Human factors and ergonomics essays examples

Literature, Russian Literature

IntroductionHuman factors and ergonomics is a wide field that deals with designing systems that complement the cognitive abilities of the human body. The term ‘ human factor’ and ‘ ergonomics’ are, in most cases, used interchangeable because they deal with more or less the same thing (Cohen & Woodson, 2005). However, it is essential to note that even though human factors and ergonomics mean the same thing, one term may be favored more than the other in different countries may or industries may. Ergonomics essentially deals with designing for the people especially when they interact with systems, processes or products. The application of principles from human factors and ergonomics is an ethical responsibility that all industries should fulfill. It is connected to the safety and function of workers. Therefore, human factors and ergonomics is an ethical responsibility that must be fulfilled to make the work environment safe for workers. It is rare for people to notice good designs unless it is an extremely exceptional design. On the contrary, it is easy for people to notice a bad design. Ergonomics emphasizes that the design should complement the abilities and strengths of the workers/people. A design should minimize the limitations of the people instead of forcing people to adapt. It is normally used to achieve health safety and increase productivity in many environments. It involves designing of safe furniture and interfaces that are easy to use. An effective ergonomic design helps prevent the development of repetitive strain disorders and skeletal problems that can lead to long-term disability (Meister, 2009). Human factors and ergonomics focus on the interaction between the user, the environment and the equipment. All these three parameters should be in fit perfect well to increases production and

promote safety and health in any environment. The fit between these three parameters is assessed by considering factors like the job being done, demands and the equipment needed for the job. An ergonomists consider size, shape and how the equipment fits the requirements of the given task. It is a field that borrows so much from fields like anthropometry, biomechanics, and mechanical engineering and so on. All these fields aid in the study of humans. Background InformationErgonomics is a term that originates from a combination of two Greeks words that mean ‘ work’ and ‘ natural laws’. Human factors are a term that is commonly used in North America to insist on the application of same methods in situations that are not related to work. A ‘ human factor’ means a cognitive or physical ability of an individual, it can also involve social behavior that is unique to human beings and can affect the functioning of any technological system. Human factors and ergonomics are real sense synonymous. In fact, many international standards like ISO 6385 treat two terms as synonyms (Wilson, 2005). The science of ergonomics might have originated from ancient Greece. Many scholars have hinted that the Greeks applied many ergonomic principles when designing tools for the job and the workplaces. For example, Hippocrates gave a vivid description of how the working space of a surgeon should be designed and the way the tools he uses should be arranged. According to Hippocrates, this would improve the effectiveness of the surgery, which is the output of the surgeon (Guastello, 2006). It would also minimize the occurrence of errors, which can cause death in delicate surgeries. The use of ergonomics can be traced to early dynasties in Egypt. Archaeological records that show household tools that were made during the

early Egypt dynasties considered the principles of ergonomics confirm this. Frederick Winslow Taylor developed a scientific method to govern the optimum method of performing a particular task, in the 19th century. Taylor discovered that the output of the workers would increase if the weight of the shovels were reduced. The size and the weight of the shovels were reduced until the optimum output was achieved in workers. Taylor's methods were improved by Lilian and Frank Gilbreth when they developed time and motion study in the 1900s (Guastello, 2006). The aim was to improve the level of efficiency by reducing the amount of unnecessary steps and actions in a given work process. They reduced the motions in bricklaying from 18 all the way to 4. 5. In effect, the bricklayers were able to increase productivity from 120 to 350 bricks in a single hour. Many more developments were made prior to World War I, which saw the creation of aircrafts that had human friendly controls. The war focused on the development of aircrafts, which meant making controls that would help improve the effectiveness of the pilot. In addition, the aircrafts were designed with safety of the pilot in mind, which involve measuring environmental effects on the pilot during flights. A depth in research aeromedical research led to the development of the first flight simulator by Edward Link in the 1930s. The other development in this era was the realization that motivational factors could increase or reduce the output of a worker. It was called the Hawthorne effect. The World War II came with the creation of sophisticated weapons. The demand on operator cognitive increased strongly in this era. Scientists realized that the design of new equipment had to consider human limitation and capabilities (Wilson, 2005). This is because an efficient equipment had to make up human

