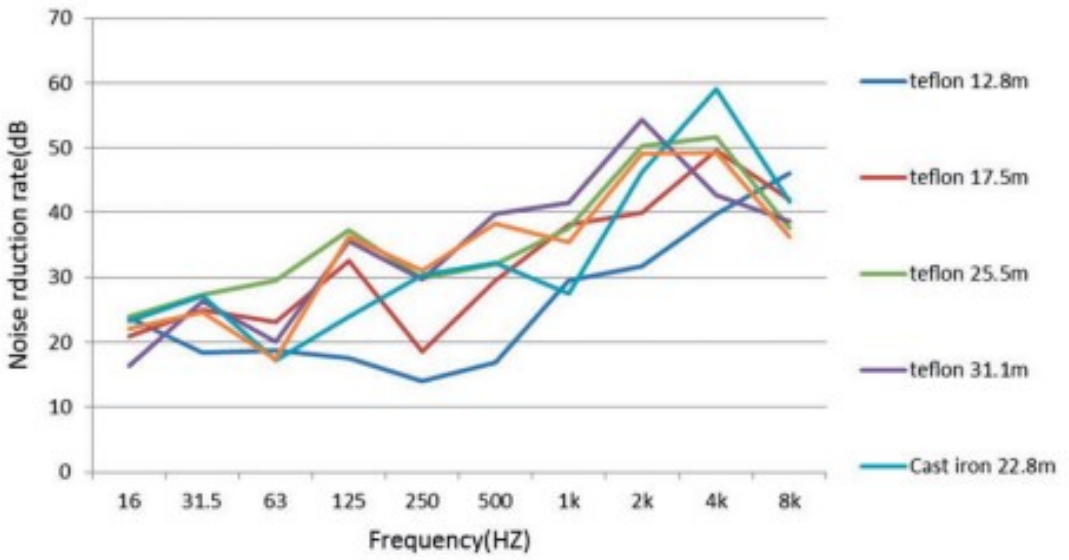

Fig. 1. Rate of sound attenuation (dB) in octave frequencies at different distances in simulated ear canal

As any object facing a sound, the ear acts as a passive filter. A passive filter is a low pass: the high frequencies are more absorbed by the object because high frequencies impose a higher pace of compression–decompression to the object. A contributing factor to this filter system is the contraction of the middle ear muscles which attenuate transmission of sound in the lower frequencies. Since sound level attenuations are different under different conditions at different distances of the simulated canal, the canal length can indicate the reason for the differences in related problems and harms in individuals. Results showed that as the distance between the earplug and the microphone increased, the sound increased up to a distance of 25.5 mm, and after this distance, the sound level had a decreasing trend, especially for frequencies under 500 Hz. The results of this study devoted to the analysis of the damping rate of earplug at different distances of its placement in the ear canal showed that when the distance of the earplug in the ear decreased, the rate of sound attenuation also decreased. This decrease was larger for the frequencies up to 1000 Hz and smaller in comparison with higher frequencies of 2000 Hz.

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STUDY OF WATER CONSUMPTION, POLLUTION, AND OTHER ANTHROPOGENIC INTERVENTIONS IN RIVER ECOSYSTEMS AND DEVELOPMENT OF CONSERVATION STRATEGIES

The study of water consumption, pollution, and other anthropogenic interventions in river ecosystems, as well as the development of strategies for their conservation, is of great importance. River ecosystems are a key element of the natural environment that determines not only the quality of life for humans but also for various plants and animal species. However, population growth, industrialization, and inefficient water use lead to serious anthropogenic interventions in river ecosystems, threatening their

stable functioning. In this context, the study of the effects of water consumption, pollution, and the development of conservation strategies for river ecosystems becomes crucial.

Water consumption in modern megacities and rapidly developing regions is one of the key problems seriously affecting river ecosystems. The continuous growth of the population and intensification of economic activities lead to unstable and inefficient use of water resources, critically impacting the environment.

One of the main problems is the insufficient volume of water to meet the needs of the population, industry, and agriculture. Megacities, in constructing their infrastructure, extensively use water for various purposes such as drinking water, industrial processes, and meeting agricultural needs. This often results in exceeding the natural capacity of water bodies and sources, leading to their depletion [1].

Misuse of water resources is also a problem that requires attention. For instance, a significant portion of water may be lost through water supply and sewage systems due to technical deficiencies or inefficient management of water-consuming enterprises.

This directly impacts river ecosystems. The decrease in the groundwater level leads to the drying up of water bodies and aquifers, threatening the life of aquatic organisms and plants. Changes in water consumption patterns affect the balance of ecosystems, contributing to shifts in the distribution of water resources and the structure of ecosystems.

