

HYGIENE OF WORK

Hygiene of work – it is part of hygiene, investigating influence of work process, professional harmful factors on organism of working and prevention professional (occupational) diseases

MAIN DIVISIONS OF HYGIENE OF WORK

- **Physiology of work**
- **Hygiene of work with harmful physical professional factors** - (noise, vibration, electromagnetic fields)
- **Radiation hygiene**
- **Hygiene of work with industrial poisons** - industrial toxicology
- **Hygiene of work in agriculture with agro-chemicals** - agricultural toxicology
- **Hygiene of work in conditions of dust pollution of air**
 - prevention professional dust pathology (phneumoconiosis)

There is also division on industries (chemical, mining, metallurgical, building etc.) and in agriculture.

PROFESSIONAL HARMFUL FACTORS AND OCCUPATIONAL DISEASES

Professional harmful factors (PHF) – it is factors, influencing on working people and capable to cause violations of health - **occupational diseases**.

Occupational diseases – it is such diseases, for which it is proved aetiologic and pathogenic role of professional harmful factors.

Doctors, learning and treating occupational diseases, named professional pathologists.

Classification PHF.

The Dangerous professional factor - can cause acute violation of health (acute occupational disease) or death of the person

The Harmful professional factor - can cause chronic violation of health - chronic occupational disease

Classification PHF:

- 1. Psycho-physiologic and physical factors of the organization of work, the lacks of workplace and the equipment**
- 2. Physical professional factors**
- 3. Chemical professional factors (industrial poisons)**
- 4. Biological professional factors (microbes, allergens)**
- 5. Industrial traumatism (mechanical, thermal, electric trauma).**

MAIN RULES OF DIAGNOSTIC PROFESSIONAL PATHOLOGY

ACUTE PROFESSIONAL DISEASE

Diagnosis must put any doctor of any medical establishment

2. He must write **Emergency notice about acute professional disease (poisoning)** and send to department of hygiene of work of SES

3. Doctors of SES after receiving this notice during 24 hours must go to enterprise to investigate conditions of work (presence harmful factor at a level, more, than MPC)

CHRONIC PROFESSIONAL DISEASE

- 1. Diagnosis can put only doctor of the special department of professional pathology (in Kiev, Charkov)**
- 2. List of such patients this department send to SES**
- 3. Doctors of SES during 7 days must go to enterprise to investigate conditions of work (presence harmful factor at a level, more, than MPC)**

Final diagnosis of chronic professional disease can be put only after conclusion of SES.

Purpose, kinds and the organization physical examinations working.

Preliminary physical examinations - for again acting for work with harmful and dangerous working conditions with the purpose:

- a) To admit to work only those which state of health completely meets the requirements of a given trade,
- b) To not admit to work the persons having deviations in health which can amplify under influence of working conditions, and also those who can be a source of infectious or parasitic illnesses.

Periodic physical examinations - regular medical inspection working in harmful or dangerous conditions. Periodicity of them is determined by the order № 45.

Tasks of these physical examinations:

- a) To reveal early attributes of occupational diseases
- b) To reveal the general diseases interfering the further work
- c) To appoint individual treatment and prophylactic actions.

Concept and classification occupational diseases.

The occupational disease (poisoning) - disease for which it is proved connection with action professional factors.

**In the order № 45 it is given
Names of occupational diseases - 27 diagnoses
(pneumoconiosis, noise, vibrating illness etc.,
sharp and chronic poisonings)**

Diagnosics and prevention professional pathology

The Order of Ministry of Public Health of Ukraine № 45, which contain:

- 1) The list of manufactures and trades for which preliminary and periodic physical examinations working are obligatory
- 2) The order of realization such surveys, structure medical commission for surveys
- 3) The list of medical contra-indications for reception at various kinds of manufactures
- 4) The list of diagnoses of occupational diseases and poisonings

ACTION HARMFUL PHYSICAL FACTORS ON THE PERSON

NOISE AS THE HARMFUL FACTOR OF ENVIRONMENT

NOISE – it is inordinate sound oscillations with frequency, heard by the man (20 - 20000 Hz), acting at the man in work time, rest or dream.

CLASSIFICATIONS NOISE

BY SOURCES OF NOISE:

Household, transport, industrial, building

BY FREQUENCY:

- low-frequency - up to 400 Hz
- middle - 400 - 1000 Hz
- high-frequency - more than 1000 Hz

BY DURATION IN TIME:

- stable - fluctuations level of noise no more than 5 dB
- unstable - fluctuations level of noise more than 5 dB
- impulsive - intermittent

UNITS OF MEASUREMENT OF NOISE

BAR - unit of sound pressure (10^{-6} atmospheric pressure)

BELL - logarithmic unity between limit of perception of sound (0 Bell) and pain limit (14 Bell):

Level of noise

$$\text{BELL} = \lg \frac{\text{Level of noise}}{\text{Limit of perception of sound}}$$

DeciBELL (dB) – 1/10 part of BELL (range of hearing noise 0 – 140 dB)

FON - unit level of sound at 1 dB at frequency 1000 Hz

SON - comparative unit of level of different by frequency sounds

STAGES OF NOISE ILLNESS

(Are studied at audiometry - definition acuteness of audition)

1. **NOISE (ACOUSTICAL) ADAPTATION –**

decrease acuteness of audition on 10 - 15 dB during 1-3 minutes – it is physiological phenomenon

2. **NOISE (ACOUSTICAL) FATIGUE –**

decrease acuteness of audition on 20 - 30 dB during hours or days after cancellation of noise

3. **PROGRESSING DEAFNESS –**

gradual complete loss of hearing because organic changes at the center of audition in CNS

