Designing the Workplace for the Aging Workforce

"How to Use Ergonomics to Improve the Workplace Design"

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Introduction

We hear it all the time—the American workforce is aging. In 1977, 37 percent of the salaried workforce was under 30 years old compared with only 22 percent in 2002, and only 38 percent was 40 or older in 1977 versus 56 percent in 2002.[1] In 1970, the average life expectancy of Americans was 70.8 years; in 2001, it was 77.2 years.[2]

According to the Bureau of Labor Statistics, of the approximately 300 million people in the U.S. today, 63 million are over 65 years of age, and ten million of them are still working. The number and percentage of older workers will double in the next ten years due to extended careers, second careers, and longer life expectancy.[3]

Older employees are defined as members of the "Mature" generation (58 or more years old in 2002 when data were collected and 60 or more years old today). Younger employees are members of three generations—the Baby Boom (post World War II or 38 – 57 year olds), Generation X (23 – 37 year olds), and Generation Y (18 – 22 year olds) in 2002.[4]

Nearly two in five workers (38 percent) currently aged 50 to 64 plan to carry on working beyond 65, according to a survey conducted by Chartered Institute of Personnel and Development (CIPD). In addition, those who are not planning to work past 65, 31 percent would change their mind if their employer allowed them to work flexibly, and another fifth say that they would be tempted to carry on working past 65 if they were offered a deferred larger pension.[4]

With this demographic shift, employers are faced with a workforce that is more diverse, not only in ethnicity and gender, but also in age. That has led to a great deal of speculation about how this age diversity will affect the U.S. economy and companies. The challenge for businesses is to create a safe and productive work environment that takes into account the characteristics that come with aging.

How do we change as we age?

As we age, we inevitably change in many ways. Cultural, attitudinal, physical, physiological, medical and cognitive changes have been well documented. In the workplace, the primary design concerns will be focused on the changes that occur to the physical, physiological and psychosocial capacities of aging employees. Understanding the differences between aging employees and their younger counterparts will better prepare employers to properly accommodate their workforces through proper workplace design.

Physical

The outward physical changes that occur when we age are the most obvious. From an employer's standpoint, the major physical concerns are:

- *Strength - 25-30 percent decrease at 65 yrs*
- *Flexibility - 18-20 percent decrease at 65 yrs*

- *Balance – One-third of 65 yrs or older fall each year*
- *Sight – All aspects deteriorate*
- *Reaction time and speed – Decreases*
- *Hearing – One-third of 65-74 yr olds have problems*
- *Manual dexterity and tactile feedback – Motor skills deteriorate*
- *Body fat – Increases*

Physiological

The internal physiological changes typically contribute to our everyday fatigue issues. The major physiological concerns are:

- *Oxygen exchange – 40 percent decrease at 65 yrs*
- *Respiratory system – 25 percent less at 65 yrs, 50 percent less at 70 yrs*
- *Cardiovascular system – 15-20 percent less at 65 yrs*
- *Systemic blood pressure – Increases*
- *Fatigue – Occurs more rapidly*
- *Extreme temperatures – More challenging*

Psychosocial

Employers can manage some of the psychosocial changes that occur with aging through proper management strategies. Some psychosocial concerns are as follows:

- *Shift preferences – Mornings, less shift work*
- *Training and learning – Structured training and education*
- *Disenfranchisement and disengagement – More likely*

What is ergonomics?

Ergonomics is the science of designing the workplace and work tasks to improve productivity and safety. According to ANSI Z94.0-1989, ergonomics is:

> "The application of a body of knowledge (life sciences, physical science, engineering, etc.) dealing with the interactions between man and the total working environment, such as atmosphere, heat, light, and sound, as well as all tools and equipment of the workplace."

The goal of ergonomics is human performance. It focuses on employees doing well. It deals with anthropometry, physiology, psychology, engineering, kinesiology, management, human factors, industrial medicine, and other fields. The goal is to design tasks, jobs, activities, work areas, and environment to remove known risk factors and obstacles that impede optimum performance in order to prevent injuries, illnesses, errors, confusion, mistakes and to improve overall employee wellness and overall business performance.

The fundamental ergonomic process followed by most practitioners is a four-step protocol:

1) *Identify* the physical, physiological and psychological *demands* of the job.
2) *Identify* the physical, physiological and psychological *capabilities* of the worker.
3) *Identify* the physical, physiological and psychological *mismatches* between the demand and the capability.
4) *Minimize the mismatches* through education and training, and work, tool, equipment, and environmental design.

If the demands of the job match the capabilities of the worker, the job-worker interface is optimized. If the capability exceeds the demands, the worker is underutilized. This can result in inefficiencies, boredom and underutilization. If the demand exceeds the capabilities, the worker will be overtaxed. This can result in injuries, fatigue, lower productivity, mistakes, stress and lower quality.

Today, the lower rates of available younger workers are causing employers to hire and retain more older workers. The lower participation rates and the higher disability rates seen by employers today, demonstrate that the work demands do not fit the changing characteristics of the aging workforce. One consequence is that productivity can not be optimal, if the skills and experience of aging workers can not be sufficiently utilized. Minimizing the 'performance gap' between the job demands and the workers' capabilities will obviously ensure greater productivity and lower risk of injuries.

