

## INFLUENCE OF DAY LIGHT AT HUMAN PSYCHIC

Ružena KRÁLIKOVÁ

Faculty of Mechanical Engineering, Technical University of Košice, Slovak Republic

### Abstract

*This article deals with influence of shortage natural /day light at human psychic and describes chances, how we can prevent this one negative influence. One from options of*

*appropriate lighting for positive seeing is using so-called SAD lamps, marks as healthy light.*

### Key words

*day light, health, SAD (Seasonal Affective Disorder), lighting*

### 1 INTRODUCTION

Day light is natural and inseparable part of human life and its influence reaches so far beyond function center of visual perception. Humans organism adapts during millennium on natural alternation of light and darkness. With appearance of artificial light source, their development and expand began change life style and human began to “extend” a day and “shorten” a night. Centuries have passed without that someone has seriously dealt with the idea if are the hits to natural bio – rhythm and manner of life, on who was humane organism ever before adapted, haven’t got negative influence at its psychic and physically comfort.

### 2 LIGHT AND HUMAN ORGANISM

Some studies shows on direct impact of daylighting on human. Optimized lighting has very many positive features that should be considered when modernizing a building. For instance, day light directly impacts to mental capacity and visual perception [8]. Light also regulates physical processes, such as the release of hormones, and provides the natural pacemaker for the human circadian rhythm [9,10]. Inadequate light intensity for a sustained period may also trigger symptoms of depression. In addition to psychological and physiological effects, optimized daylighting also has energy benefits. For example, reducing artificial light periods by improving daylight autonomy saves electricity, Fig.1.

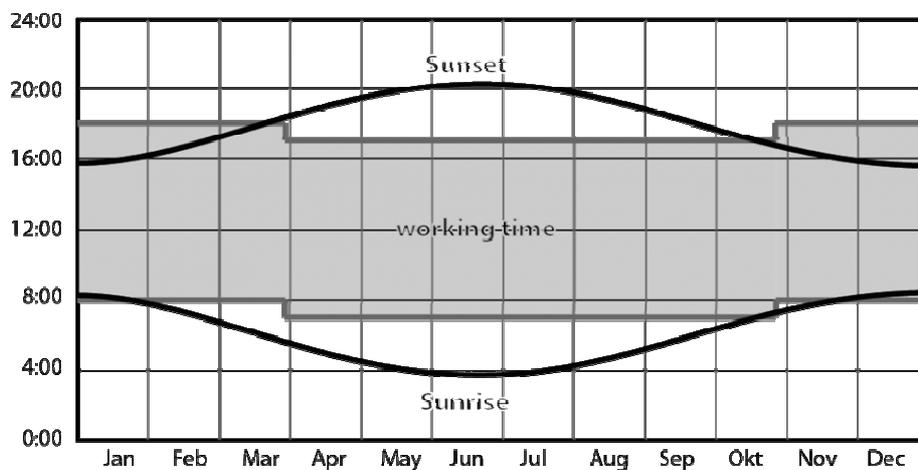


Figure 1: Hours of available daylight



Results from last years approve that day light effects to right behaviour of human apparatus and their mutual combination, its results general salutary condition of human body. Human recieves light and humans body needs it for important life processes. The light has three base features [1]:

- Visual functions – adaptation of visual impulses and perceptions.
- Sence system – perception, as sence of visual discomfort and common sence of environment.
- Non-visual functions – needed to protect biological processes in organism and general physic condition of human body.

Effects of daily light on humane organism are showns on the Figure 2.

