

Ergonomics in Action Tech Guide 220



Appendix B: Glossary of Terms



abatement plan - A proposal to reduce something in amount, degree, or intensity.

active surveillance - Involves actively seeking information to target and assess problematic work areas, job series, and tasks.

anthropometry - The study of the physical dimensions of people, including size; breadth; girth; distance between anatomical points; and joint range of motion.

arm reach envelope - How far an individual can reach with his hands in an entire range of vertical and horizontal directions.

biomechanical risk factors - As the word itself implies, these risk factors involve the interaction between human beings (bio) and their work environment (mechanical). More specifically, they represent certain task-related conditions which contribute to WMSDs, including:

- Postures. Awkward postures require increased muscle force and contribute to muscle fatigue, tendon fatigue, joint soreness, and increased forces on the spine.
- Repetition. Repeated motions or tasks increase fatigue and muscle-tendon strain. Highly repetitive tasks often prevent adequate tissue recovery time from the effects of awkward postures and force.
- Force. Forceful exertions increase the physiologic stress to muscles, tendons, and joints. Muscles fatigue faster as the force exerted increases.
- Mechanical Compression or Contact Stress. Mechanical compression creates pressure over a small area and interferes with blood flow and nerve function. This compression can be caused by hard or sharp objects, the sharp edge of the desk, and small diameter handles.
- Duration. Duration is the amount of time the worker is exposed to the risk factor. Prolonged exposure increases local and generalized fatigue and tissue stress. As the duration of exposure increases, the required recovery period increases proportionally.
- Vibration. Localized vibration occurs when a part of the body contacts a vibrating object, e.g., pneumatic, electric, or impact hand tools.
- Temperature. Prolonged contact between the bare hand and metal surfaces below 59°F (15°C) may impair dexterity, and contact with metal surfaces below 44.6°F (7°C) may induce numbness.

break - A short period of rest for frequently used muscles. Breaks are most effective if taken before reaching the point of fatigue.

compressible - Possessing the property of a tissue or other soft, loose material to be locally depressed or of a gas to be reduced in volume when external pressure is applied.

cost effectiveness index - The cost effectiveness index is a measure that represents, in a single value, the ratio between the cost of an abatement project and the potential effectiveness (measured in terms of reduced frequency and severity of WMSDs) to be derived from implementing the abatement project.

culture change - In the context of ergonomics, culture change means abandoning the out-moded traditions of “business as usual” and learning how to transform the work environment for safe, comfortable, and effective human use throughout the entire organization. This is accomplished by implementing and maintaining an ergonomics program. It requires getting everyone in the organization—from the commander to the front-line workers—to cooperate with this global change and relying on key personnel to ensure that the program proceeds as planned. Creating an ergonomic environment requires fitting the job to the worker, rather than the worker to the job. Accordingly, input from the front-line workers can offer the greatest help in identifying and resolving many of the work conditions which can lead to WMSDs. In an ergonomic environment, the flow of decisions regarding work conditions must flow in both directions, up and down, within the organization.

cumulative stress injuries - See work-related musculoskeletal disorder (WMSD). cumulative trauma disorders (CTDs) - See work-related musculoskeletal disorder (WMSD).

cycle - A complete sequence of elements or events making up a unit process or activity in a repetitive, periodic operation.

denervation - A complete sequence of elements or events making up a unit process or activity in a repetitive, periodic operation.

design for the average - A design approach that uses anthropometric data on the average-sized worker for designing workplaces and equipment. This approach should be used only as the last resort. Although this approach is more economical, the equipment or workplace will not accommodate the majority of the workforce.

design for the extreme - The second approach, design for the extreme, involves designing for either the smallest female or the largest male in the population. The smallest workers (5th percentile) determine reach dimension (e.g., fire extinguisher placement) and visual clearances. The largest workers (95th percentile) determine clearances (e.g., doorways, walkways).

design for the range - The preferred approach is to design for the range. This approach usually involves some adjustability and “fits” the majority of workers. Workstations and equipment designed using the design for the range approach usually fits the majority of workers, from the 95th percentile male to the 5th percentile female, thus accommodating approximately 90% of the working population.

dynamic work - The work performed when one or more muscle lengths change, producing external motion.

engineering controls - Physical changes to work stations, equipment, materials, production facilities or any other relevant aspect of the work environment that reduce or prevent exposure to workplace risk factors.

