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Chapter 1 : Office ergonomics: Your how-to guide - Mayo Clinic

The Ergonomics Payoff is a valuable collection of technical information about office design for the present and the future. The book is profusely illustrated with black and white, as well as a number of color pictures, tables, charts, and graphs.

Just imagine walking through the plant floor and instantly being able to identify risk factors that contribute to soft tissue injuries and disorders. Seeing the world through ergo eyes is like being able to see the potential injuries that could mar your stellar safety record so you can proactively make workplace design improvements to prevent that from happening. So, here are eight fundamental ergonomic principles to help you identify ergonomic risk factors and maintain your stellar safety record. Maintain Neutral Posture Neutral postures are postures where the body is aligned and balanced while either sitting or standing, placing minimal stress on the body and keeping joints aligned. Neutral postures minimize the stress applied to muscles, tendons, nerves and bones and allows for maximum control and force production. Following are examples of Neutral vs. Awkward postures for the wrist, elbow, shoulder and back. Neutral and awkward wrist postures source Neutral and awkward elbow postures source Neutral and awkward shoulder postures source Neutral and awkward back postures source Pistol grip vs. The power zone for lifting is close to the body, between mi-thigh and mid-chest height. This zone is where the arms and back can lift the most with the least amount of effort. Working for long periods of time in a static position will cause your body to fatigue. This is what is known as static load. Raise your hands over your head for the next 30 minutes Remain standing in the same position for the next 8 hours Write with a pencil for 60 minutes straight If you do those things, you will experience static load. Now, what is the first thing you will naturally do once you when you are finished with these tasks? Stretching reduces fatigue, improves muscular balance and posture and improves muscle coordination. Everyone is an athlete in life, so you need to prepare your body for work by warming up to improve performance and lower injury risk. A warm-up stretching regimen is a great way to prepare your body for work. It is also beneficial to take periodic stretch breaks over the course of your work day to get your blood moving and restore your energy. Reduce Excessive Force Excessive force is one of the primary ergonomic risk factors. Many work tasks require high force loads on the human body. Muscle effort increases in response to high force requirements which increases fatigue and risk of an MSD. There are numerous conditions that affect force, but the idea is to recognize when a job or task requires excessive force and then find ways to reduce that force. Eliminating excessive force requirements will reduce worker fatigue and the risk of MSD formation in most workers. Using mechanical assists, counter balance systems, adjustable height lift tables and workstations, powered equipment and ergonomic tools will reduce work effort and muscle exertions. Reduce Excessive Motions Repetitive motion is another one of the primary ergonomic risk factors. Many work tasks and cycles are repetitive in nature, and are frequently controlled by hourly or daily production targets and work processes. A job is considered highly repetitive if the cycle time is 30 seconds or less. Excessive or unnecessary motions should be reduced if at all possible. In situations where this is not possible, it is important to eliminate excessive force requirements and awkward postures. Other control methods to consider are Job enlargement, job rotation and counteractive stretch breaks. This contact creates localized pressure for a small area of the body, which can inhibit blood, nerve function, or movement of tendons and muscles. Examples of contact stress include resting wrists on the sharp edge of a desk or workstation while performing tasks, pressing of tool handles into the palms, especially when they cannot be put down, tasks that require hand hammering, and sitting without adequate space for the knees. Vibration syndrome has adverse circulatory and neural effects in the fingers. The signs and symptoms include numbness, pain, and blanching turning pale and ashen. Too much or too little light makes work difficult â€” just imagine trying to do your job without sight! Dimly lit work areas and glare can cause eye fatigue and headaches and improperly lit areas put workers at greater risk for all types of injuries. Providing workers with adjustable task lighting is often a simple solution to lighting problems. At a computer workstation, take steps to control screen glare, and make sure that the monitor is not placed in front of a window or a bright background. You might also like these articles:

