

Focus on IAG's work

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Lighting during flexible working hours

Problem

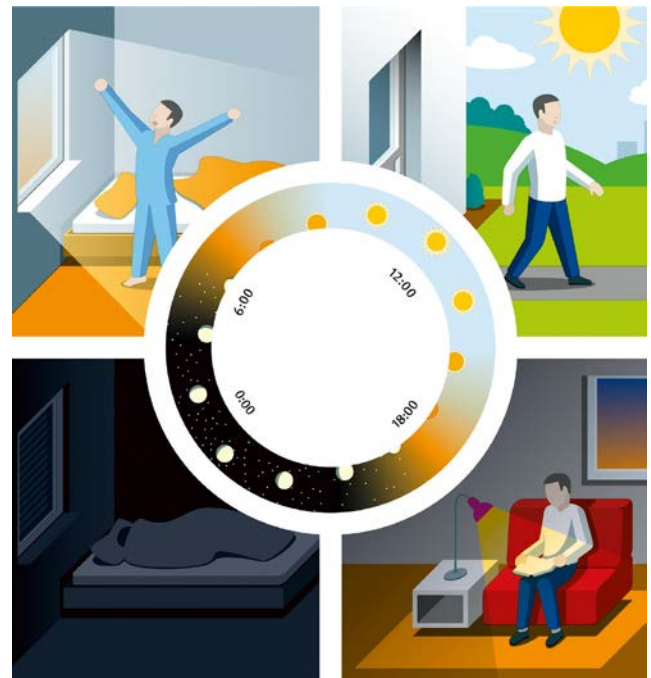
At present, 20% of employees in Germany do not work entirely between 7 am and 7 pm: their working hours are offset with respect to this period, or they work in alternating and night shifts or entirely at night.

At the same time, tremendous changes are taking place in the world of work. Progressive digitalization of various processes (Industry 4.0) is furthering globalization and the intermeshing of trade, production and the delivery of services throughout the world. In consequence, work is increasingly shifting to times of the day that were uncommon in the past, because individuals in different time zones communicate with each other in real time at any time of day or night.

The issue is therefore no longer merely that of shift work, but of working hours becoming more flexible, with a corresponding increase in work performed under artificial lighting.

Activities

Each person has their own natural sleep/wake rhythm. Any form of light, whether natural or artificial, at home or at work, influences this rhythm. The stability of the rhythm correlates positively with aspects of health. If it is disrupted frequently or over long periods of time, persistent sleep and health problems can arise.



Daily routine with natural light/dark rhythm
 (Image: Jörg Block/BG ETEM)

In view of this situation, the Lighting subcommittee of the DGUV's Administration expert committee developed guidelines for the use of artificial lighting at workplaces in the evening and at night. The guidelines were based upon validated findings of scientific studies. They relate in the first instance to shift work, but can equally be applied to flexible working hours.

The IAG was closely involved in their preparation.

Results and use

Both daylight and light produced by lamps, appliances or monitors have non-visual effects upon the human organism. The effect of light in the blue spectral range, to which a certain type of receptor in the human eye responds, is particularly strong. Through a wide range of physiological mechanisms in the body, these effects take many forms, including influencing the "sleep hormone" of melatonin and thus the individual's sleep/wake rhythm, and his or her performance.

The requirements listed in the Technical Rule for Workplaces ASR A3.4 are of essential importance to artificial lighting at the workplace, and their observance is mandatory. Beyond these requirements, guidelines exist concerning the non-visual effects of light, observance of which can avert negative impacts upon health. The guidelines set out briefly below are in no way exhaustive:

- Wherever possible, preference should be given at the workplace to natural daylight over artificial lighting. Daylight has all the qualities needed to synchronize and stabilize the human biological clock.
- Where little or no daylight is available at the workplace, it should be augmented or compensated for during the day by bright artificial lighting or lighting with a high blue component.
- Bright light and light with a high blue component should be avoided for at least two hours before the individual usually goes to sleep.
- Likewise, when using computers, tablets or smartphones, individuals should use software that filters out blue light (apps for this purpose are often available at no cost) before going to bed, particularly in the evening and at night.
- Work breaks should preferably be spent outdoors, where the most daylight is available.
- Restful sleep, whether at night or during the day following a night shift, is supported by rooms that are dark, quiet and cool.
- Artificial lighting should be avoided altogether during sleep. This includes weak standby lights on electrical appliances, for example.

User group

Labour inspectors, OSH professionals, management personnel, employers, consultants

Further information

- [DGUV Information 215-220](#): Nichtvisuelle Wirkung der Beleuchtung auf den Menschen. Published by: Deutsche Gesetzliche Unfallversicherung e.V. Berlin, 2018
- Zieschang, H.; Soestmeyer, G.: Nichtvisuelle Wirkungen von Licht auf den Menschen. [DGUV Forum \(2018\), No 6](#), pp. 38-39
- Kantermann, T.; Schierz, C.; Harth, V.: [Gesicherte arbeitsschutzrelevante Erkenntnisse über die nichtvisuelle Wirkung von Licht auf den Menschen. Eine Literaturstudie](#). Published by: Verein zur Förderung der Arbeitssicherheit in Europa e. V. (VFA), 2018

Technical enquiries:

IAG, Work design – demography section

Lighting subcommittee of the DGUV's Administration expert committee