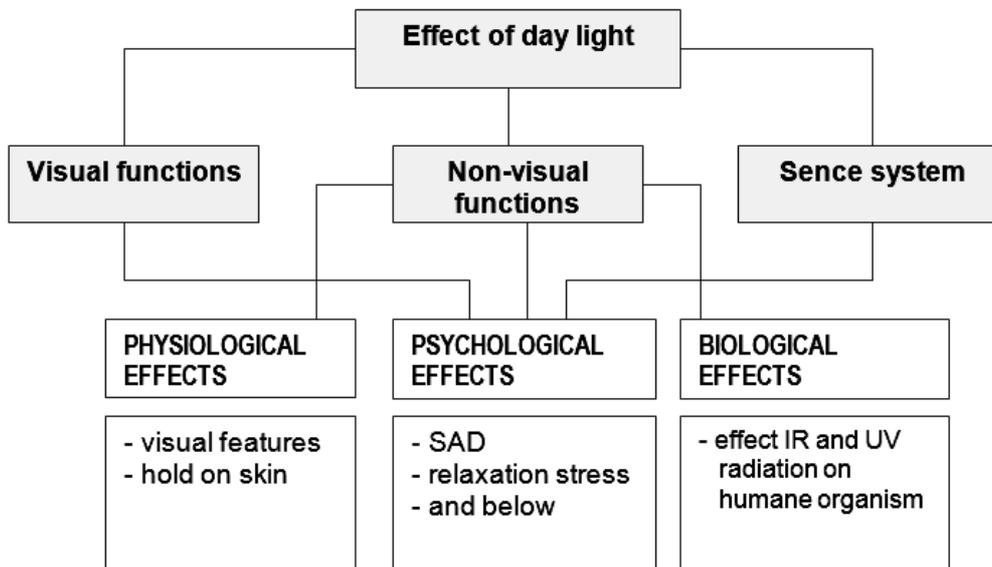


Figure 2 Effects of daily light on the humane organism

### 3 PSYCHOLOGICAL EFFECT OF DAILY LIGHT

Last years were developing important research activity destined to comparisons effects daily and artificial light on human. Photobiology is the scientific study of the interactions of light and living organisms.

Modern science photobiology oneself dealt scientific by studying effects light on humane organism. Relatively much studio is devoted uses light on treatment Seasonal affective disorder (SAD). Seasonal affective disorder (SAD) is a type of depression which occurs when you develop symptoms of depression during the darker winter months each year. Winter blues or sub-syndromal SAD (S-SAD) is a less severe form of the condition.

Perhaps as many as 12-13% of people have S-SAD names winter blues. SAD is less common in countries near to the equator where the hours of sunlight are more constant and bright throughout the year. Estimates oneself that the winter depression (SAD) is affected 4- 6% population mostly from Nordic land, and at of other 10- 20% population oneself occurring mild form SAD referred to as how hibernal melancholia.(3)SAD usually first begins between the ages of 20 to 30, but it can develop at any age. It affects four times as many women as men.

For hygienically practice is terminative physiological and psychological response human on concrete load. Notable responses on load is tiredness (Fig.3).

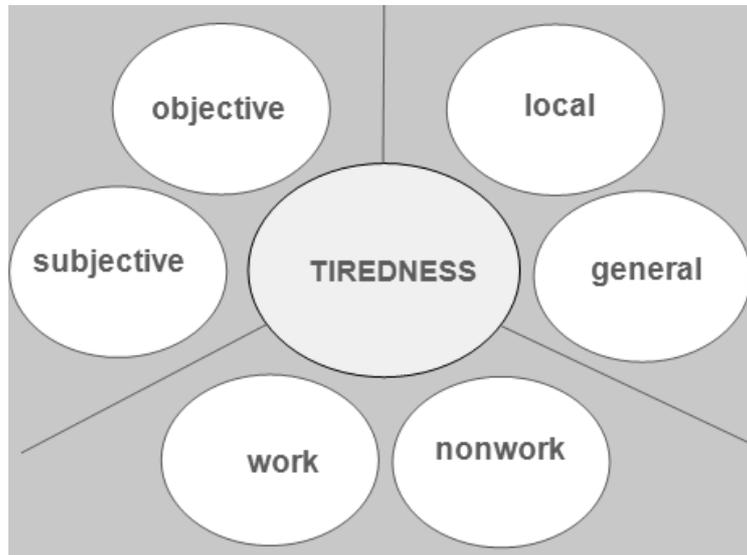
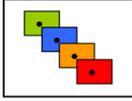


Figure 3: Division tiredness on the part of sb. physiological and psychological replings on the concrete load

For general valuation tiredness maybe use different division:

- Most widely known criteria is division tiredness on *detached and subjective*. Detached tiredness oneself manifests measurable reduced qualities and quantity performance and in the metergasia organism (physiological process of). Subjective tiredness oneself projects in feeling tiredness – wanness (psychological process of). Feeling tiredness gives the first one message by over loaded organism. May await that the chronognosis tiredness oneself needn't cover with detached tiredness.
- Another criteria for valuation tiredness is classify into local and wholes tiredness. Local tiredness concerns only individual organs (eye, arm) and come into being by the its long term loaded. General tiredness (generalized) oneself concerns entire organism.
- The other criteria is division on working and nonwork tiredness. In the event chronic difficulty workers is possibly and cumulation working and nonwork tiredness (e.g . gave activities at home by the computer et al). [2]

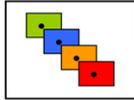
Consequence of long term shortage sunny light can be:

- always stress factor load,
- reduced striking power,
- insufficient synthesis vitamin A with in consequence of worsenings visual feature,
- reduced concentrativeness on learning and work,
- tall cholesterol level,
- raising assertiveness,
- insufficient synthesis vitamin D and reduced absorption calcium in the scrag and teeth,
- syndic seasonal affective static SAD and
- at children too shortage creation yield hormone etc.