The 'performance gap' created by having jobs with demands that are higher than the capacity of the workers will ultimately create problems and concerns that must be dealt with by the companies if they desire workplaces that are complementary to their workers. In business, the goals of productivity often increase the demands of the job and push the limits of the workers' capabilities. These business goals will be further challenged by the fact that the workforce is aging. With aging, worker capabilities will change. Despite these changes, the demands of the job will no doubt remain the same, unless attention is afforded to redesigning the job demands. Changing the demands to better match the inevitable changes in the workforce, that will occur with aging, is crucial to the success of companies and businesses.

Ergonomic control measures for dealing with the aging workforce

Accommodations for older workers are important in the inevitably changing workforce. Employers must be aware of the issues faced by older adults and how to accommodate them in the workplace. It has been suggested that designing a suitable environment for older workers will increase the safety and productivity of all workers. In addition to workplace modifications, employers can also adapt job duties to accommodate age-related changes. In an effort to reverse the effects of an aging workforce on a company's productivity and safety metrics, many companies turn to *ergonomics* for help.

Ergonomic programs have two fundamental control measures: (1) engineering solutions and (2) administrative solutions. Engineering solutions are seen as better than administrative solutions since they tend to be more permanent. Administrative solutions are usually explored when it is found that engineering solutions are not available or are prohibitively expensive. Many times concerns can be addressed through both engineering and administrative controls. The effectiveness of each type of control naturally depends on the concern that is being addressed.

Administrative controls refer to those actions taken by the management or staff to limit the potentially harmful effects of a stressful job on workers. Administrative controls are achieved by modifying existing personnel functions. Administrative controls include programs, managerial strategies, policies and procedures. They include but are not limited to:

- Education and training
- Job assignments and placements
- Job rotation and breaks
- Stretching programs
- Exercise, strength, conditioning and health programs
- Return-to-work strategies

In other words, the control actions are focused on the worker. Improving the capacity of the employees to perform the job, will narrow the 'performance gap' from the capacity side.

By contrast, engineering controls focus on the job and work environment. The aim is to redesign the job, tools, equipment and environment to achieve control over those risk factors associated with poor performance, such as lower productivity and injuries and illnesses – narrowing the 'performance gap' from the demand side. Engineering controls include but are not limited to:

- Task design
  - Postures
  - Forces
  - Repetition
  - Boredom vs. complex jobs
  - Rate, duration, and recovery
  - Static vs. dynamic muscle activity

- Workstation design
  - Sit vs. stand
  - Work surface height
  - Reach zones
  - Work envelopes
  - Visual zones
  - Chairs
  - Slanted surfaces
  - Sharp edges
  - Footrests
  - Floor mats/insoles
  - Shelving

- Environmental design
  - Lighting
  - Temperature
  - Noise
  - Vibration
  - Clothing
  - Footwear
  - Gloves
  - Office design

- Tool design
  - Grips
  - Leverage
  - Weight
  - Balance
  - Triggers
  - Torque
  - Vibration
  - Handle design

- Manual material handling design
  - Push vs. pull
  - Manual material handling guidelines

- Equipment design
  - Knobs and switches
  - Control locations
  - Lighting
  - Keyboard and mouse
  - Lettering and character size
  - Analog vs. digital
  - Colors

Conclusions

The growth in the number of older workers may lead to changes in age norms, particularly in the later career stages.[28] Career stages and the concept of retirement will be in transition, as rising life expectancies will place life roles into a new context. Eventually employers will see the advantages to hiring older workers. They are mature, reliable, adaptable, experienced, loyal, and have a desire to work.[29]

Redesigning the work and the workplace to accommodate for the aging workplace is crucial. Ergonomics and its scientific approach to identifying the mismatches between the job demands and the workers capabilities is an effective program for addressing the concerns of the aging workforce. Workplace modifications, job/task redesigns and job/duties accommodations will all be necessities in the future. The stakes are high, for employers as well as employees. Ultimately, such improvements could be the only way of securing the supply of labor.

By applying such science, the workplace can be designed and redesigned so that older workers have the ability and desire to adapt.[32] This is perhaps most important as it relates to the large number of baby boomers—the 78 million people who will begin to reach traditional retirement age by 2010. Employers will need to find ways to keep their aging employees healthier and working longer. It is important to increase awareness and reduce the risk of injuries for older workers. Employers, ergonomists and other specialists will know what to look for to avoid hazards in the workplace. In turn, they will be able to implement programs and modify the environment, processes, and procedures to better support the needs of older employees. Ergonomists should be part of a collaborative team to identify processes and job hazards that could exacerbate musculoskeletal conditions. Educational materials should be developed and provided in order to raise awareness. Ergonomics programs and workplace design strategies will help the older employees perform their jobs productively and safely by reducing the 'performance gap'.

The culture and values of the older workers are significant assets for the companies that choose to attract and retain them. These values include commitment and loyalty to the employer, fewer sick days, reduced injuries, and enhanced length of service. Companies need to recognize older workers' importance in the workforce and their changing roles in their fields.[26] Accommodating the older workers is important in the changing workforce. Employers must be aware of the issues faced by older adults and how to use the sound principles of ergonomics to accommodate them in the workplace.

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