limitations and take advantage of the capabilities. For example, Fitts and Jones did a research to determine the best design for the control knobs in the cockpit of an aircraft. A research done by Alphonse Chapanis revealed that pilot error could be reduced if an aircraft was equipped with few confusing control knobs. The field of human factors and ergonomics has been growing for many years after the World War II. The start of the cold war led to great expansion in the field of research and development. The research was funded with motive of war. It led to the design of many equipment, which eventually translated to the civic sector. This saw growth in the field of human factors and ergonomics. This is because the research focused on increasing the productivity of humans and equipment in a war environment. Therefore, the research had to apply ergonomic principles to ensure that the user, the environment and equipment fit perfectly. In the recent years, the increased competition among manufacturers has seen the application of ergonomic principles in many products. The manufacturer aim at producing easy to use tools that would encourage people to buy and use. The steps made in technology have increased the efficiency of creating designs that fit perfectly with the human body. The importance of human factors and ergonomics in health and safety cannot be overlooked. In fact, many organizations have been formed to handle matters pertaining to human factors and ergonomics. Some of the oldest organizations in this field include the Institute of Ergonomics and Human Factors, Ergonomics Society and the International Ergonomics Association. All these organizations are tasked with responsibility of advancing the field of human factors and ergonomics and its application in the real world. The aim is quality of life

improvement by eliminating health hazards in the work places and at home. It will also help in increasing the productivity in many industries, which translates to economic growth (Helander & Helander, 2005). The Institute of Occupational Medicine is another organization that deals with the application of ergonomic principles. It was started in 1969 to help in applying ergonomic principles to design coal machinery. The organization continues the application of principles of ergonomics in managing heat stress, protective clothing and disorders that affect the skeletal structure. The ergonomists from these organizations take the concerns raised by aging employees who are already retired. The Society of Automotive Engineers is another international body that is active in the application of ergonomic principles. The organization deals in the engineering of powered vehicles of all types. The organization puts much emphasis on the consideration of human factors when designing a vehicle. It is among the most influential organizations in automotive design. Human factors and ergonomics field is divided into different fields of specialization. It is divided into physical ergonomics, environmental ergonomics, cognitive ergonomics and organization ergonomics. The International Ergonomics Association has made these divisions. Application of Human Factors and Ergonomics PrinciplesThe application of human factors and ergonomics is being used in consumer products and relatively simple systems. Ergonomic principles have been used to design phones, alarm clocks, computers and many consumer products. For example, laptops come with a preinstalled light filter to reduce the negative effects of light on the eyes of the user. This feature was not available in the first group of computers that were developed. The other

example is the production of screwdrivers that are equipped with serrations to improve the grip of finger. The most common injuries in many work places are strongly associated to musculoskeletal disorders. These disorders lead to persistent pain, the loss of functional capabilities and the inability to work. Research has shown that approximately 1. 8 million Americans suffer from work related injuries. It shows that approximately 600, 000 injuries are severe to warrant the workers to miss work (Salvendy, 2012). In addition, some kinds of jobs involve repetitive actions, the use of force and less mobility, which makes the development of musculoskeletal disorders very easy. Constant heavy lifting, use of vibrating equipment and awkward positions are dangerous for workers. According to the Occupational Safety and Health Administration (OSHA), the use of human factor and ergonomic principles can help in reducing the cost of compensation for workers, increasing productivity and reducing the employee turnover (Salvendy, 2012). Employers are encouraged to research on job conditions that cause most injuries and apply the necessary principles to reduce injuries and improve productivity. It is an ethical responsibility of an organization to ensure that safety of all workers is taken under due consideration. Therefore, manufacturers should design the workplace use ergonomic principles, which would help reduce the occurrence of injuries. Furthermore, it would improve the safety of works as they operate in the work environment. A well-designed environment makes the movement of workers within organization relatively easy and safe. The safety of workers is an ethical responsibility that a company should strive to achieve. The application of ergonomic principles would help an organization to achieve these objectives. For

example, installation of user-friendly computers would reduce the negative effects of screen lights for operators. The application of ergonomic principles would involve giving workers short breaks between working hours. This helps reduce the effect of repetitive actions and forceful working conditions. Some of the methods that are used to collect information include ethnographic analysis, iterative design, focus groups, meta-analysis, task analysis and subject in tandem. Ethnographic analysis observes the way technology is used in a practical environment. Ethnographic analysis is a qualitative research method that is observational in nature. The iterative design involves users of a certain technology at different levels. The method corrects the problems at each level before moving to the next stage. In focus groups, an individual asks a question to get a response on the use of a certain technology. It is like a discussion that can involve interviews or group work. In conclusion, the applications of human factors and ergonomics principles improves the conditions of safety for workers in the work place. Therefore, application of human factors and ergonomics principles is an ethical responsibility for all organizations (Salvendy, 2005). This is because it promotes the safety of workers at the workplaces, which is an ethical responsibility for all organizations, according to Occupational Safety and Health Administration guidelines.

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