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

ergonomics action team - A group of workers designated as an action team for their worksite, who analyze and identify jobs for ergonomic stress, and recommend solutions.

ergonomics expert - The ergonomics expert is a qualified professional who possesses a recognized degree or professional credentials in ergonomics or human factors engineering (typically a master’s or doctorate degree). He/she must demonstrate the ability to identify and correct WMSDs in the workplace and teaches the 40-hour ergonomics course for the trained ergonomics personnel. The ergonomics expert provides consultation only in cases when trained ergonomics personnel are unable to solve identified problems. In most cases, an ergonomics expert will not be available at each installation.

ergonomics stress - Undue strain on the human body due to improper workstation setup, the improper use of tools, and/or the repetition of tasks.

ergonomics subcommittee - Those responsible for identifying and correcting occupational hazards in the workplace, including trained ergonomics personnel, health care providers, industrial hygienists, safety personnel, engineers, and other support personnel, managers, and supervisors.

fatigue - A state characterized by lack of motivation, interest, and/or an inability to maintain normal, consistent productivity and quality due to recent physical or mental exertion.

field of view - The solid angle within the visual field for which the eye or other optical sensor provides useful data.

finger clearance - Fingers are able to move without obstruction esp. when using a hand tool that requires trigger use.

foot-candle - The illumination of a surface one foot distant from a source of one candela, equal to one lumen per square foot.

frequency-of-use principle - A rule that states that frequently used tools, equipment, and other workstation components should be located in convenient locations.

function principle - A rule that states that workstation components should be grouped and arranged according to their function, such as the groupings of displays, controls, or machines that are functionally related to the operation of the system.

general duty clause - Refers to a safe and healthful working environment as described in title 29, Code of Federal Regulations, Part 1910. Authorizes the enforcement of a recognized industry safety or health standard when identified hazards are not covered by an existing OSHA standard. Only violations viewed as serious may be cited under the general duty clause.

health care personnel - Physicians, chiropractic physicians, nurses, occupational therapists, physical therapists, physicians' assistants, and other health care professionals and their related, supervised technicians (e.g., certified occupational therapy assistants and licensed practical nurses). Health care personnel participating in the ergonomics program should have training in basic ergonomics and epidemiology and be up-to-date in the systematic recognition, evaluation, treatment, and rehabilitation of CTDs.

high-risk task focusing - Process that uses information from workers' job descriptions, injury report data, and direct input from the workers to classify and subclassify workers to a level where most of the workers in the group are exposed to the same risk factors.

importance principle - A rule that displays and controls with the greatest operational importance should be placed in optimum locations with regard to convenient access and visibility.

microtraumas - Small, limited area tissue damage or tears. Cumulative trauma occurs when rest or overnight sleep fails to completely heal the microtrauma and residual trauma carries over to the next day, adding to the total system trauma.

modified duty assignments - Workloads adjusted to facilitate the early return to work of those employees recovering from an illness or injury. Modified duty assignments are meant only for those employees who are expected to return to full duty in their previously held positions.

neutral posture - The position the body naturally assumes. It is the least stressful, strongest, and most efficient position for the body.

nonconductive - Unable to transmit heat, electricity, or sound.
occupational disease and injury - Any functional or organic disease or physical trauma resulting from the working environment or the worker's exposure to the operations or materials involved in that working environment.

occupational hazard - Conditions, procedures, and practices directly related to the work environment that create a potential for producing occupational injuries or illnesses.
occupational injury/illness - To be recorded as an occupational illness, the condition must be diagnosed by a physician, registered nurse, or other person who, by training or experience, is capable of making such a determination (such as an occupational therapist, physical therapist, or physicians assistant). In addition, the condition must meet the following criteria:

- Either a physical findings or subjective symptoms must exist, that is, at least one physical finding (e.g., positive Tinel's, or Finkelstein's test; swelling, redness, or deformity; or loss of motion or strength) or at least one subjective symptom (e.g., pain, numbness, tingling, aching, stiffness, or burning).
- WMSDs must be associated with repeated trauma, and exposure at work must have caused or contributed to the onset of symptoms or aggravated existing symptoms.

