BULLET POINTS: 5 PARAMETERS FOR A PERFORMANCE ORIENTED INDOOR ENVIRONMENT

Most existing research literature on indoor environment is oriented to health and comfort, but human performance oriented data can be easily extracted from this achieved knowledge and applied on practical situations. Nevertheless, a comprehensive collection and analysis of relevant data around indoor environment influence on human performance is still to be done: a challenge and a opportunity.

The materials found indoors are not considered independently on this summary but they have a key influence on the five group of parameters described below.

1. THERMAL PARAMETERS

What: there is a constant metabolic process of balance between the heat produced by our body and its dissipation to environment. We can consider thermal parameters to be optimal when the minimum amount of energy to adapt to environment is needed.

Performance & health: metabolism stress to adapt to environment.

Measurable factors: internal factors as personal metabolism/activity, clothing and skin temperature, and external factors as air temperature, relative humidity, surface temperature of surrounding elements and air movement.

2. LIGHTING AND VISUAL PARAMETERS

What: level and type of illumination and lighting (artificial lighting & visible-natural light), and views from the workplace.

Performance & health: visual fatigue, headache, irritability, negative effects on performance and tiredness, accidents, mood and concentration, biophilic distress, alteration of the circadian rhythms.

Measurable factors: illumination level, distribution & glare index, colour-rendering index, light spectrum, light flickering, colour temperature.

3. INDOOR AIR PARAMETERS

What: we need the air to live (20 m^3 air a day minimum) and it is the main path to introduce substances and particles that affect us negatively. Furnishing and construction materials, ventilation system components, activities performed by occupants influence the indoor air quality.

Performance & health: alteration of cognitive tasks and decision-making capabilities, dizziness, allergy, asthma, irritation of nose/eyes/throat/ skin.

Measurable factors: ventilation rate, CO_2 concentration, CO concentration, odours, air ions, volatile and semi-volatile compounds (TVOCs) concentration, and particles and fibres concentration.

4. SOUND PARAMETERS

What: prevent the noise/sound from the outdoor and indoor sources to interfere in occupant activity, as well as the conditioning of spaces of activity to allow optimal speech communication. The difference between sound and noise is strongly influenced by subjective appreciation.

Performance & health: cognitive tasks and memory adversely affected, Lombard effect, speech communication-intelligibility, annoyance and social and behavioural effects, hormonal responses, cardiovascular effects.

Measurable factors: reverberation time, speech intelligibility, sound absorption and sound insulation, infrasound & ultrasound, oscillations and vibrations.

5. BIOELECTRICAL PARAMETERS

What: electric potentials and currents are produced by or occur within living organisms. Electromagnetic radiation associated with man-made technologies has a potential to affect human behaviour and health.

Performance & health: fatigue, headache, irritability, dizziness and nausea, sick building syndrome.

Measurable factors: AC electric fields, AC magnetic fields, radio-frequency radiation, and static electric fields.