To solve these issues, it is necessary to implement sustainable water use strategies aimed at optimizing the use of water resources and reducing the negative impact on river ecosystems. It is also important to develop technologies for wastewater treatment and support natural balance in river areas through the preservation of natural corridors, restoration of riparian zones, and regulation of water regimes through natural methods [2].

The overall goal is to ensure a balance between the needs of society and the preservation of nature to provide stable and healthy river ecosystems for future generations.

Anthropogenic emissions and discharges of water-consuming and industrial wastewater are one of the main causes of river water pollution. This leads to a decrease in water quality, poisoning of aquatic organisms, and deterioration of the health of people who depend on these waters.

Pollution of river waters by anthropogenic discharges can result in the poisoning and death of aquatic organisms. Fish, aquatic invertebrates, and plants can be particularly vulnerable to these pollutants. Toxic substances can accumulate in organisms and pass through the food chain, opening pathways for the spread of hazardous compounds in the aquatic environment.

People who use contaminated river waters for drinking, irrigation, or other domestic purposes may face serious health problems. Toxic substances, such as heavy metals or chemical pollutants, can negatively affect human organs and systems, including the kidneys, liver, and nervous system.

Construction of hydrotechnical structures, such as dams, embankments, canals, and other engineering facilities, is an essential component of modern development. However, it can simultaneously have a significant impact on river ecosystems, disrupting their natural processes and balance [3].

One of the main problems is the alteration of the hydrological regime of river systems. Dams and embankments can impound water, creating large reservoirs. This leads to changes in water levels and river flow both upstream and downstream of the structure, affecting water resources and biodiversity.

The migration of aquatic organisms becomes problematic due to obstacles created by hydrotechnical structures. Many fish species have natural migration routes for reproduction and food seeking. Dams and embankments can block these routes, hindering the normal functioning of the ecosystem and leading to a decrease in populations of certain species.

The flooding of large areas is also a consequence of hydrotechnical construction. This can result in the loss of natural landscapes, including wetlands and coastal zones that are crucial for species diversity.

Additionally, hydrotechnical structures can contribute to erosion processes. The altered river flow regime resulting from construction can cause weathering and soil removal in river areas, impacting riverbanks and coastal zones.

To mitigate the negative consequences of hydrotechnical construction, it is crucial to consider ecological aspects and develop strategies aimed at preserving river ecosystems. This may involve the use

of technologies to reduce the impact on aquatic organisms, consideration of natural river flows, and restoration of ecologically important areas.

Preserving river ecosystems requires the implementation of comprehensive strategies that take into account the needs of both the population and nature. This includes rational water use, the implementation of effective wastewater treatment systems, restoration of natural river landscapes, and addressing issues of anthropogenic interference.

Conclusion. Studying the effects of water consumption, pollution, and other anthropogenic interventions in river ecosystems is a crucial stage in understanding the problem and developing effective solutions. Combining scientific research with practical measures is necessary to ensure sustainable development in river regions and preserve natural ecosystems for future generations [1,2,3].

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HUMAN AND ENVIRONMENT. OCCUPATIONAL HEALTH

Environmental protection and occupational health are two interrelated areas that play a crucial role in ensuring human well-being and sustainable development. Environmental hygiene focuses on the effects of the natural and anthropogenic environment on human health, while occupational hygiene is concerned with the health and safety of workers in workplaces. Recognizing and addressing the interrelationships between these two areas is essential to creating a healthier and more sustainable future.

1. The Design of Work Environments Directly Impacts Worker Health: Poorly designed workplaces with inadequate ventilation, excessive noise, or ergonomic inefficiencies can lead to a range of health problems, including musculoskeletal disorders, respiratory illnesses, and hearing loss. Implementing evidence-based design principles that prioritize worker well-being can significantly reduce these risks [1, 2].

2. Environmental Hazards in the Workplace Contribute to Chronic Health Conditions: Exposure to occupational hazards such as chemicals, dust, and radiation can increase an individual's susceptibility to chronic illnesses like cancer, heart disease, and lung diseases. Proactive monitoring and mitigation strategies are crucial to protect workers' long-term health [3, 4].

3. Mental Health Challenges are Increasingly Recognized as an Occupational Health Issue: Stress, anxiety, and depression are prevalent among workers due to factors like demanding workloads, long hours, and lack of control. Integrating mental health awareness and support into occupational health programs can improve employee well-being and productivity [5, 6].

4. Climate Change Poses Emerging Threats to Occupational Health: Rising temperatures, extreme weather events, and changing air quality can introduce new hazards to outdoor work environments.