

The biosphere reserve project is attractive, because the conditions for farming and nature conservation for biosphere reserves are flexible and functional, and they were developed by UNESCO. The project provides for the maintenance of traditional farming in certain areas, and on the other hand – the preservation of nature, scientific research, monitoring, educational projects, informing society and coordinating the work of various organizations in this territory.

According to the Ministry of Natural Resources, the territory of the future Chernobyl biosphere reserve will be zoned: in certain areas only scientists will be allowed. Other areas will be visited by tourists, but there will be no economic activity. They will be part of the reserve and the territory where limited economic activities are permitted, including timber harvesting. Industrial sites of the Chernobyl NPP and other enterprises in the reserve will not be included.

References:

1. <http://chernobylplace.com/chernobyl-recovery-plan/>
2. <https://ecoplanet777.com/en/nature-returns-to-the-chernobyl-exclusion-zone/>

ENGINEERING ADVANCEMENTS IN HEALTHCARE, ENVIRONMENT PROTECTION, AND ARCHITECTURE

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Engineering is the knowledge and practical skills required to solve problems. For decades, engineering, which has evolved and branched out continuously, has helped humanity survive and improve the quality of life. “Whatever problem arises, it takes engineering science to solve it,” experts say. “The most urgent task for humanity today is to develop along a path that would not lead to the destruction but to protection of the planet. And here engineering plays a central role.”

In *healthcare* alone, engineering advances have improved water quality and sanitation, and many diseases have been eradicated, including typhus and cholera. More and more advanced prostheses, hearing aids, pacemakers, computer diagnostics, laser and microcamera surgery – all this became possible thanks to the work of engineers.

Among the recent advances in healthcare engineering, some of the most interesting are:

Autonomous power systems Powerwall. The head of the American company Tesla Motors Elon Musk said at a press conference that he is starting

the mass production of powerful lithium-ion batteries Powerwall, which can accumulate a large charge and gradually give it to the network as needed. The widespread adoption of this device has the potential to completely transform power distribution mechanisms in the future. Batteries are already being produced and used in the famous Volta series electric vehicles.

Bionic lenses, which will end cataracts and myopia. Canadian optometrist Dr. Gareth Webb has invented a new bionic lens system that allows a person to achieve three times the visual acuity of normal. The Ocumetics Bionioc Lens System is transplanted into the eye in a simple and painless surgical procedure that takes eight minutes. A tiny biomechanical camera built into the lens allows changing the focal length faster than a healthy eye.

California-based Tri Alpha Energy, which until now few have heard of, has made a step towards a working fusion reactor. It achieved major success in confining plasma at temperatures as high as 10 million degrees Celsius.

The company's experimental thermonuclear facility uses not external magnets, as in the Tokamaks, to confine the plasma, but beams of charged particles that are fired into the plasma and create a holding "cage" around it. The researchers managed to achieve a plasma confinement duration of 5 milliseconds, which is the largest breakthrough in the field of thermonuclear research.

Ecological problems are of great concern now. Currently, most often, environmental issues are understood primarily as issues of *environmental protection*. In many ways, this shift in meaning was due to the increasingly tangible consequences of human influence on the environment. Interesting advances in engineering in this area are:

In Sweden, only 4 % of garbage is buried in the ground, the rest is recycled. In recent years, Sweden has been importing garbage from other countries in the amount of 80 thousand tons per year, most of it from Norway. Moreover, the Norwegians themselves pay for the removal of this waste, the Swedes receive electricity, and the remaining ash with a high content of toxins and heavy metals is sent back to Norway for burial.

The renowned American musician, producer and designer Farrell signed a contract with the Dutch denim brand G-Star Raw in 2014. Together, they created a clothing line made from plastic waste found in the waters of the world's oceans. The eco-collection was named "Raw materials from the oceans", and a funny octopus became its symbol.

World renowned company Adidas presented sneakers that are made entirely from plastic waste found in the ocean. Thus, the sports brand continues to amaze its fans with stylish and unusual novelties and also fights for the purity of the environment.

Architecture. When developers, architects and buyers get tired of the massive construction of the same type, there is a justified idea to create something unconventional, original and memorable. True, it is not at all a fact that such an unusual building will be acquired in an instant by some real estate

collector. But the fact that it will be remembered, will make a proper impression and will certainly go down in architectural history – this is absolutely certain.

Amazing achievements of modern architecture:

Mary Ax Tower, 30 or Saint Mary Ax, 30 is a skyscraper in London, which is one of the main modern landmarks of the city. The skyscraper surprises with its unusual structure, which is made in the form of a mesh shell with a central support base. It was built with consideration for the laws of aerodynamics. The bob-shaped structure is resistant to wind loads and therefore reduces wall loads, frees up large spaces inside the building and even allows skyscraper windows to be opened. The tower is made entirely of glass, has a height of 180 meters and has 41 floors, has an oval elongated shape, and it is slightly widened in the middle. Due to the round shape of the tower, the wind smoothly bends around it, and therefore pedestrians are not threatened by sudden gusts of wind, as is the case with rectangular skyscrapers. The building is faced with 745 glass panels, their area is equal to 5 football fields.

References:

1. <https://news.un.org/ru/story/2021/03/1398002>
2. <https://vestnik.icdc.ru/index.php/live/1469-uran-glavnyj-element-atomnoj-energetiki>
3. <https://infourok.ru/dostizheniya-nauki-v-ekologii-2468705.html>
4. https://www.bbc.com/russian/science/2016/01/161201_2015_science_yearender

ENVIRONMENTAL IMPACT OF THE SURROUNDING SURFACE ON HEAT TRANSFER AERODYNAMICS OF CONICAL CHIMNEY THERMAL POWER STATION

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Introduction. The safety of modern TPS significantly depends on the reliable operation of the whole complex of main and auxiliary equipment. Its periodic replacement and modernization apply only to the main equipment of TPS and do not apply to chimneys. This leads to the fact that currently the chimneys work with parameters for which they were not designed. This state of chimneys is largely detrimental to the ecological situation of the planet.

The aerodynamics of chimneys determines the thermal processes and conditions of moisture loss inside the pipe. The flow conditions are influenced