

The Impact of Aging on Ergonomics Design



Introduction

We regularly hear questions and concerns of how the aging workforce will impact or change occupational ergonomics. Contrary to many articles and websites, the effects of aging on performance of people are not new or impending. We have always had a workforce that is aging. However, it is now a discussion topic primarily because of the impact that the aging of the baby boomer generation is having on the economy, society, and health care.

“Old age isn't so bad when you consider the alternative.”
- Maurice Chevalier

Our position on ergonomics is to design for the capabilities of employees of all ages in the workplace, including older ones. A well-designed workplace benefits everyone. This means designing to accommodate a few age-related differences, such as hearing, vision, strength, and flexibility.

The Impact of the Aging Workforce

As noted, the workforce has always been aging. The current concerns with the “aging workforce” are centered on how to address the increasing proportion of older adults (55 years and older) in the workforce. For several reasons, mostly financial, people are working past the traditional age for retirement. Reasons for continuing their working career may include maintaining health care benefits, decreased pension and retirement savings, desire for intellectual challenge, and the social benefits of work.

Older employees make up a larger portion of today's workforce. In 2010, people aged 55 years and older accounted for almost 20% of the working population. In the European Union, people aged 50 years and older make up 25% of the workplace. The U.S. General Accounting Office estimated that the proportion of people working over the age of 55 had doubled between 1990 and 2015. Employers need to better understand the capabilities

and performance of older workers, as they represent the fastest growing segment of the working population.

A review of studies on the relationship between a worker's age and the incidence of non-fatal occupational injuries indicates that older workers have the same incidence of injuries at work as younger workers. However, the U.S. Bureau of Labor Statistics has identified that the length of absence from work as a result of injury tends to be longer for older workers than for younger ones. According to the 2016 Liberty Mutual Workplace Safety Index, the top cause of serious, non-fatal workplace injuries is overexertion, which includes sprains, strains, and MSD injuries.

What Changes as we Age?

Health declines with age. It is the gradual accumulation of a wide variety of molecular and cellular damage that leads to a gradual decrease in physiological reserves, an increased risk of many diseases, and a general decline in the capacity of the individual. These changes are neither linear nor consistent, and they are only loosely associated with age in years, yet have some common outcomes.

Strength decreases with age. In general, people achieve their maximum muscle strength in their mid-twenties and early thirties. Beginning in the forties, strength begins to decline, with more rapid change after the late fifties. Over an adult's lifetime, about 25% of strength is lost. Over time this can affect a person's ability to manually grip, push, and pull. Just as physical strength varies by individuals, the loss of strength varies and is greatly influenced by an individual's lifestyle choices (exercise, diet, wellness). This decrease of strength may affect an individual's ability to perform manual tasks correctly and safely.

Flexibility and movement decrease with age. There are changes in force control and a decrease in perception of force, as well as decreases in muscle endurance and range of motion.



The amount of decrease appears to be related primarily to individual lifestyle choices. Decreased flexibility and mobility may affect an individual's ability to perform manual tasks.

Reaction times slow with aging. By age 40, 25% more time is required to react. At age 60, 150% more time is required. This, in addition to changes in gait and balance, can result in an increased chance of slips and falls by older employees.

Cognitive information processing can decrease in speed. This is mostly attributed to the declining ability to manage multiple and unfamiliar tasks, as older people apportion their attention differently.

Vision is one of the major physiological changes due to aging. By age 60, the ability to resolve detail (visual acuity) decreases by about 26%. In addition, the ability to accommodate (focus on objects of different depths) decreases, as does the useful field of view and the ability to detect color contrasts. Susceptibility to glare tends to increase with age. People at age 40 need twice the light for viewing than they did at 20 years. After 60 years, five to six times more light is required. This may affect an individual's ability to perform visually intensive tasks, such as inspection, reading characters on a screen, etc.

Hearing can decrease with age. Presbycusis (age-related hearing loss) affects about one-third of people between the ages of 65 and 74, and half of people 85 years and older. This may affect an individual's ability to hear audible alarms and signals, and verbal instructions in areas with a high background noise level.

Ergonomics Design Addresses Aging-Worker Concerns

As stated earlier, the best method for addressing concerns about older workers is to design a workplace that fits the capabilities of workers of all ages, including the older ones. This means applying anthropometric and design guidelines that represent the full range of employee sizes and ages in order to design within the strength, flexibility, and movement capabilities of all. Lighting, audible alarms, and messaging should be designed for the vision and hearing needs of older employees. All workers will benefit from this design.

Opposing Positions

We've heard from several safety professionals that the solution for the aging workforce is to make accommodations for the needs of individual older workers, that is, to adjust and change their specific job tasks and workstations to align with the capabilities of those individuals. This is a reactive approach based on individual solutions for different people. It is an accommodation, which is normally used to adjust for the needs of injured employees, but is applied to older employees.

This lagging approach can limit opportunities for older employees, can require special scheduling considerations, and has been proven to be costly. In contrast, our position is to design the workplace to fit the capabilities of the whole workforce, including those who are older and those who will be older.

Conclusion

All people age. Overexertion injuries will be a primary concern for the full working population, as well as for older workers. As we age, several physiological changes occur that reduce strength and force, flexibility and motion, reaction time, hearing, and vision. So every employer will need to deal with the changes that occur in their workforce as time goes on.

To retain good employees, along with their skills and knowledge, it is to an employer's advantage to ensure that the workplace is designed to enable individuals to perform at their best. The ergonomics design of the workplace, to ensure that it and the tools used in it are designed within the capabilities of people at work, is an investment in the future success of the organization and its employees. Incorporating design criteria for older employees, specifically addressing strength, movement, hearing, and vision, is the best investment for enhanced performance and for accommodating any reduction in physical capabilities.

Endorsement

This position statement was accepted by Senior Leadership on October 24, 2016.

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