ELECTRIC LIGHTING
HEALTH
Talking Points

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Improved visual comfort in the workplace leads to higher building-occupant satisfaction and productivity

- Harsh overhead office lighting is usually one of the causes of migraines and headaches. If any employee experiences headaches or migraines during their work, it could cause them discomfort, which prevents them from feeling productive or motivated (Luenendonk, 2019).
- Groups working in artificial light only tend to be more stressed than those working in a combination of natural and artificial light over the year (van Bommel, 2006).
- Improvements of 30% or more compared to baseline measures were observed in the areas of (i) concentration, (ii) light headedness, (iii) lethargy and (iv) sleepiness in the intervention group (Mills et. al., 2007).

Personal control of an individual's lighting system leads to higher satisfaction and typically a reduction in energy consumption

- Participants with personal control expressed significantly higher satisfaction (Newsham et. al., 2009).
- Participants with personal control expressed significantly lower distraction from changes in temperature and acoustic conditions (Newsham et. al., 2009).
- The use of personal controls reduces energy use of building services 10% (Newsham et. al., 2009).
- In Escuyer and Fontoynont's [16] study, the main reasons participants mentioned that they preferred manual over automatic lighting controls were to benefit from daylighting, reduce energy, and to relieve their eye-strain caused by a high lighting level (Gilani & O'Brien, 2018).
- As related to CCT, females' negative mood decreased in the warm and increased in the cool white light source. Males' negative mood, on the contrary, increased dramatically in the warm compared to the cool condition (Baron et. al., 1992).
- Based on the meta-analysis, the best estimates of average energy savings potential are 24% for occupancy, 28% for daylighting, 31% for personal tuning, 36% for institutional tuning, and 38% for multiple approaches (Williams et. al., 2011).
- The amount of light that is best differs from one person to another as well as the tasks they want to get done. That's why the best solution is to opt for variable or flexible lighting, which allows one to dim overhead lights as well as provide individual light and lamps that can be turned on or off based on a person's preference or task (Luenendonk, 2019).

Talking Points

Employees value their work environment, and especially the visual environment, as part of their compensation package

- A study by the American Society of Interior Design shows that 68% of employees complain about the lighting situation in their offices. Because of poor lighting, people get headaches due to the strain it puts on their eyes (Luenendonk, 2019).

Dynamic electric lighting systems can contribute to maintaining natural biological cycles that lead to improved health

- A significant positive correlation between vertical illuminance and sleep quality. As vertical illuminance increases, so does sleep quality within day-time office workers (van Bommel, 2006).
- Using dynamic artificial lighting that adjusts color and intensity throughout the day according to a human rhythm will greatly impact the health and well-being of employees (van Bommel, 2006).
- Higher lighting levels also influence the electroencephalogram (EEG), keeping us more alert and less sleepy (Juslén et. al., 2005).
- The higher lighting level results in fewer delta waves (the delta activity of an EEG being an indicator of sleepiness), indicating that bright light has an alerting influence on the central nervous system (van Bommel, 2006).
- The greater the ability for a artificial lighting system to mimic natural conditions, the better the effect on those using the lighting system (Cupkova et. al., 2019).
- The data show that blue-enriched white lighting in offices, when compared with white office lighting, has beneficial effects on daytime alertness, performance, mood, and eye strain, as well as on nighttime sleep quality and duration (Keis et. al., 2014).
- This novel photoreceptor cell type, an intrinsic photosensitive retinal ganglion cell (ipRGC), regulates many non-visual biological effects such as circadian timing, body temperature, heart rate, cortisol production, melatonin production and alertness (van Bommel, 2006).
- High correlated color temperature fluorescent lights could provide a useful intervention to improve wellbeing and productivity in the corporate setting, although further work is necessary in quantifying the magnitude of likely benefits (Mills et. al., 2007).

KEY REFERENCES

Primary Research

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