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Chapter 1 : Introduction to human factors and ergonomics for engineers in SearchWorks catalog

It addresses the topics of human factors, work measurement and methods improvement, and product design an approachable style. The common thread throughout the book is on how better "human factors" can lead to improved safety, comfort, enjoyment, acceptance, and effectiveness in all application arenas.

This week, we are going to move below decks and talk about how space is maximized inside of a sailboat. People live, travel around the world, and spend countless hours on sailboats. In order to have a healthy and fully functioning life, a sailboat needs to contain most spaces that you find in a generic house including places to eat, sleep, cook, and spend time. Starting with where to sleep, there are several different possible locations below the deck of the boat. In order to sleep as many people as possible, space that is not used at kitchen, table, or bathroom space must be maximized as sleeping spaces. This means creating bunks with storage or bunks that fold up. There are three main categories of sleeping areas in a sailboat: Each cabin has its own pros and cons for each person. This is the V berth in the bow front of the boat. The space is maximized because of the tons of storage below the beds Richard, L. Retrieved March 25, , from https: This is not the best type of bunk for couples or This is the kitchen, or the galley. Retrieved March 25, , from http: Another possible arrangement for a v berth is if the whole bow is filled as a bed. Normally, this compromises storage space and if there is storage, it becomes harder to access. Although storage is compromised, this arrangement allows multiple people to sleep together. These are the center bunks. Space is maximized because during the day, the beds are used as seats for the table. Normally, the center bunks sleep two people, one on each side of the boat. Some boats have a set up where an upper storage space is also a bunk. Similarly to the v berth, this setup reduces the amount of storage available on the boat. This is the aft cabin in the stern back of the sailboat. Generally, this area has a larger sleeping space with an adequate amount of storage. The second most important thing after sleep is food. How do you fit a whole kitchen inside of the tiny corner in a boat? Many tables fold up against the wall or have two leafs that fold down flat against each other. For the oven, stove, fridge, and sink, many items can be combined to fit in a smaller space. The stove is normally on top of the oven with an insulated fridge opening at the top and doubling as a counter top. As far as the sink goes, it is hard to minimize the space used for it. Normally, the sink is tucked into a corner as much as possible. The remainder of the space below deck is used for the bathroom head , a navigation desk, and storage. The head is normally very small with barely enough room to close the door while you are inside. The navigation desk is normally quite spacious because navigating is extremely important when sailing overnight and if the space is cramped, things could get messy and disorganized. This is the head, or the bathroom on the sailboat. They are normally so squeezed in that the door barely passes clear of the toilet. There is a constant battle between storage space and living spaces. Each and every boat is different, customized for racing or for cruising, for overnight trips or for living on. Retrieved March 08, , from https:

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Chapter 2 : What is Human Factors Engineering and Ergonomics? | Human Factors Engineering Blog

*Introduction to Human Factors and Ergonomics [Robert Bridger] on calendrierdelascience.com *FREE* shipping on qualifying offers. Building on the success of previous editions, the 4th edition of 'Introduction to Human Factors and Ergonomics' provides a comprehensive and up to date introduction to the field.*