PROPHYLACTIC MEASURES HARMFUL ACTION OF NOISE

- 1. Administrative - state measures (laws on preservation work)**
- 2. Architectural – planning measures**
- 3. Hygienic measures - preventive and current sanitary control levels of noise in cities, inhabited premises**
- 4. Medical-preventive measures**
- 5. Technological measures**
- 6. Individual means of protection (headphones etc.)**

MAXIMAL PERMISSIBLE LEVELS OF NOISE FOR VARIOUS PREMISES

Kind of
premise

	MPL, dB	test of harmful activity
Inhabited rooms	30	conservation
Wards in hospitals	25	support treatment - protective regimen
Educational rooms	50	conservation perception of the information
Industrial premises	65* - 85	prophylactic of noise illness

The note: * - for high-frequency noise

VIBRATION AS THE HARMFUL PROFESSIONAL FACTOR

Vibration – it is oscillations of the elastic bodies with frequency more than 1 Hertz (1 oscillation in 1 sec.)

CLASSIFICATION VIBRATION:

GENERAL
LOCAL

ON FREQUENCY:

Low-frequency
Middle-frequency
High-frequency

ON DIRECTION:

Horizontal
Vertical

STAGES VIBRATORY ILLNESS at action common vibration

- 1. Small pains and parestesia of extremities**
- 2. Expressed parastesia, decrease sensitivity of a skin**
- 3. Vascular and trophic violations of dactyls, changes of CNS**
- 4. Generalized sharp vascular violations, vessel spasms of heart and CNS**

DEGREES OF VIBRATORY ILLNESS at action local vibration

- 1. Peripheral angiodystonic syndrome, sensory polyneuropathia dactyls of hand**
- 2. Expressed angiospastic syndrome dactyls of hand**
- 3. Expressed generalized angiospastic syndrome, dystrophic changes of bones, muscles of arms, deformation joints of dactyls of hand**

CLASSIFICATION ELECTROMAGNETIC FIELDS (EMF)

EMF – complex of electrical (EF) and magnetic fields (MF)

NATURAL EMF:

1) MF of the Earth - 400 Amper / meter - depends on geographical position, season and day, solar activity ("magnetic storms")

2) EF of the Earth - 130 Volt / meter at surface of the Earth, is reduced with height

ANTHROPOGENIC (TECHNOGENIC) EMF:

- 1) Electric Static Fields (ESF)**
- 2) Stationary Magnetic Field (SMF)**
- 3) EMF industrial frequency - 50 Hz**
- 4) Infrared, visual, UV, laser radiation**
- 5) EMF radio frequencies.**

CLASSIFICATION EMF RADIO FREQUENCIES

Kind application	length of wave	sources,
Low-frequency	1-10 kms	broadcasting, radio
Middle	100m - 1 km	- " -
High	1 - 100 m	- " -
Ultra-High	10 cms - 1 m	radio, TV, medicine
Super high frequencies (MICROWAVE)	1 - 10 cm	radiolocation, television MICROWAVE OVEN
Hyper-high frequencies (HHF)	1 mm - 1 cm	industry

BIOLOGICAL EFFECTS OF EMF

DEGREE biological effect EMP depends from:

- Frequency (than above, the more strongly effect)**
- Intensity**
- Exposure time**
- Character of irradiating (continuous, modulated)**
- Regimen of irradiating (constant, intermittent, periodic)**

MECHANISMS ACTION EMF

- 1. HEAT EFFECT (at very high radiation intensity)**
- 2. NOT THERMAL EFFECT (small levels of action) – formation oxide and non-oxide radicals and other biologically active products**

CLINICAL PICTURE OF ACTION EMF:

- Asthenic syndrome**
- Asthenic-vegetative syndrome**
- Diencephalic syndrome**
- Damage systems: cardiac, hemopoiesis, immune, endocrine etc.**

At chronic action the cumulation harmful effects EMF is possible.

THE FORMS OF PATHOLOGICAL ACTION

EMF:

- 1) Acute and chronic form
- 2) Mild, medium and serious degree

MICROWAVE - SYNDROME:

- 1) Violations of CNS
- 2) Turbid crystalline lens (cataract)
- 3) Damage hair follicles (baldness)

Besides: changes cardiac system, violations of blood-forming, dysfunctions of immune, endocrine systems, remote effects.

PROPHYLACTIC OF HARMFUL ACTION EMF

For working with sources EMF, especial MICROWAVE EMF

4 PRINCIPLES PROTECTION from electromagnetic radiation (including ionization radiation):

- 1) Protection by dose or amount (MPL)
- 2) Protection by distance
- 3) Protection by time
- 4) Protection by screening

BASE DIRECTIONS PROPHYLACTIC HARMFUL ACTION EMF:

- 1) Administrative measures for guarding work - cutting working time (protection by time)**
- 2) Architectural – planning measures - sanitary - protective zones from sources EMF, correct placement sources EMF from other objects (protection by distance)**

3) Hygienic measures:

a) Preventive sanitary control - substantiation MPL EMF (protection by dose):

- In industry - MPL for a working day - 2 Watt in hour / m²**
- For the population - MPL inside inhabited buildings - 0,5 kiloWatt / m,**
- In territory of inhabited building - 1 kw / m,**
- Outside of inhabited building - 5 kw / m,**
- Near lines of electricity - 10 kw / m**

b) current sanitary control - check keeping MPL, hygienic prescriptions etc.

4) Medical-preventive measures - physical examinations working and population, treatment-improving measures

5) Technological measures - change technology for drop level EMF, protection by screens.