Visual Quality – Development of Lighting for Dynamic IT Work.

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Rising user needs for Visual Quality and good lighting at the office

Parallel with the TCO certification program for IT and office equipment there is a rising need for information and user advice for lighting at the IT workplace. TCO Development has therefore initiated a development of user guide lines for visual quality at the office workplace. Some outlines are described in this article.

We know from work environmental research that the user can work more efficiently when supported by good lighting. Modern office work spaces are more and more created as open landscapes. In this work environment the choice of work light can be complex. The mix between daylight and artificial work light must offer good visual ergonomic conditions for computer display work, for keyboard work and other IT based work tasks. To give priority to natural daylight contributes strongly to alertness and mental concentration.

The display should be positioned so that the user can read the display without effort. This is created if the user can control the work light easily, without any impact from glare or reflexes at the workplace as well as in the range of close surrounding. This means that the workplace should be equipped with specific work light in harmony with room and day light. The needs of the user will guide this balance. Well planned work light also means a highly energy efficient lighting. A thorough analysis of the needs of the user, the choice of work tasks, the length of work tasks and when work is done during the day are factors to be taken into thorough consideration.

Criteria for quality lighting at the workplace are:

1. to offer the user a high quality work light, which is easy to control and adjust by the user;
2. this means a dimmer function for the adaptation of the user's specific needs.
3. the light must be completely free from the risk of glare against the user as well as other users who are positioned within this lighting area.

In modern office work places the usage of high quality work chairs and work desks are more and more used. The physical needs of the user are well supported by this flexible workplace, where variation between sitting and standing is natural and easily done. We know that frequent variation for the body is beneficial. An easily adjustable work light is as important as more than 80% of the user's space orientation and perception is supplied by the user's visual information. A workplace that is flexible through workplace layout including it's lighting is therefore essential.

Photo illustration reference:
1. Lighting from Waldmann Ljusteknik, Sweden
2. Lighting from Fagerhult, Sweden.

Open work spaces

Modern office work areas are more and more open spaces for large groups of users. Planning for a good lighting environment in these open spaces is more complex compared with a room for a single user. Many individuals with different needs and in different ages are supposed to share the same work space. A thorough analysis must be the initial step before selection of work light solutions. Regarding the quantity of work light, a 50 year old user will need 100% more light as compared to a 25 year old user, a 60 year old user even more than that. The distribution of light in and around the work space is also very important. These factors must be taken into close consideration when planning for the needs of an ageing population in Europe. Analyzing questions as “how” as well as “by whom will the workplace be used” are essential.

There is also a fact that the users work in different projects and move between different work areas and work places. This fact will make an essential impact on

lighting planning, which must have a high adaptation quality for different groups of users. The light must be adequate for the individual, for the group and the work that is performed. The choice of light as well as the colour balance in the office is important. The reason is simple: IT work demands good visual support and comfort!