At least one of the following response actions must occur:

- Medical treatment (including self-administered treatment if made available to personnel by their employer).
- Lost or restricted work activity.
- Transfer or rotation to another job.

occupational overuse syndrome - See work-related musculoskeletal disorder (WMSD) for definition.

passive surveillance - The systematic analysis of data provided in existing reports and data sources such as outline injury reports, log and summary of occupational injuries and illnesses, Federal Employees Compensation Act (FECA) claims, medical and safety records, and workforce reports and suggestions.

peripheral field of view - The area which is perceived near the outer edges of the retina and is seen on either side of one's direct gaze.

Phalen's test - A test for carpal tunnel syndrome in which both hands are held tightly and palms are flexed opposite to a prayer position, creating at least a 90° angle between the forearm and the hand. If the test is positive, numbness and tingling are produced when the hands are held in this position for approximately 30 seconds.

physical environment - The physical environment includes lighting, temperature, and noise level.

pinch grip - A grip that involves the thumb and one or more other fingers.

power grip - A type of grip in which the fingers and palm are partially flexed around an object, with an opposing thumb and thumb crotch.

prevalence rate - A frequently used statistic which provides important information for both worksite analysis and the program assessment. It is expressed as:

Total number of cases (both and old) at a POINT IN TIME

Total number of workers at the point in time

reach envelope - The volume or solid bounded proximally by the body, clothing surface, or proximal reach and by the distal boundary in any direction which an individual or robotic device can attain by any combination of postures, rotations, and flexion and/or extension movements under specified conditions.

repetitive motion disorders - Synonymous with cumulative trauma disorder, occupational overuse syndrome, and repetitive strain. See cumulative trauma disorder for definition.

repetitive strain - Synonymous with cumulative trauma disorder, occupational overuse syndrome, and repetitive motion disorders. See cumulative trauma disorder for definition.

residual trauma - Trauma not healed by rest or overnight sleep, carrying over to the next day.

restricted duty assignments - A change in type of workload for employees who have temporary physical restriction resulting from work-related injuries.

risk assessment code (RAC) - Assigned to an area-wide ergonomics problem to define its severity or magnitude. It describes the level of risk associated with an ergonomics problem, and combines the hazard severity and accident probability into a single numeral. Coupled with the costs associated with any given intervention method, it establishes the priority of the problem area. in or required for one or more humans to perform a given task.

thoracic outlet syndrome - A sensation of weakness, numbness, or pain in the arm, due to compression of nerves and blood vessels supplying the arm by the scalenus anterior muscle.

threshold limit values - A set of safety guidelines established by the American Conference of Governmental Industrial Hygienists (ACGIH) for exposure to toxic substances in the normal working environment in order to protect most workers from known adverse effects.

Tinel's sign - A tingling or shock-like sensation in the fingers supplied by the median nerve (thumb, pointer, middle, and half of ring finger) when the skin and soft tissue over the nerve are tapped at the wrist. The presence of a Tinel's sign is suggestive of carpal tunnel syndrome.

tools, equipment, and containers - The tools, equipment, and containers include hand and power tools, machines, components, keyboards, assembly parts, and boxes.

trained ergonomics personnel - Trained ergonomics personnel are health care, industrial hygiene, environmental science, safety, or engineering personnel with approved training in ergonomics. Minimum acceptable training for installation-level ergonomics personnel is the 40-hour ergonomics course offered by USACHPPM or equivalent civilian training.

work area - The work area consists of three basic components, including the (1) workstation and physical environment; (2) the task; and (3) the tools, equipment, and containers used in the job.

work environment - The total physical, physiological, social, and psychological environment within which a worker performs his tasks.

workflow - The flow or progress of work done by a company, industry, department, or person.