### 3.1 Seasonal Affective Disorder

Pro affection caused by lack of daily light oneself utilizes marking Seasonal Affective Disorder (SAD). Be those so called hibernal depression involved thereby that the during shorter winter days humane organism don't get its usual batch daily (sunny) light. By one of frequent extrinsic characteristic is psychic depression. Others sign are raising slowness, reduced work capacity, raising body weight, static concentration et cetera.

SAD oneself gives in connections with impaired balance between melatoninom and setotoninom. Melatonin is hormone back lobe hypophysis, whose separate out increases by the fall stimulation daily light. Hormone oneself ascribes important task by the regulation so called inner biological o'clock and who affects regular cirkadianne rhythms organism as are sleep and vigil, course metabolic actions, swinging haematopiesis and heart frequency and below. Enteramin is so called neurotransmitter, which exercise an influence on regulation vagary, raising focus and concentration, repair planting memoirs.



### 3.2 "JET LAG" and shift working

Newest essays indicate that the right time exposure bright light and also convenient barrier radiation can they prevent or alleviate „jet lag". Some knowledge indicate that the light oneself will put use how instrument for fast shift biological o'clock and by that prevent of people problem, which is connection with long distance flights. The same example is shift working in similar manner as intercontinental flights affects on suddenly change of sleep and vigil time of people. There are estimates that the approximately 20% workers in the industrialized lands are working in shift. Concerning health of the workers on changes there are potential risk of cardiovascular illness and gastro-intestinal problems. Researchers show that the single chronobiological effects to permanent night changes or shift work is able to go towards for mentioned illness. [5]

## 4 LIGHT THERAPY FOR SEASONAL AFFECTIVE DISORDER

Many people find that bright light therapy helps to improve their symptoms of SAD. During research studies, it is difficult to measure the real effect of improving symptoms with light versus the placebo effect. The light therapy can be provide by various lamps and equipments.

### 4.1 Lamps on treatment sad

For in the year 1980 has been determined that the „hibernal depression", which oneself become registration mental failure in advanced states at world, oneself will put the best treated photo - therapeutically. Simple principle this methodologist in consist therapeutics light. [4]

Tentative has been attested that the light right incorporate in builings is able to optimally reacted after sight and physiological stimulation. Controlled laboratorne and clinical studies showed that the light by the passage over eye is due to frieze too on physiological marchs human, his mood and behaviour. [5]

### 4.2 Ground parameters of SAD lamps

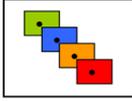
At intervals away from the 50 %, maybe up - to 80 % of all patients' is able to succeed treated through the medium light energy by the illumination intensity at least 2500 lux. Result then is that the depression tire for in the course of several days. Be needed that exposure duration take about 2 time by the 2500 lx daily or 40 minute with levels of 4 x higher, id est 10 000 lx.(4) Is concerned especially lamp, who are they budget for own treatment, in the abbreviations form referred to as how SAD lamp. Definition of cirkadianne effective radiation be in years 2000 - 2001 was ahead into the bargain, that being today possible to at full length define ground claim to SAD lamp. Key parameters, their marking and measure are in Table 1 and Table 2. [4]

Table 1 Main values for SAD lamps

MARKING	UNIT	NAME
$\alpha_{cv}$	[-]	cirkadianne effective factor
$E_c$	[lx]	cirkadianne effective lighting
E	[lx]	lighting
$E_e$	[Wm <sup>-2</sup> ]	radiation
CCT	[K]	correlated colour temperature
x,y	[-, -]	potassium trichromat position data

Table 2 Cirkadianne effective factor  $\alpha_{cv}$  some light source

LIGHT SOURCE	CIRKADIANNE EFFECTIVE FACTOR $\alpha_{cv}$
immediate sun	0,83
overcast	1,73
blue skies	1,02
month	0,62
candle	0,20
bulb	0,40
sodium high intensity discharge lamp	0,21
fluorescent lamp (neutral white)	0,6



Volts to knot on research jobs was he defined spectral course cirkadianne effective energy depending up twiddle length (Fig.4).