About this product Synopsis Emphasizing customer oriented design and operation, Introduction to Human Factors and Ergonomics for Engineers explores the behavioral, physical, and mathematical foundations of the discipline and how to apply them to improve the human, societal, and economic well being of systems and organizations. The book discusses product design, such as tools, machines, or systems as well as the tasks or jobs people perform, and environments in which people live. The authors explore methods of obtaining these objectives, uniquely approaching the topic from an engineering perspective as well as a psychological standpoint. The 22 chapters of this book, coupled with the extensive appendices, provide valuable tools for students and practicing engineers in human centered design and operation of equipment, work place, and organizations in order to optimize performance, satisfaction, and effectiveness. Covering physical and cognitive ergonomics, the book is an excellent source for valuable information on safe, effective, enjoyable, and productive design of products and services that require interaction between humans and the environment. Introduction to Human Factors and Ergonomics for Engineers, Second Editionsupplies a breadth and depth of coverage beyond that found in most traditional texts. This volume presents and integrates in a single source important methods and tools used in the fields of industrial engineering, human factors, and ergonomics to design and improve jobs, tasks, and products. The authors cover such topics as the human system, motion analysis, predicting human performance, simulation in ergonomic design, product quality and usability, macroergonomics, and occupational safety and health. Using a practical, applied orientation suitable for engineering undergraduate students, each chapter offers challenging problems to illustrate concepts. The second edition features two new chapters that address human error causation and reduction and human computer interaction. It also includes updated figures. Packed with cases studies and examples, readers will use the book well beyond the classroom and into their professional lives. Supplying a breadth and depth of coverage beyond that found in most traditional texts, Introduction to Human Factors and Ergonomics for Engineers, Second Edition presents and integrates important methods and tools used in the fields of Industrial Engineering, Human Factors and Ergonomics to design and improve jobs, tasks and products. It presents these topics with a practical, applied orientation suitable for engineering undergraduate students. See What s New in the Second Edition: Revised order of chapters to group together topics related to the physical and cognitive aspects of human-integrated systems Substantially updated material emphasizes the design of products people work with, tasks or jobs people perform, and environments in which people live The book has sufficient material to be used in its entirety for a two semester sequence of classes, or in part for a single semester course, focusing on selected topics covered in the text. The authors provide a set of guidelines and principles for the design and analysis of human-integrated systems and highlights their application to industry and service systems. It addresses the topics of human factors, work measurement and methods improvement, and product design an approachable style. The common thread throughout the book is on how better "human factors" can lead to improved safety, comfort, enjoyment, acceptance, and effectiveness in all application arenas. Packed with cases studies and examples, readers can use well beyond the classroom and into their professional lives. With a practical, applied orientation, this book presents and integrates in a single source important methods and tools used in the fields of industrial engineering, human factors and ergonomics to design and improve jobs, tasks and products. The author covers such topics as the human system, motion analysis, predicting human performance, simulation in ergonomic design, product quality and usability,

macroergonomics, and occupational safety and health. Each chapter offers challenging problems and examples to illustrate concepts. The new second edition features two new chapters that address human error causation and reduction and human computer interaction.

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Chapter 3 : Introduction to Human Factors and Ergonomics for Engineers: 2nd Edition (Hardback) - Routle

Supplying a breadth and depth of coverage beyond that found in most traditional texts, Introduction to Human Factors and Ergonomics for Engineers, Second Edition presents and integrates important methods and tools used in the fields of Industrial Engineering, Human Factors and Ergonomics to design and improve jobs, tasks and products.

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. Typically, an ergonomist will have an undergraduate degree in psychology, engineering, design or health sciences , and usually a masters degree or doctoral degree in a related discipline. 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.

Chapter 4 : Key Topics â€“ Human Factors

Supplying a breadth and depth of coverage beyond that found in most traditional texts, Introduction to Human Factors and Ergonomics for Engineers, Second Edition presents and integrates important methods and tools used in the fields of Industrial Engineering, Human Factors and Ergonomics to design.

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Chapter 5 : Human factors and ergonomics - Wikipedia

Emphasizing customer oriented design and operation, "Introduction to Human Factors and Ergonomics for Engineers" explores the behavioral, physical, and mathematical foundations of the discipline and how to apply them to improve the human, societal, and economic well being of systems and organizations.

Chapter 6 : Introduction to Human Factors and Ergonomics for Engineers - CRC Press Book

Introduction to Human Factors and Ergonomics for Engineers - CRC Press Book Supplying a breadth and depth of coverage beyond that found in most traditional texts, Introduction to Human Factors and Ergonomics for Engineers, Second Edition presents and integrates important methods and tools used in the fields of Industrial Engineering, Human.

Chapter 7 : Human Factors â€“ Introduction to human factors & ergonomics

Human Factors Engineering is the meeting point between engineering and design, between making functions work and telling people how they work. Human factors is a "body of knowledge", spanning across nearly every field you could imaging from anatomy to management to industrial engineering.