



## Fact Sheet

Reprinted from WOHR News  
July/August, 1980

# Video Display Terminals Pose New Health Hazards

**Better design and planning can help prevent eyestrain, tension,  
and other discomforts.**

Perhaps not since the typewriter has a machine changed office work as much as the video display terminal. VDTs (sometimes called CRTs for cathode-ray tubes) are the television-like screens that display information stored by computers to workers in a wide variety of jobs, from newspaper reporters to airline reservation clerks.

More than three million of the machines are now in use, and another four million will be by 1984. Most are being incorporated into the existing workplace without adequate design considerations or attention to the health needs of the workers who use them. What may be good lighting design for a paper-handling job may be inadequate or even bad for a VDT operator.

The government has not yet set standards to protect these workers, but at the request of many trade unions, NIOSH (the National Institute for Occupational Safety and Health) has begun research that should lead to some.

### The symptoms

The most common complaints among VDT operators are:

- Eyestrain, with such symptoms as soreness, redness, stinging, itching, and general discomfort;

- Pains in the neck and back;
- Dull headaches;
- Blurred vision;
- Dizziness and nausea;
- Problems with eyeglasses and contact lenses;
- A general feeling of tension and irritability.

### Eye fatigue

Eyestrain is uncomfortable and annoying; daily eyestrain may cause temporary deterioration of vision. A feeling of eyestrain often results from fatigue of the muscles that control the movements of the eye and those that regulate the amount of light that is allowed to enter. Viewing at close range for long periods of time can be particularly tiring.

VDT operators should take periodic rest breaks in open areas away from their machines.

During the breaks, it is a good idea to do simple body and eye exercises. Most important, however, is giving the eyes an opportunity to view at greater distances.

Another ideal situation is to alternate an hour of screen work with an hour of another kind of work that allows viewing from a greater distance, as well as more body movement.



**Correct posture:** Screen should be situated so that eyes look slightly downward.

### Glare

Eyestrain is also caused by glare on the VDT screen resulting from light reflected from windows and shiny surfaces, or from office lighting that is too bright or badly positioned. The glare makes it difficult for the eyes to see the information on the screen. It may also cause neck and back pains if the operator contorts her body to avoid the glare.

The best remedy for glare is a screen made of nonreflective glass. Glare can also be prevented by installing blinds or awnings on nearby windows, relocating machines for better light exposure, relocating lighting fixtures, installation of indirect lighting or reducing lighting without making it difficult to read printed copy.

## Contrast glare

Eyestrain may also be caused by viewing a screen against a background that is too bright, such as a white wall or a window. The pupils, which control the total light entering the eyes, adjust to the bright background rather than to the darker screen. Images on the screen become difficult to see. Some operators compensate for this by putting their heads down to block the light and raising their eyes to see the screen. This can cause back and neck aches. Another poor solution is the use of sunglasses.

The best solutions are dimming the lights, changing the location of the machine, painting or covering the facing wall in a color or texture that reflects less light, and installing a simple partition or screen behind the machine.



**Lighting incorrect:** Glare on screen causes eyestrain.

## Screen size and color

The size of the screen is of great importance to the viewer's comfort. It is best to have a large screen with a viewing distance of more than two feet and a character height of at least 3/16 of an inch.

Research has not yet established the best colors for screens and characters, and different operators show different

preferences. However, the colors generally recommended are a dark green screen with lighter green or yellow characters, or a black screen with white characters.

## Posture

Sitting in a fixed position for a long time is tiring and may cause muscle strain. This is particularly true of VDT operators, who hold a constant head and neck as well as eye position. However, some postures are less fatiguing than others.

The most comfortable viewing position is with the eyes looking slightly downward. Therefore, the height and angle of the screen should be adjustable to accommodate operators' different heights and preferred angles of viewing.

Ideal is a machine with a detached keyboard and a fully adjustable stand. The detached keyboard enables the operator to move the screen or to raise or tilt it without changing the keyboard position.

Like other sedentary workers, VDT operators should also be concerned with the chairs they use. Sitting on poorly designed furniture may lead to back problems, varicose veins, and hemorrhoids. Care should be taken to avoid sitting with the spine curved backward.



**Lighting correct:** Indirect lighting prevents glare on screen.

## Machine maintenance

VDTs should be checked at least twice a year, with periodic replacement of tubes. A full record of the machine maintenance should be kept and should be available to workers.

## Eyeglasses and contact lenses

Workers who wear corrective lenses often have additional difficulty in using VDTs, and should inform their eye doc-

tors that they work with them. It may be necessary for such workers to be fitted with special lenses designed to focus at the normal viewing distance from eyes to screen.

## Stress

In addition to eyestrain and postural problems, VDT operators are subject to many of the stressful conditions common to all office work: noise, pressure, overcrowded work spaces, and uninteresting work. One researcher has found that as the machines proliferate their operators sometimes become even more alienated from their jobs than assembly-line workers—another good reason that employees should strive for variety in the workday.

Heat from the machines and their bad positioning in overcrowded offices can also cause stress. Especially to be avoided is the seating of a worker with her back too close to the back of another machine, or the arrangement of workers in clusters facing each other.

Stress may also arise from the intense concentration often required in working with VDTs. Pauses while the operator waits for information to appear on the screen are not restful, but often particularly stressful. ■



**Detached keyboard** allows operator to adjust screen for maximum viewing comfort.