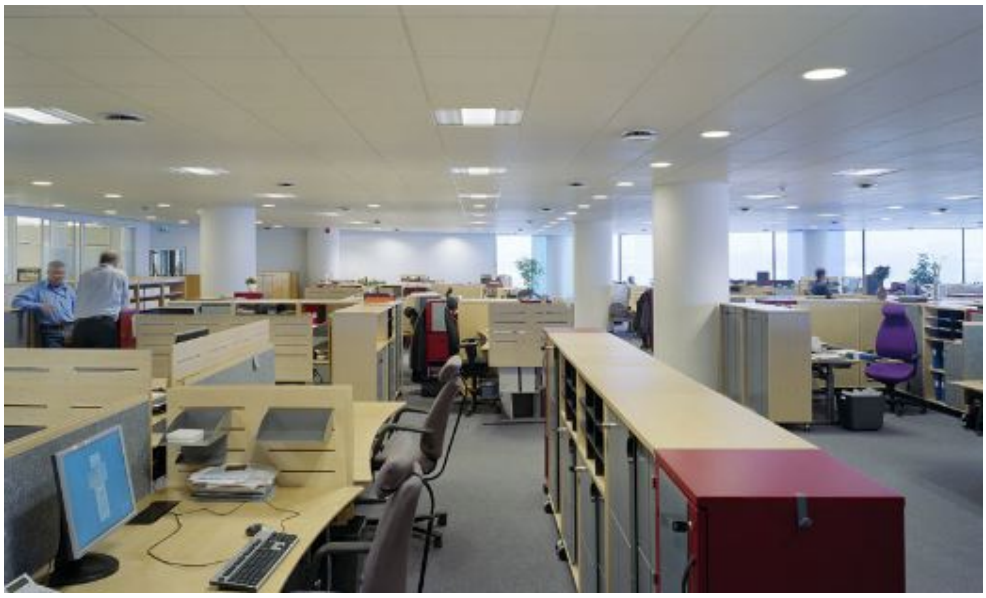

Photo illustration reference: Annell Ljus&Form, Sweden

The need of natural day light

We live and work indoors up to 90 to 95% of the year. More than 80% of our environment information is transported through our eyes. Day light is crucial for our health which means that indoor work requires a high quality flicker free artificial work light that in a limited form can compensate for day light. Following modern visual research, development of artificial light also tries to compensate for natural daylight. This however will never be completed to a full extent. Work light is also a matter of light quality from the background light in the computer display, including the contrast in the display, the front frame and the length of time spent at the computer. This complexity requires a balance between work light, correct eye sight and correct ergonomic workplace layout.

There is a clear connection between poor visual work quality and physical as well as mental overload. Poor lighting conditions make the user strain his eyes with bad physical work postures. The user complains from muscle strain, aching neck, shoulders and back. Eyestrain and mental tiredness is very common.

According to ergonomic planning tradition, computers are positioned parallel to the window. Modern flat displays, offers good visual quality which allows the possibility to position the display according to the user’s needs.
All TCO labelled displays have this high quality.

Photo illustration references: Atelie Lyktan, Sweden

User recommendations

Consequently, follow these user recommendations:

- Create a flexible workplace with a good balance between daylight, room colours and artificial lighting;
- Require TCO certified displays and office equipment;
- Choose harmonic colour balance on walls, floor and other areas close to the workplace;
- Avoid tiresome contrasts in the range of eyesight;
- Avoid strenuous glare conditions from window light without sufficient shades or curtains;
- Avoid glare conditions from poor lighting armatures, positions or directions;
- Use the ergonomic and visual ergonomic variation possibilities offered by the IT equipment and the workplace;
- Require flicker free work light, easily controllable by the user;
- Integrate IT work with sufficient rests, for the body as well as for the eyes and mental system. A good user recommendation is working during no more than 20 minutes at a time, especially for IT work using a portable computer.
- Avoid IT work in rooms without windows. If this is not possible, make sure that the user has the possibility to take a 30 minutes rest in natural daylight.

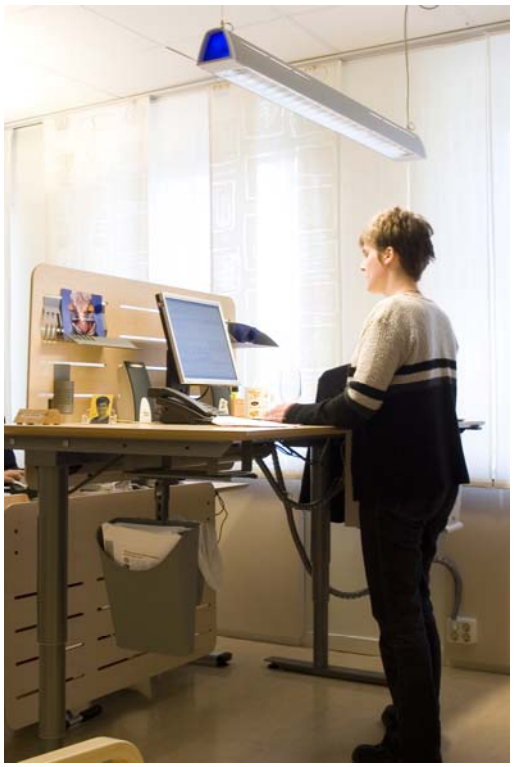

Photo illustration reference:
1. TCO Development Show Office, Sweden.
Lighting from Fagerhult, Sweden.
2. M.O.R.E. design concept, Sweden.

Costs or benefits for good work lighting

What if your employer finds it too expensive to buy new quality work lighting? Then explain the benefit for the company, as well as the welfare benefit for the user. What are the costs for the company if productivity falls because of the employees´ tiredness, eye strain and consequently long periods of sick leave? Swedish work life research show that good work lighting only takes 1% of the total costs for the company.

A clear and interesting example from recent research in Swedish schools shows: when the researchers supplied school rooms with quality work lighting, teenagers stopped yawning, in fact they became more alert during morning hours and they slept more efficiently during the night!