Chapter 2 : blog.quintoapp.com: ergonomic

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He used it to encompass the studies in which he had been engaged during and after World War II. A "human factor" is a physical or cognitive property of an individual or social behavior specific to humans that may influence the functioning of technological systems. The terms "human factors" and "ergonomics" are essentially synonymous. There are many specializations within these broad categories. Specialisations in the field of physical ergonomics may include visual ergonomics. Specialisations within the field of cognitive ergonomics may include usability, humanâ€"computer interaction , and user experience engineering. Some specialisations may cut across these domains: Environmental ergonomics is concerned with human interaction with the environment as characterized by climate, temperature, pressure, vibration, light. For instance, "user trial engineer" may refer to a human factors professional who specialises in user trials. According to the International Ergonomics Association , within the discipline of ergonomics there exist domains of specialization: Physical ergonomics[edit] Physical ergonomics: Physical ergonomics is concerned with human anatomy, and some of the anthropometric, physiological and bio mechanical characteristics as they relate to physical activity. Physical ergonomics is important in the medical field, particularly to those diagnosed with physiological ailments or disorders such as arthritis both chronic and temporary or carpal tunnel syndrome. Pressure that is insignificant or imperceptible to those unaffected by these disorders may be very painful, or render a device unusable, for those who are. Many ergonomically designed products are also used or recommended to treat or prevent such disorders, and to treat pressure-related chronic pain. Work-related musculoskeletal disorders WRMDs result in persistent pain, loss of functional capacity and work disability, but their initial diagnosis is difficult because they are mainly based on complaints of pain and other symptoms. These types of jobs are often those involving activities such as repetitive and forceful exertions; frequent, heavy, or overhead lifts; awkward work positions; or use of vibrating equipment. Cognitive ergonomics Cognitive ergonomics is concerned with mental processes, such as perception, memory, reasoning, and motor response, as they affect interactions among humans and other elements of a system. Organizational ergonomics[edit] Organizational ergonomics is concerned with the optimization of socio-technical systems, including their organizational structures, policies, and processes. History of the field[edit] In ancient societies[edit] The foundations of the science of ergonomics appear to have been laid within the context of the culture of Ancient Greece. A good deal of evidence indicates that Greek civilization in the 5th century BC used ergonomic principles in the design of their tools, jobs, and workplaces. In industrial societies[edit] In the 19th century, Frederick Winslow Taylor pioneered the " scientific management " method, which proposed a way to find the optimum method of carrying out a given task. Taylor found that he could, for example, triple the amount of coal that workers were shoveling by incrementally reducing the size and weight of coal shovels until the fastest shoveling rate was reached. They aimed to improve efficiency by eliminating unnecessary steps and actions. By applying this approach, the Gilbreths reduced the number of motions in bricklaying from 18 to 4. Bekhterev argued that "The ultimate ideal of the labour problem is not in it [Taylorism], but is in such organisation of the labour process that would yield a maximum of efficiency coupled with a minimum of health hazards, absence of fatigue and a guarantee of the sound health and all round personal development of the working people. Dull monotonous work was a temporary necessity until a corresponding machine can be developed. He also went on to suggest a new discipline of "ergology" to study work as an integral part of the re-organisation of work. The war saw the emergence of aeromedical research and the need for testing and measurement methods. Studies on driver behaviour started gaining momentum during this period, as Henry Ford started providing millions of Americans with automobiles. Another major development during this period was the performance of aeromedical research. Many tests were conducted to determine which characteristic differentiated the successful pilots from the unsuccessful ones. During the early

s, Edwin Link developed the first flight simulator. The trend continued and more sophisticated simulators and test equipment were developed. Another significant development was in the civilian sector, where the effects of illumination on worker productivity were examined. This led to the identification of the Hawthorne Effect , which suggested that motivational factors could significantly influence human performance. It was no longer possible to adopt the Tayloristic principle of matching individuals to preexisting jobs. Now the design of equipment had to take into account human limitations and take advantage of human capabilities. There was substantial research conducted to determine the human capabilities and limitations that had to be accomplished. A lot of this research took off where the aeromedical research between the wars had left off. An example of this is the study done by Fitts and Jones , who studied the most effective configuration of control knobs to be used in aircraft cockpits. Much of this research transcended into other equipment with the aim of making the controls and displays easier for the operators to use. The entry of the terms "human factors" and "ergonomics" into the modern lexicon date from this period. It was observed that fully functional aircraft flown by the best-trained pilots, still crashed. In Alphonse Chapanis , a lieutenant in the U. Army, showed that this so-called " pilot error " could be greatly reduced when more logical and differentiable controls replaced confusing designs in airplane cockpits. After the war, the Army Air Force published 19 volumes summarizing what had been established from research during the war. It was the climate for a breakthrough. Alphonse Chapanis , Paul Fitts , and Small. Also, many labs established during WWII started expanding. Most of the research following the war was military-sponsored. Large sums of money were granted to universities to conduct research. The scope of the research also broadened from small equipments to entire workstations and systems. Concurrently, a lot of opportunities started opening up in the civilian industry. The focus shifted from research to participation through advice to engineers in the design of equipment. After , the period saw a maturation of the discipline. The field has expanded with the development of the computer and computer applications. Tolerance of the harsh environment of space and its effects on the mind and body were widely studied [19] Information age[edit] The dawn of the Information Age has resulted in the related field of humanâ€”computer interaction HCI. Likewise, the growing demand for and competition among consumer goods and electronics has resulted in more companies and industries including human factors in their product design. Using advanced technologies in human kinetics , body-mapping, movement patterns and heat zones, companies are able to manufacture purpose-specific garments, including full body suits, jerseys, shorts, shoes, and even underwear. Present-day[edit] Ergonomic evaluation in virtual environment In physical ergonomics, digital tools and advanced software allow analysis of a workplace. The body structure, sex, age and demographic group of the mannequin is adjustable to correspond to the properties of the employee. The software provides several different evaluations such as reachability test, spaghetti diagram, or visibility analysis. Human factors organizations[edit] Formed in in the UK, the oldest professional body for human factors specialists and ergonomists is The Chartered Institute of Ergonomics and Human Factors , formally known as the Institute of Ergonomics and Human Factors and before that, The Ergonomics Society. According to it mission statement, ACE unites and advances the knowledge and skills of ergonomics and human factors practitioners to optimise human and organisational well-being. The mission of the IEA is to elaborate and advance ergonomics science and practice, and to improve the quality of life by expanding its scope of application and contribution to society. As of September , the International Ergonomics Association has 46 federated societies and 2 affiliated societies. From the outset the IOM employed an ergonomics staff to apply ergonomics principles to the design of mining machinery and environments. To this day, the IOM continues ergonomics activities, especially in the fields of musculoskeletal disorders ; heat stress and the ergonomics of personal protective equipment PPE. Like many in occupational ergonomics, the demands and requirements of an ageing UK workforce are a growing concern and interest to IOM ergonomists. The International Society of Automotive Engineers SAE is a professional organization for mobility engineering professionals in the aerospace, automotive, and commercial vehicle industries. The Society is a standards development organization for the engineering of powered vehicles of all kinds, including cars, trucks, boats, aircraft, and others. The Society of Automotive Engineers has established a number of standards used in the automotive industry and elsewhere. It encourages the design of vehicles in accordance with established human