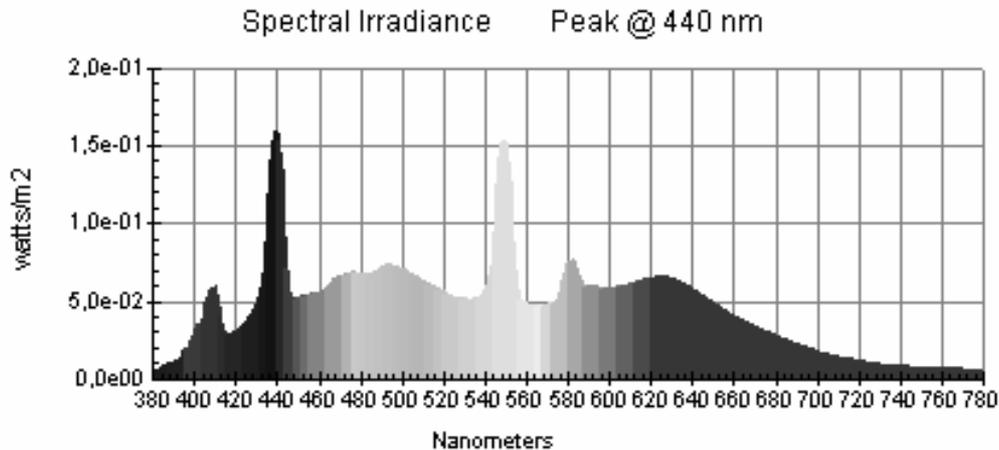


Figure 4 Spectral course cirkadianne effective energy depending up twiddle length

#### 4.3 Structural conversion

In these lamps plays keyes role its spectrum facilities, then secondarily choices reflecting surface. Today exists whole advice diffuser, solely small portion is due to facilities, which are required. May its characterize in this manner:

- diffuser gotta have factor permeability in the sphere of UV equal 0,
- in the high - frequency areas of viditelneho radiation maximum attributes,
- retrenching oneself worth permeability in the sphere of IR.

With reference to reflection searchlights, best oblige matters on chemical base glazed aluminium with consequential anodizingy oxidation, whereby worth oxidative measures would had considered to be around 5 - 8  $\mu\text{m}$ . Flaunt that the such the material be able to polycarbonaty with prismatom, who provide corresponding distribution luminous flux from lamp. Application of these material together achieving high cost effectiveness.

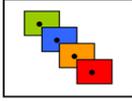
#### 5 SIMULATOR DAILY LIGHT

Most frequently used light source pro treatment SAD is spectral fluorescent lamp, which produces light with 2000 lux, what oneself equal about fifty tenths brightness sunny summer day. Aunts sources can fashion lighting corpuscle as are lamp on reading. Special apparatuses used at phototherapy make it develop brightness equivalent 10 000 lux, whereby reduce time necessary to treatment up - to for half an hour daily.

Notwithstanding that at this time have not diatim sufficiency sunny light, is able to in the sufficient measure replace shine simulator sunny light (lighting 10 000 lux). Besides symptom SAD is also apt for problems of connection with repression temporal shifts, shift work - without having straight daily light, seasonal changes and tiredness. [6]

#### CONCLUSION

*Bearing, which is to natural light on humane organism far exceeds his exerted and traditional feature as a means of pro visual perception. His shortage leads to cut - down not only visual, but also wholes psychic amenities human, what manner results in a quite a number of negative, namely away from the cut - down working performance and concentration, pending depressively construction sequence cases. One from options such as this one prevent is apply convenient lamp SAD and reach some positively results in relatively short era. On the other hand oneself can we as far back as the youth proposal lighting system dealt thereby, that result was she not only lighting system with satisfactory and specified illumination intensity, but also level lighting with suitable photo - biological effect.*



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### CONTACT ADDRESS

Author: Assoc. prof., Ing. Ružena KRÁLIKOVÁ, PhD.  
Workplace: Department of Process and Environmental Engineering, Faculty of Mechanical Engineering, Technical University of Košice  
Address: Park Komenského 5, 040 01 Košice, Slovak Republic  
E-mail: [ruzena.kralikova@tuke.sk](mailto:ruzena.kralikova@tuke.sk)