar support cushion if the chair provides insufficient support.
(4) Make sure that the work surface and chair allow adequate clearance to allow leg movement and changing of position from time to time.
(5) Adjust work surface height and the chair seat height to prevent constant leaning and bending when performing job tasks.

(6) Adjust height of the work surface while standing to prevent constant leaning and bending when performing job tasks. This can be accomplished by either raising the work surface or by adjusting stools or chairs.

(7) Request forearm and elbow support if discomfort is experienced during work in which manual job tasks are conducted for long durations (for example, data entry, fine repair work, etc.)

(8) Place frequently used items on storage or cabinet shelves at a level no higher than an chest level. This will prevent repetitive overhead reaching leading to shoulder strain.

(9) Place heavy items waist level on storage or cabinet shelves to prevent reaching and leaning while moving the heavy items.

(10) Position your body facing work and as close to it as feasible to avoid reaching and twisting.

**Video Display Terminal (VDT) Ergonomic Safety**

(1) Position VDT screens so that the entire primary viewing area is between 0 and 60 degrees below eye level.

(2) Position VDT keyboards in relation to the seat and work surface height to allow operation of the keyboard with forearms, wrists and hands in a straight line and approximately parallel to the floor (i.e., placement of keyboards and other input devices at elbow height).

(3) Adjust furniture to allow adequate space and comfortable support for the knees and hips to be bent at approximately 90 degrees with arms at your side and wrists straight toward the keyboard.

(4) Request an adjustable document holder and assure proper placement, angle and height to avoid both eye strain and uncomfortable head and neck position.

(5) Request and use wrist rests to maintain a straight line and neutral position of the hands and wrists while using keyboards. The rest should be padded and free of sharp edges.

(6) Request and use arm rests if necessary for improved comfort during computer operation. Arm rests should not interfere with the ability to relax the shoulders or to operate the keyboard with hands, wrists and forearms in a straight line and approximately parallel to the floor.

(7) Adjust lighting for VDT work station for visual comfort and to avoid glare.

(8) Minimize glare on VDT screens by shielding windows, adjusting overhead lighting or by fitting VDT screens with anti-glare devices.

(9) Keep VDT screens clean and free of perceptible flicker.
Perform (or request) alternative work for five minutes during or immediately after each one-hour period of repetitive VDT work. Operators should be aware that there is computer software which provides an exercise regimen to reduce eyestrain and improve visual performance.

Ensure that the work surface is of sufficient size to accommodate the VDT components, document holder and other task-dependent items.

**Back and Joint Injury Prevention Safety Rules**

Employees with job tasks that pose a risk of neck, shoulder and back injuries should:

1. Follow instructions with respect to proper lifting techniques and other safe work practices designed to prevent back, neck and shoulder injuries.

2. Use care in positioning body and back before even mild exertion during lifting. The object to be lifted should be faced and lifted, keeping the back as straight as possible by bending and using legs for lifting power.

3. Do not reach to place or retrieve heavy objects in high storage; use a stable platform or step stool.

4. Be conscious of the need for rest and relaxation during non-working hours and good physical conditioning generally to avoid strains and sprains.

5. Make sure the employer is aware of any pre-existing condition or the requirement to wear a brace and complies with all such medical requirements.

6. Use proper techniques for lifting objects:
   - Keep stomach in, knees bent, weight close to body and back straight.
   - Keep feet apart with one foot ahead of the other.
   - Always lift with legs.
   - Only lift an object if its size and weight are within your capabilities.
   - Get help if an object is heavy or oversized.

7. Use proper techniques for carrying an object:
   - Keep weight close to body.
   - Always carry objects in an upright position with back straight.
   - Use dollies, carts, or other equipment whenever available.

4. **Items Subject to Periodic Scheduled Inspections**

The employer's periodic scheduled inspections should consider the following during workplace inspections:

1. Are employees aware of and providing information on ergonomic or repetitive motion injury hazards or discomfort during inspections or to supervisors and the person responsible for injury and illness prevention?

2. Are there any reported cases of ergonomic injury that should be evaluated during the next scheduled inspection, or have all such cases been investigated?

3. Are there any apparent ergonomic hazards in work areas (for example, improperly positioned computer keyboards in relation to work and video display screen, poorly designed or adjusted
work stations, repetitive work tasks in stressful positions, glare from background lighting on VDTs, etc.)?

(4) Are any employees observed improperly lifting or moving heavy objects? Request a demonstration if appropriate to observe work practices.

(5) Are heavy objects that must be frequently moved stored in high or low locations when more ergonomically appropriate locations are feasible?