factors principles. It is one of the most influential organizations with respect to ergonomics work in automotive design. This society regularly holds conferences which address topics spanning all aspects of human factors and ergonomics. Designers industrial, interaction, and graphic , anthropologists, technical communication scholars and computer scientists also contribute. Though some practitioners enter the field of human factors from other disciplines, both M. Methods[edit] Until recently, methods used to evaluate human factors and ergonomics ranged from simple questionnaires to more complex and expensive usability labs. Using methods derived from ethnography , this process focuses on observing the uses of technology in a practical environment. It is a qualitative and observational method that focuses on "real-world" experience and pressures, and the usage of technology or environments in the workplace. The process is best used early in the design process. This can be on a one-to-one interview basis, or in a group session. Can be used to gain a large quantity of deep qualitative data, [26] though due to the small sample size, can be subject to a higher degree of individual bias. Can be extremely costly. Also known as prototyping, the iterative design process seeks to involve users at several stages of design, to correct problems as they emerge. As prototypes emerge from the design process, these are subjected to other forms of analysis as outlined in this article, and the results are then taken and incorporated into the new design. Trends among users are analyzed, and products redesigned. This can become a costly process, and needs to be done as soon as possible in the design process before designs become too concrete. A supplementary technique used to examine a wide body of already existing data or literature to derive trends or form hypotheses to aid design decisions. As part of a literature survey, a meta-analysis can be performed to discern a collective trend from individual variables. Two subjects are asked to work concurrently on a series of tasks while vocalizing their analytical observations. This is observed by the researcher, and can be used to discover usability difficulties. This process is usually recorded. A commonly used technique outside of human factors as well, surveys and questionnaires have an advantage in that they can be administered to a large group of people for relatively low cost, enabling the researcher to gain a large amount of data. The validity of the data obtained is, however, always in question, as the questions must be written and interpreted correctly, and are, by definition, subjective. Those who actually respond are in effect self-selecting as well, widening the gap between the sample and the population further. A process with roots in activity theory , task analysis is a way of systematically describing human interaction with a system or process to understand how to match the demands of the system or process to human capabilities. The complexity of this process is generally proportional to the complexity of the task being analyzed, and so can vary in cost and time involvement.

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Chapter 3 : Human factors and ergonomics - Wikipedia

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The truth is, assemblers can see real bottom-line benefits to investments in workstations and other ergonomic aids, and factorywide ergonomics programs can pay offâ€"big time. That was the conclusion of a benchmarking study published in August by ergonomics consulting firm Humantech Inc.

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When it comes to ergonomics, "An ounce of prevention is worth a pound of cure". Even a little preventative effort will often pay off. Putting the time, energy and resources into creating and maintaining an ergonomically friendly workplace environment will result in a happier, healthier, and more productive workforce.

Chapter 7 : The ergonomics payoff | Rani Lueder - blog.quintoapp.com

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Assist in the ergonomic process by voicing their concerns and suggestions for reducing exposure to risk factors and by evaluating the changes made as a result of an ergonomic assessment. Provide Training - Training is an important element in the ergonomic process.