4.2e Workplace Facilities

Designing a workplace that provides opportunities for the broadest potential workforce makes good business sense. This allows employers to select the most qualified people from the largest possible applicant pool. It may also improve work efficiency, employee productivity, workplace safety and the quality of work.

The workforce will likely represent a wide range of demographics and abilities. Most workers spend much of their time at the workplace. Therefore, many design considerations for workplace facilities may be different than other types of built environments that are used by fewer people over shorter time periods.

General Environment

Job performance is best when the environment neither under-stimulates nor over-stimulates the employee. Lighting, the thermal environment and noise are the key environmental variables to consider. The most desirable levels of each will not only vary across work environments and people, but also will vary for different jobs.

The United States Bureau of Labor Statistics reports that over 3% of this nation's workforce is paid for work performed at home. The universal city will undoubtedly employ telecommuters, but providing recommendations for the design of home working environments is beyond the scope of this guidebook.
requirements. It is therefore important for the designer to have a good understanding of the work requirements to design effective environments.

**Lighting**

Appropriate lighting is critical to effective task performance.

**Guidelines:**

1. The amount of light necessary for good work performance will depend on the requirements of the task and the abilities of the employee. When possible, use a combination of natural and artificial light sources that can be adjusted through the use of blinds, overhead lights and direct light sources. This will allow employees to adjust the lighting to fit the requirements of their tasks and individual abilities.
2. Use adjustable blinds so that employees can control the amount of natural light that enters their workspaces. Motorized blinds may offer the easiest adjustment.
3. Place direct lighting at workstations to enable employees to adjust the level of lighting for their specific task requirements and individual abilities.
4. Excessive glare may cause discomfort and reduce work performance. Because those with reduced visual ability may require greater illumination levels, it is very important to avoid glossy work surfaces.

**Thermal Environment**

Temperature, humidity and ventilation affect more than employee comfort. They also impact work performance and employee health.
Workplace Facilities

Guidelines:

Individuals should be able to adjust the ventilation, heat and humidity associated with their work areas. This can be accomplished by giving employees control over the temperature and ventilation at their workstations through the use of local thermostats, windows, fans and adjustable window blinds.

Temperature and humidity extremes should be avoided, particularly cooler environments that may be uncomfortable for the elderly or others with circulatory impairments.

Ventilation must be effective but minimally distracting. Use low speed ceiling fans, so that air velocities can be changed depending on the environment temperature and humidity, tasks performed and preferences of individual employees.

Noise

Workplace noise can negatively affect both task performance and personal safety.

Guidelines:

Background (ambient) noise can interfere with communication among employees. To allow efficient communication, keep ambient noise levels low and avoid short, unpredictable noise.

Uninvited noise is distracting and should be minimized, but there are large differences between individuals in the types and intensity levels of noise that are distracting. Individuals should be allowed to control the noise levels in the environment without interfering with the noise in another employee's environment. Offices or cubicles with high sound resistant walls, rather than large open areas with desks, can be used.

Figure 4.2e.3. Window treatments like shades and blinds enable employees to control the amount of natural light and solar heat gain in their work environment.

Figure 4.2e.4. This fire alarm provides both auditory and visual signals to enable detection by most people.
Alarms or communications having auditory frequencies above 4000 Hz are difficult for many individuals to detect and should be avoided. Auditory alarms should be supplemented with visual signals (e.g., flashing lights).

**Layout of Work Areas**

Environments that promote efficient materials flow, minimize manual materials handling and facilitate social communication and social interaction will provide an accommodating work environment.

**Materials Flow, Handling and Storage**

Materials flow, handling and storage should be designed to enable job performance by people of varying statures and abilities.

**Guidelines:**

- The frequency and distance of materials moved from receiving to workstations should be minimized. In addition, minimize redundant handling of materials. Options can be evaluated by developing and using simple material flow diagrams.
- Provide people with containers that give them the option of carrying, pushing or pulling.
- Stored materials should be reachable by anyone regardless of size or ability whether standing or seated. Automated materials retrieval systems that allow selected materials to be brought close to the employee can be used.

**Social Interaction**

Opportunity for social interaction between all employees contributes to higher morale and satisfaction.
Guidelines:

- Workstations should be situated so employees can communicate information effectively with visual and/or verbal modes of communication. Visual obstacles except for intentional obstructions such as cubical or office walls should be avoided. Background noise should be minimized.

Employees should have designated areas to recover from work demands and communicate with others. Break rooms or areas should be located near workstations and have a clear path to minimize travel time, and should be quiet, well lighted and equipped with chairs and tables to facilitate recreational social interaction between all employees.

Workstations

Workstations can be categorized into those that allow standing or sitting postures, or a combination of both (i.e., sit-stand stations). In addition, workstations that contain computers and their accessories require special design consideration. The appropriate workstation design will allow the broadest set of employees possible to perform specific sets of job tasks. While the physical characteristics of a workstation will depend largely on the tasks that are to be performed, some general guidelines can be provided.

Standing Workstations

Several types of employees (e.g., retail checkers, ticket takers, fabricators, architects, and graphic designers) use standing workstations. Standing for long periods of time can be particularly straining to the back and legs; as a result, standing workstations often contain a sitting or resting option to reduce fatigue.
Guidelines:

- Use standing workstations instead of sitting workstations when larger physical work effort is required or the employee must cover a larger work area. Employees should not be required to stand in place for long periods.
- Counter or table heights should be adjustable to allow the employees to maximize their strength capabilities and minimize physical effort associated with maintaining stooped working postures.
- Working heights of standing workstations for employees performing inspection tasks should be adjustable for those who want to bring the task closer and should be designed to minimize efforts that would result in awkward neck postures.
- Provide adequate knee and toe clearance beneath workstations and counters so that employees can be as close to the workstation as possible.
- Avoid the use of elevated platforms, but consider the use of durable rubber floor matting to reduce muscle fatigue of the legs and backs for those who stand.

Sitting Workstations

Sitting is generally less strenuous than standing, and allows easier control over hand and body movements. It is not surprising that the sitting workstation is the most common.

Guidelines:

- Use sitting workstations to facilitate hand movement accuracy when smaller hand manipulation forces are required and when less area needs to be covered by the employee.
Seated workstation table heights should be approximately the elbow height of the seated individual and therefore should be adjustable. Seated workstations should allow enough clearance for users of wheeled mobility devices.

Sit-Stand Workstations

Sit-stand workstations offer the most flexibility to employees because standing and sitting put stress on different parts of the body. They enable employees to change their postures throughout the day to minimize muscle fatigue and can be used by people with a very wide range of abilities. Several studies have shown that they can reduce physical strain on specific muscle groups and increase productivity.

Guidelines:

Workstations that accommodate both standing and seated work are extremely desirable. Use these stations when possible.

Computerized Workstations

Video display terminal (VDT) workstations hold a monitor, and usually a keyboard, mouse, trackball and/or other input device, and may also require room for a telephone, printer, and other office supplies. The space and furniture requirements of VDT workstations therefore have a unique set of design requirements.

Guidelines:

Monitors should be positioned to reduce neck strain. Adjustable stands are desirable to accommodate people with different statures and needs.

Drive slots should be positioned so that individuals with varying statures and abilities can insert CDs and disks.
Tilt-adjustable keyboards or keyboard support surfaces are recommended to reduce awkward postures of the wrist during keyboarding.

Footrests should be used to provide relief in the lower back and buttocks for those sitting in front of computer terminals.

Ambient and natural light conditions should be designed to eliminate any glare or interference on the screen.

Figure 4.2e.10. This workstation offers a lowered keyboard surface and tilted keyboard to reduce back, neck and wrist fatigue.